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ARCHITECTURE

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CONTRACT REPORTER.

VOL. LVIII.

THE

ARCHITECT

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CONTRACT REPORTER.

VOL. LVIII.

THE
ARCHITECT

AND

Contract Reporter.

A WEEKLY

ILLUSTRATED JOURNAL

OF

ART,

CIVIL ENGINEERING,

AND

BUILDING.

Alas! so is it everywhere, so will it ever be; till the Hodman is discharged, or reduced to hodbearing; and an Architect is hired, and on all hands fitly encouraged."—THOMAS CARLYLE.

VOL. LVIII.

JULY TO DECEMBER, 1897.

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THE ARCHITECT AND CONTRACT REPORTER. A JOURNAL OF ART, CIVIL ENGINEERING & BUILDING.

THE WEEK.

AFTER the resolutions adopted at the special meeting of the London County Council on Monday, the Works Department is not likely to cause much loss to the people of London, or at least until the so-called "Progressives" can once more become omnipotent. The susceptibilities of that party are not wounded, for the Works Department will continue to exist, although the Chairman says it is "practically extinct," but the members will enjoy a sort of sinecure. The first resolution adopted was as follows:—"That all works ordered by the Council to be carried out without the intervention of a contractor shall in future be carried out by the manager of the Works Department, who shall be responsible to the spending committee in the same way as a contractor would be, and that the finance committee shall have control of the finances of the department." It is not altogether clear how a manager can be made to bear an equal financial responsibility with a contractor, for the latter might have to expend a fortune in carrying out the conditions of a contract; but the intention, we suppose, is that the Council will look to the manager rather than to the Works Department, and if there are losses he runs a risk of dismissal. Through the next resolutions the ignoring of the Works Department will be extended:—"That any committee desiring to propose to the Council the carrying out of any works without the intervention of a contractor shall, in the first instance, obtain an estimate from the proper officer and then refer such estimate to the manager of the Works Department for his examination and report before reporting to the Council," and "That the works manager shall be responsible to the spending committee, and the committee shall report from time to time to the Council." The manager will, no doubt, have a difficult rôle to perform, for while he is supposed to be the officer of a department without power, he will have to carry out the demands of departments who are not supposed to have any acquaintance with works. The question must also arise whether, if one department can be carried on with an honorary committee, is it not also feasible, as well as economical, to adopt similar arrangements elsewhere? The extravagance and mismanagement of the Works Department may, therefore, eventually bring compensation by the simplifying of the whole system of administration in the Council. The legitimate contractor is also to have a chance, for such alterations can be introduced in "the conditions of contract as will insure fair and just treatment of contractors, and to remove the objections which many of the best London firms have to tender for the Council's work." It will, therefore, be possible to carry out municipal works on a honest basis, and without the necessity of sham profit and loss accounts or supplies to make up for deficiencies which dare not be revealed.

AN esplanade, promenade, or sea-wall in a watering-place is generally open for public traffic, and to that extent resembles a high road, but as carriage traffic is often disallowed, and the promenade is not necessarily in direct communication with main roads, there is some difference between it and a highway. The class in which one of these frontages is to be placed becomes important, especially when payment has to be made for repairs which become necessary by the encroachment of the sea. A case of the

kind has arisen at Sandgate. Part of the way known as the Esplanade, with its groyne, was washed away, and the reconstruction cost 6,000*l*. The local authorities claimed the amount from the County Council of Kent. The dispute was referred to an arbitrator appointed by the Local Government Board. He decided against the County Council for the larger part of the claim, the exception being a groyne and work in connection with it, which cost 1,500*l*. The County Council appealed. The Master of the Rolls, in giving judgment against the award, said under the Highway Acts it was never intended that the liability imposed upon the county to contribute towards the maintenance of main roads should include a liability to do so in the case of an esplanade or sea-wall such as the one which formed the subject of this arbitration. The promenade was built for the benefit of the inhabitants of the watering-place and as an attraction to visitors, and was not a "highway" for the use of the county generally. When the road was made a main road the sea had not encroached to the same extent as now, which rendered the question on whom lay the liability to repair damage done by storms from time to time a very serious one. In his opinion the local authority had no claim whatever against the County Council or those who happened to be on it for any contribution towards the expenses that had been incurred in repairs. The Lords Justices were of the same opinion. Judgment was therefore entered for the County Council of Kent, with costs.

IT is difficult to make paintings at a cheap rate which will combine accuracy of portraiture and picturesqueness. Mr. J. S. PHIPPS wished to have a sort of hunting scene at Burnham Beeches, and a coaching picture. One was to cost 150 guineas and the other 50 guineas. Instead of dealing directly with an artist or artists, he gave the commission to Messrs. M'QUEEN, of the Haymarket. They employed Mr. HARRINGTON BIRD to paint the landscape, hounds and horses, and Mr. SPENCELAYH for the portraits. When the work was completed Mr. PHIPPS was not satisfied, for some of the figures were not, he considered, as accurate as he had anticipated. He therefore declined to take the pictures, and it became necessary to have recourse to the Law Courts. At the trial on Wednesday, Mr. BIRD said he showed defendant the pictures, and made alterations to please him. Mr. SPENCELAYH also said the portraits were properly painted, but in the case of small portraits it was impossible to avoid making them appear hard if details must be introduced. Mr. PHIPPS, the defendant, said it was arranged that the works were to be subject to his approval. Expert evidence was given on both sides, but the jury found a verdict for the full amount which was claimed. It is satisfactory to find a special jury showing so much good sense. To admit the plea that an artist must always please his patron would be fatal to art. Art is, or should be, the genuine expression of the artist's thought, and to compel him at his peril to rival the photograph in a mechanical or chemical reflection of a face would be degrading. The case suggests how little is known about the aims of painters among people who are believed to be educated. At the same time, it is unfortunate to find artists ready to produce portraits after two sittings of photographs are lent for their use.

CANTERBURY CATHEDRAL.

LAST week England was celebrating a reign which has lasted during sixty years. To-day a great many of the inhabitants may be said to commence the celebration of another reign which has existed for more than twenty times sixty years, and as yet exhibits no signs of decay. The visit of the bishops to Ebbs Fleet, the spot in the Isle of Thanet on which St. AUGUSTINE landed in 597, is a recognition of what may be called the beginning in an official sense of the Church in England. For the history of the primatial see of Canterbury can be traced from the time when St. AUGUSTINE took his seat as archbishop. There were already Christians in the city. According to BEDE, two churches were erected in Canterbury "whilst the Romans inhabited Britain," and it is supposed the still existing St. Martin's is one of them. Moreover, BERTHA, the wife of the Kentish King ETHELBERT, was a French princess, who on her marriage had stipulated for freedom to worship according to the Christian rites. It was in reliance on her power that AUGUSTINE was sent with forty Italian and Gallic monks by St. GREGORY THE GREAT to convert the Anglo-Saxons.

When the late Mr. STREET introduced a figure of St. GREGORY in the new porch of Bristol Cathedral, there was an outcry which amazed not only the architect and the cathedral authorities, but everyone who was acquainted with ecclesiastical history. For that Pope was the first man who was possessed of a belief in the future of the Anglo-Saxon race. From the moment when he made his memorable pun in the Roman slave market, and described the British children exposed for sale as angels rather than Angles, until his last days, Britain exercised a fascination over him which he never cared to conceal. His letters prove that every advance made by his representatives gave him exquisite pleasure. It was with a prophetic eye he fixed his gaze on the remote island amidst the western seas. It is manifest that AUGUSTINE and his followers were unable to understand the Pope's enthusiasm for so barbarous a race. The monks had not travelled far from Rome before they became alarmed at the perils awaiting them, and sought permission to abandon the enterprise. GREGORY proved he was entitled to be called "Servus servorum Domini," for instead of threats he appealed in the humblest way to the missionaries, imploring them to continue their journey. Evidently he was alarmed that his pet project would not be realised in his lifetime. Afterwards, when a footing was gained in Britain and the prospects of the Church were promising, we find AUGUSTINE, who apparently was one of those formalists who must have authority in writing for everything, demanding solutions of various questions which seemed hardly to belong to an infant Church. In reply GREGORY again shows his large heartedness, his desire to see the spirit rather than the letter of the law prevail, his tolerance of departures from ritual by the new converts. He went so far as to oppose the destruction of heathen temples, and suggested that it was preferable to purify them and convert them into Christian churches—advice which, if generally followed, would have preserved many relics of antiquity.

According to tradition, AUGUSTINE and his monks first settled in a street afterwards known as the Stable Gate, in the parish of St. Alphage, Canterbury. Apparently the bishops, or rather archbishops, lived for more than a couple of centuries with the monks in community. It is not related that AUGUSTINE built a cathedral, although full liberty was given to build and repair churches in all places. He is supposed to have employed for that purpose a basilican building which stood on the same site as the present cathedral. It is sometimes said the church of St. Martin was the original cathedral, but as it was soon found to be too small to accommodate the crowds of converts, King ETHELBERT assigned his palace to AUGUSTINE, who transformed it into a church, and dedicated it to OUR SAVIOUR. But it is impossible now to discriminate between statements which were merely traditional and those which are worth accepting as evidence. The Christian Church of Canterbury was in its early days enriched through the generosity of converts, not only with gifts in money but with landed estates, and, following the usual custom, a large proportion of the wealth would be expected to be devoted to building.

Yet there is no record of any building existing which would be worthy of an archdiocese. There is a mention of the Canterbury Cathedral in the tenth century, but it is puzzling. When ODO was transferred from Winchester in 941 he is said to have found the cathedral in an unsafe condition, for the roof was broken and the walls were falling. He at once commenced restoration. But when it is related in the same account that during the three years the works were in progress ODO's prayers were heard, and no rain fell in Canterbury, we seem to have no more than a pious legend to guide us, which may be figurative in its expression, and was not intended to serve as an illustration of architectural history. In 1011 there is a record which unfortunately seems to be probable. The Danes or Northmen are said to have attacked the church and set fire to it. The lead with which the roof was covered was melted and fell on the monks who found a refuge in the building. Those who endeavoured to rush forth were thrust back or slain. CANUTE, it is believed, endeavoured to make compensation for the misdeeds of his fellow rovers by restoring the cathedral, and gave back the revenues of which the monks were deprived during the wars. In those records it is assumed that the building which suffered was the basilica in which AUGUSTINE officiated.

A description by EADMER suggests there was a resemblance between it and some of the primitive Roman churches. The part used by worshippers was divided into a nave and aisles. At the extreme east end was an altar of unhewn stone which served as a shrine for the remains of St. WILFRID. Nearer to the congregation was the high altar at which service was celebrated daily. This part of the building was at a higher level than the nave. A space surrounded by a partition was assigned to the singers in the nave. Near the south entrance was a chapel which was sometimes used as a sort of law court. Against the west wall was placed the archbishop's chair, made of large stones set in mortar. There were also various altars and chapels in the building. The undercroft or crypt was formed with a vaulted roof, and extended beneath the eastern part of the building.

When WILLIAM THE CONQUEROR succeeded in his enterprise and was eager to have England organised, he fixed on LANFRANC the Lombard as the most capable ecclesiastic to rule in Canterbury. He was a type of the advanced Mediæval scholastic, and had served as professor, disputant, ambassador and abbot. It was with difficulty he could be persuaded to accept the archiepiscopal mitre. When he arrived at Canterbury the state of the cathedral made him despair of bringing it into a condition becoming the foremost church of the kingdom. The extent of his restorations is not clear from the record, and while some suppose that LANFRANC's operations were restricted to the superstructure, there are others who conclude that the crypt was also reconstructed by him, and that he created a new building. But as LANFRANC is said to have occupied no more than seven years with his works, it is difficult to realise how so much could be accomplished in so short a period.

According to GERVASE, the new church was marked in the centre by a tower supported by four immense piers. It was known as the "Angel Steeple," from a figure on one of the pinnacles. The nave was westward of the tower, and the roof was supported by eight pillars. Under the tower was the altar. Across the building was a rood-beam. In the south transept the organ was placed. In the north were tombs of some of the archbishops. There was a pillar in the middle of the transept, which was afterwards removed to afford space for the altar of St. THOMAS A BECKET. The crypt was approached by several steps.

ANSELM succeeded LANFRANC. For a time he made it a practice to expend his revenues upon the choir. By his orders the then-existing choir was removed, and under the superintendence of Prior ERNULPH another was commenced which surpassed all others in England. It was, however, completed by Prior CONRADE, with whose name it was associated in the chronicles. ANSELM did not live to see the beautiful choir in all its glory. It was dedicated during the episcopacy of WILLIAM CORBOIL, in the presence of the king and queen and DAVID OF SCOTLAND.

On December 29, 1170, the great tragedy was enacted which will make not only the cathedral but Canterbury

unforgettable as long as the world lasts. The tenure of office by THOMAS A BECKET was too precarious to allow him to exhibit himself as a lover of building. He did not enrich the cathedral. After the archbishop's murder the cathedral was closed by order of the Pope for a year or two. A fire which occurred in 1174 appeared to be a punishment

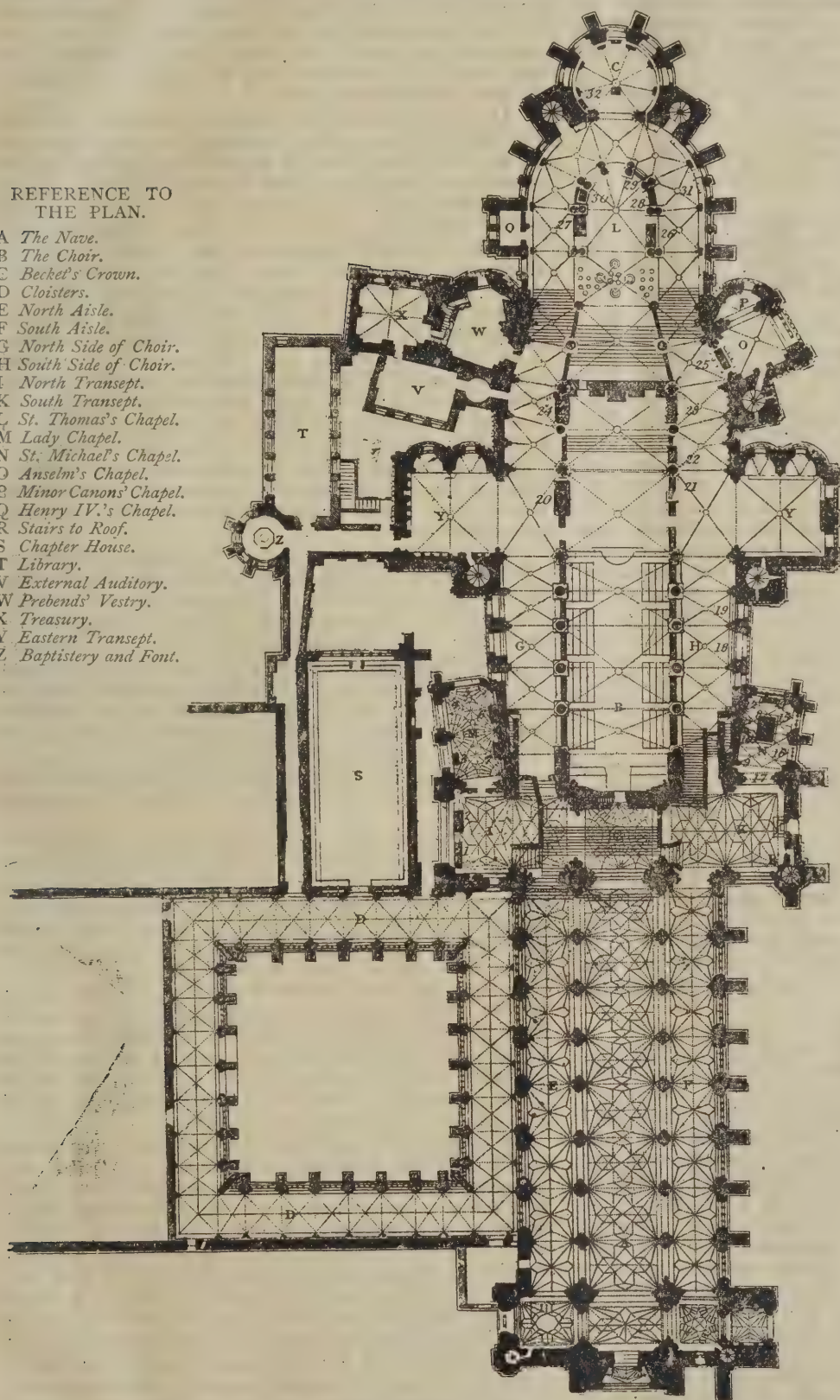
called WILLIAM. He was pressed to expedition by the monks, and in a year or two the choir rejoiced all eyes. The Englishman is also credited with the eastern transept, Trinity Chapel, Becket's Crown and the crypts beneath. With WILLIAM'S work we come to the end of the Norman style. There is much variety to be seen in the treatment,

REFERENCE TO THE PLAN.

- A The Nave.
- B The Choir.
- C Becket's Crown.
- D Cloisters.
- E North Aisle.
- F South Aisle.
- G North Side of Choir.
- H South Side of Choir.
- I North Transept.
- K South Transept.
- L St. Thomas's Chapel.
- M Lady Chapel.
- N St. Michael's Chapel.
- O Anselm's Chapel.
- P Minor Canons' Chapel.
- Q Henry IV.'s Chapel.
- R Stairs to Roof.
- S Chapter House.
- T Library.
- V External Auditory.
- W Prebends' Vestry.
- X Treasury.
- Y Eastern Transept.
- Z Baptistry and Font.

REFERENCE TO THE MONUMENTS.

- 1 Archbishop Peckham.
- 2 Archbishop Warham.
- 3 Dean Rogers.
- 4 Dean Bargrave.
- 5 Dean Turner.
- 6 Dean Boys.
- 7 Dean Fotherby.
- 8 { Earl of Somerset } and their
- { Duke of Clarence } ladies.
- 9 Colonel Prude.
- 10 S. T. Thornhurst.
- 11 Lady Thornhurst.
- 12 Dame Dorothy Thornhurst.
- 13 Miss Ann Milles.
- 14 Archbishop Langton.
- 15 Sir G. Rooke.
- 16 Sir J. Hales,
- 17 F. Godfry.
- 18 Archbishop Reynolds.
- 19 Hubert Walter.
- 20 Archbishop Chichely.
- 21 Archbishop Kempe.
- 22 Archbishop Stratford.
- 23 Archbishop Sudbury.
- 24 Archbishop Bouchier.
- 25 Archbishop Mepham.
- 26 Edward the Black Prince.
- 27 Henry IV. and his Queen.
- 28 Cenotaph of Courtney.
- 29 Monument of Cardinal Chatillon.
- 30 Monument of Dean Wotton.
- 31 Monument of Archbp. Theobald.
- 32 Monuments of Cando and Archbp. Pole.



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for the sacrilege of which the cathedral was the scene. The new choir was destroyed. But no time was lost before commencing restoration. WILLIAM OF SENS was appointed architect, and in 1175 the masons were at work under his direction. He was engaged during five years, but a fall from a scaffold compelled him to return to France. He was succeeded by a little Englishman who was also

and indications are not wanting that a new style was about to appear. But the great interest of the early work is historical. The BECKET tragedy made the cathedral unique as a place of pilgrimage, and, as good often arises out of evil, a period of financial prosperity followed in which all the religious of Canterbury were sharers.

(To be continued.)

AIDS TO THE EXTENSION OF ELECTRIC LIGHTING.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

THERE is now a great movement amongst the electric-lighting supply companies and corporations in the direction of the extension of electric lighting, chiefly amongst poorer consumers. The means by which this is being carried out are as follows:—

1. The substantial reduction in price to long-hour consumers.
2. The free wiring of premises.
3. The use of automatic (penny in slot) meters.
4. The supply of lamps free of charge, or guarantee of the life of lamps.

These four points strike at the root of the difficulty in inducing the public to use the electric light. The first point has already been dealt with very fully in this Journal in some of my previous articles, and the remaining three points will now be dealt with.

Free Wiring of Premises.—The cost of installing electric light in houses, &c., has always been the great deterrent to the majority. The intending consumer, especially the middle-class one, looks at the matter from an eminently practical point of view. He usually has gas-fittings, which are useless if he installs the electric light, and the high cost of a good electric-light installation is more than he is prepared to pay. There is usually very little or no saving in the light bill claimed by the adoption of electric light, the benefit being on the score of cleanliness, less cost of painting and whitewashing, and saving of the damage to goods caused by gas. The small shopkeeper and householder thinks of the high capital outlay and underrates the benefit of electric lighting because it is indefinite. The usual result is that the wiring canvasser finds, after wasting much time and preparing estimates, that the consumer thinks he will have to wait a little longer before incurring the outlay, as he really cannot afford the expense just now. In fact, the money is usually worth more to him, or he thinks it is, than a pure light.

Now, if this consumer is approached in a different way he will, no doubt, adopt electric light. If a hire-purchase system extending over, say, five years is proposed, there is no doubt the consumer is secured. This system was tried, and is now being used in Galway (Ireland) with a marked success. The system was a three years' one; 5 per cent. on the capital outstanding is charged quarterly in addition to the twelve instalments. This satisfies the supply company and the consumer, who usually prefers this method of payment, because his money is worth more than 5 per cent. to him; in fact, the terms are too lenient, as many rich people take the system up.

A somewhat similar system has been proposed by the writer for two Irish towns with which he is connected as consulting engineer, and the matter shows every prospect of being taken up extensively. The system is as follows:—

Installations will be undertaken for those who desire it under the following terms:—A charge of 6 per cent. on the cost of the installation will be made per annum for interest on capital and maintenance of installation in good repair, and a further charge of 5 per cent. as a minimum will be made for the sinking fund per annum. The wiring will become the property of the consumer when the whole amount has been paid off. A greater amount than 5 per cent. can be paid off in any year or years, enabling the amount to be paid off sooner. The wiring will be kept in repair by the undertaker, excluding breakage due to wilful damage or carelessness.

There is another method of charging for wiring which has been pushed by large syndicates in various towns during the last year or so. This consists in putting up fittings for consumers, making no charge, but increasing the price of electricity to them by a small amount, say $\frac{3}{4}$ d. per unit, which amount becomes the property of the syndicate. The fittings never become the consumers' property, but always remain the property of the syndicate or their assignees. This has been taken up with great eagerness by the poorer consumers and has already proved a success, as these consumers use a considerable amount of electricity per lamp installed. One syndicate has introduced

automatic meters (penny in slot) in connection with these systems.

These poorer consumers are so desirable that in some cases the supply companies or corporations have allowed the $\frac{3}{4}$ d. per unit off the usual price, the consumer obtaining his supply at the standard rate. Although there is no doubt as to the success of these latter (increased cost per unit) systems, they are obviously unfair to the best consumers, as the payment for fittings bears no proportion to their cost but to the amount they are used, which penalises the most desirable consumers.

The use of prepayment meters, whether connected with free wiring or not, is to be encouraged for several reasons. In the first place, there is no difficulty in collecting the accounts, as the current is paid for before delivery; and in the second place, the payments are not felt by the poorer consumers, who, as a rule, object to large bills at unfrequent intervals, and prefer a system which uses their loose coins. Even the upper middle classes prefer such a system, as it prevents waste. An instance may be given of a case where the family goes away for the summer, leaving the servants in charge of the house, being allowed a weekly sum for expenses. The usual method is to cut off the light altogether, but with a prepayment meter the servants could have the light by paying for it out of their allowance. Many improvements will have to be made in automatic meters before they will be extensively adopted, as complaints have been made as to their reliability. There is, however, no reason why automatic meters should not be made perfectly reliable, and a few years' experience will suffice for this.

The remaining point is that of free lamps. The incandescent lamp is undoubtedly one of the chief annoyances to the consumer of electricity. They sometimes have a habit of failing after short use, and the cost of the lamp is then a loss. The same argument applies to incandescent gas-mantels, only with greater force, but still the fact remains that the cost of lamps is often high. Another feature is that the worse the regulation of pressure in the mains the more failures of lamps; thus the consumers have to pay for the misdeeds of the suppliers of electricity.

A system of free supply of incandescent lamps has been proposed by Mr. A. H. GIBBINGS, and is now in operation in Bradford.

The basis on which the supply is given is the following:—16 candle-power lamp burning 1,000 hours consumes 60 units; 25 candle-power lamp burning 1,000 hours consumes 94 units; 32 candle-power lamp burning 1,000 hours consumes 120 units; 50 candle-power lamp burning 1,000 hours consumes 188 units, and so on. Every good lamp is supposed to last 1,000 hours burning.

Every consumer is entitled to one 8 or 16 candle-power lamp for every 60 units consumed; and if higher candle-power lamps are required instead of 16 candle-power, the number of lamps to which the consumer is entitled will be in inverse ratio to the candle-powers. This is in brief the system, but there are many other details which are not of sufficient general interest to go into here.

The object of the system is to encourage the consumer. It will certainly encourage a consumer who does not reason the system out—and they are perhaps the majority. To a business man, however, the gift of anything excites suspicion. Let us examine the facts in this case. A consumer is given a 16 candle-power lamp for every 60 units consumed; why not give him the value of such lamp as a rebate on his current, and let him buy his lamp, if he wants it? The answer is not evident, and is rather difficult to give. There is no guarantee of the lamp, so the consumer is not relieved from the annoyance of premature failure, although the lamp is "carefully tested." All lamps should be carefully tested before leaving the maker, but this will not prevent bad lamps getting used; in fact, if the illustration be permitted, you cannot tell the qualities of a lamp before it is broken (in use) any more accurately than you can those of an egg. The expense of this free lamp is charged to the electricity department, and so the consumers of course really pay for it, although indirectly.

A guarantee system proposed by the writer for certain towns is as follows:—

The consumer may, if he likes, pay for one lamp per holder per annum; all lamps required over and above that

are supplied free, if the lamps blacken badly or are broken owing to being defective. If there is any doubt about a lamp being bad it will be tested, and if the candle-power is 30 per cent. less than the declared, or the energy consumed per candle-power have increased 30 per cent., it will be taken as defective. A few precautions which will be taken to prevent fraud, &c., are as follows:—All old lamps must be returned, and they will all be marked distinctively before being sent out (probably numbered). To avoid too much testing a charge of 6d. will be made for each lamp tested if it proves to be up to the standard mentioned.

The object of this system is that the consumer who is a long-hour consumer, and who will use more than one lamp per holder per annum, will get a rebate by this means; the system will guarantee the life of lamps, and so avoid the dissatisfaction which often occurs over this point; it will encourage the purchase of good lamps from the supply company (to whose interest it will obviously be to supply the best), and it will penalise the company if they keep an unsteady pressure on the mains. It is a business arrangement which will, by the law of averages, very nearly, if not quite, pay for itself, and which will tend to give the consumers confidence in electric lighting.

A defect in the Bradford system is that undue preference is given to incandescent lighting, and it is asked, "Why not give free carbons for arc lamps and brushes for motors?" This objection has, no doubt, great weight in the case of the Bradford system. Mr. GIBBINGS should give one pair of carbons for each 8 hours burning of the arc lamp, also a pair of brushes for each 1,000 hours running of the motor, to be consistent. In the case of the latter system mentioned (the "guarantee" system), this might be done in a similar way to that of incandescent lamps, and would be done if desired. If a consumer pays for a pair of brushes per annum, and the company has supplied or approves of the motor, he will be supplied with all the brushes he needs, and if the consumer pays for carbons for 1,000 hours burning, the company will supply him with all the carbons he needs, and see that they are good.

From this and previous articles it will be seen that there is no lack of enterprise on the part of suppliers of electricity, and it only needs a very few more years and there is no doubt that electricity will be as much used as gas; the long-hour and best consumers will find it cheaper than gas, while the gas companies will be left with the short-hour consumers, whom they can supply cheaper than can the electricity supply authorities. With free wiring, prepayment meters and free lamps, and large rebates to long-hour consumers, electricity will be the light of the "masses" as well as the "classes."

THE AUGUSTINE CELEBRATION.

THE following is the programme to be observed at the visit of the Anglican bishops to Ebbs Fleet and Richborough on (to-day) July 2:—The special train for the bishops and Church dignitaries will leave Charing Cross station at 1.35 P.M. It will reach Canterbury at 3.10 p.m., and will there be joined by the Dean and Chapter of Canterbury, the cathedral choir, and a few others to whom tickets have been allotted. The train will arrive at Ebbs Fleet at 3.35 P.M., and a commemorative service (drawn up by Archbishop Benson) will be held at St. Augustine's Cross. The enclosure at Ebbs Fleet will be reserved for those who travel by the special train, but the public generally will be admitted to the adjoining field on payment of a small fee to the tenant. The train will leave for Richborough Castle at 4.25 P.M., and a procession will be formed at 4.45 P.M., consisting of the bishops and the mayor and corporation of Sandwich, from the north postern gate to St. Augustine's Cross, in the centre of the castle grounds. There Psalm xcvi. will be said, and a brief address will be given by Canon Routledge on the history of the castle. Tea will afterwards be provided by the trustees for bishops and other invited guests. The public will be admitted at the west gate on payment of 1s. to the custodian. The special train will leave Richborough at 6 o'clock and is due at Canterbury at 6.30.

On returning to Canterbury the bishops will receive the hospitality of the residents, each bishop having been invited to become the guest of a citizen. It is arranged that at ten minutes to ten on Saturday, July 3, the archbishops and bishops (not wearing their robes) will meet at the lych-gate of the historic church of St. Martin, where they will be received by the choir and clergy. The hymn "The Church's one founda-

tion" is to be sung as the procession goes to the church, where a form of service, lasting about a quarter of an hour, will be gone through. The special Litany of St. Augustine, which the monks sang on entering Canterbury, will be rendered to music specially composed for the occasion by the Rev. F. H. Hichens, hon. canon of Canterbury Cathedral. Special prayers in connection with Queen Bertha, King Ethelbert, St. Augustine and St. Martin are also to be offered, and the service will conclude with the hymn "We love the place, O God." Having inspected the church, the bishops will have time to walk from the Quenen Lane and Bowling Green to the cathedral. The special service, at which the archbishops and bishops will be addressed in the cathedral by the Archbishop of Canterbury from the steps of the chair of St. Augustine, will take place on Saturday, July 3, at 11.30. The Kentish mayors, military officers and others will assemble at the Guildhall and will walk in procession. Others will assemble at the Guildhall and will walk in procession to the cathedral by 11.15. The bishops will robe in the crypt and will pass in procession through the cloisters to the west door of the cathedral, where they will be received by the Archbishop of Canterbury, Dean Farrar, the cathedral clergy, the rural deans, the city clergy and others. The bishops will be seated on the sacarium and choir steps, the Archbishop of Canterbury occupying the patriarchal chair of St. Augustine, which will be placed in front of the communion table. An allocution by the archbishop will follow the singing of the Te Deum, and Handel's Hallelujah Chorus is to be rendered at the close prior to the Benediction. After the service the mayors of the chief towns will be presented to the Archbishop of Canterbury outside the west door of the cathedral. The representatives from other boroughs are subsequently to be entertained by the mayor of Canterbury. After the service all the archbishops and bishops are invited to a public luncheon at St. Augustine's College at 1.30. After the luncheon there will be time for any of the bishops who desire it to visit the cathedral or the ruins of the ancient church of St. Pancras, dedicated by St. Augustine and close by St. Augustine's College. Evensong will be at 3.30. After the evening service at 4.30 all the archbishops and bishops are invited to a reception at the deanery. The Archbishop of Armagh will preach at the cathedral on July 4 at the service commencing at 10.30. In the afternoon at 4 P.M. it is proposed that a sermon shall be preached in the nave of the cathedral by the Bishop of Christchurch to men only. In the evening at 6.30 the preacher will be the Bishop of Ripon. Trains will be arranged to be run on Monday morning, July 5, from Canterbury to Victoria and Charing Cross, arriving in ample time for the Lambeth conference. On Sunday, July 11, the sermons at the cathedral will be preached at 10.30 by the Bishop of London, at 3 by one of the colonial bishops, and at 6.30 by the Bishop of Newcastle.

EASEMENT OF SUPPORT.

JUDGMENT has been given by Mr. Justice Bruce in the important case *Greenwell and Others v. the Low Beechburn Coal Company*, which was tried at the last Durham assizes. The decision will affect other cases in which the easement of support is introduced. The plaintiffs' houses were injured by subsidences, which it was alleged were caused by the defendants' removal of the supports in the coal mines. Having described the circumstances, Mr. Justice Bruce said:—

The general question of the liability of the owner of mines for injury caused by reason of his underground workings to the surface and to buildings upon it has been much discussed in recent years. In *Bonomi v. Backhouse* the question raised was whether the statute of limitations ran from the time of the accruing of the damage or from the time of the taking away of the support which caused the damage. It was finally decided by the House of Lords that the statute did not begin to run until the time of the actual happening of the damage. In order to determine the question when the statute began to run it became necessary for the judges to consider the nature of the right which gave rise to the cause of action. Here it is necessary to observe that although the right of the owner of the surface and the right of the owner of the buildings on the surface not to have the land or buildings interfered with by underground working on the part of the owner of the minerals stand upon different footings as to the mode of acquiring them, yet the right as regards buildings when once acquired is in character the same as the right of the owner of the surface. As I have already observed, the buildings in question in the present case at all material times were more than twenty years old, and were in the nature of ancient buildings, and it will be necessary, in discussing the character of the right, to distinguish between land and buildings. For practical purposes in this case the character of the right in each case is the same. Wightman, J., in giving his judgment in *Backhouse v. Bonomi*, expresses the opinion that the cause of action was founded upon a breach of duty on the part of the defendant by so using his property as to injure that of his neighbour and not upon any

right of the plaintiffs to an easement in, upon or over the land of their neighbours. In the Exchequer Chamber, Willes, J., in delivering the judgment of the Court affirming the view expressed by Wightman, J., says, p. 659:—"We think that no cause of action accrued from the mere excavation by the defendant in his own land so long as it caused no damage to the plaintiff, and that the cause of action did accrue when the actual damage first accrued." In the same case in the House of Lords, Lord Cranworth says:—"It has been supposed that the right of the party where land is interfered with is a right to what is called the pillars or the support. In truth, his right is a right to the ordinary enjoyment of his land, and until that enjoyment is interfered with he has nothing of which to complain." In *Lamb v. Walker*, Lord Chief Justice Cockburn, referring to the decisions of the Exchequer Chamber and the House of Lords in *Blackburn v. Bonomi*, says:—"The decisions establish conclusively and incontrovertibly that it is not the withdrawal of the support previously afforded by the adjacent strata—a support to which, according to the view there taken, the adjoining owner had abstractedly no right—but the actual disturbance of his enjoyment of his property which constitutes a wrong and gives a legal ground of complaint. . . . The act of the excavating owner is not tortious *in se*; it is tortious only when it produces, and, as it seems to me, to follow logically to the extent to which it produces actual damage." The same view of the nature of the right of action in cases of this character is expressed by the judges in the Court of Appeal in *Mitchell v. Darley Main Colliery Company*, and in the same case by the majority of the judges in the House of Lords. In the last-mentioned case the defendants in 1867 and 1868 worked a seam of coal lying under and near to the plaintiff's land. A subsidence took place in 1868 and continued until 1871, and cottages of the plaintiff's were damaged by the subsidence. The plaintiff made a claim upon the defendants in respect of that damage, and the defendants repaired the damage, and so satisfied and discharged the cause of action in respect of that damage. Afterwards, without any further working on the part of the defendants, a further subsidence took place in 1882, caused wholly or in part by the defendants' workings in 1867 and 1868, and did further damage to cottages of the plaintiff's. On September 27, 1882, the plaintiff brought an action for this further damage. The defendants pleaded the Statute of Limitations, but it was held in the Court of Appeal and in the House of Lords that the plaintiff was entitled to recover. The judgments of the Master of the Rolls and the other judges of the Court of Appeal in *Mitchell v. Darley Main* affirm the principles laid down in the earlier cases to which I have referred. But there are some expressions in the judgment of the Master of the Rolls which the defendants in the present case have relied upon as supporting their contention. At page 129 the Master of the Rolls says:—"What they (the defendants) did in excavating was perfectly lawful, if they had taken care that in so using their property they did not hurt him (the plaintiff); but in 1868 or immediately afterwards they did something which did give him a cause of action—that is, they caused his land to subside. . . . That cause of action was settled between them when they repaired his houses, but now they have done him a new and wholly independent injury, they have caused his land to subside again. . . . They have caused that subsidence by the excavation of the minerals in 1868 and by not having filled up the excavation before 1882. I cannot help thinking that the judgment of the Lord Chief Justice . . . examines the whole subject afresh, and gives the most weighty reasons to show that in such a case as this the only cause of action is the subsidence of the plaintiff's land, and if that subsidence has been brought about by the defendants, whether or not by the omission of something after commission—that is, without taking precautions against the consequences of an act of commission by them—each subsidence is a new cause of action, although the *causa causans* of each subsidence may be the same. It may be argued that the *causa causans* is not the same. The *causa causans* of the first is the excavation; the *causa causans* of the second is, as a matter of fact, the excavation unremedied, or the combination of the excavation and of its remaining unremedied." It is contended that some of the phrases in the judgment I have quoted support the view that the *causa causans* of the second subsidence in *Mitchell v. Darley Main* was the neglect to fill up the excavation. But I think that the judgment must be read in connection with the facts of the case, and the Master of the Rolls nowhere speaks of the simple neglect to fill up the excavation or to provide artificial support as an act of omission of such a character as to give a cause of action. In each case he speaks of the taking away of the support and the neglect to provide artificial support as acts which, taken together, operated to cause the subsidence so as to give a right of action. But even if the words can be so construed as to lead to the conclusion that the neglect to provide artificial support of such a character as to prevent the second subsidence was to be regarded as the cause of action, it does not follow, because there is an obligation upon a person who has made an excavation of such

character as will, if left without being artificially filled up, cause successive subsidences in his neighbour's land, to prevent the subsidence by providing artificial support, that therefore a similar obligation attaches to a person who is merely in possession of the minerals, and has done no act calculated to cause damage to his neighbour. I do not think any of the expressions in the judgment I have referred to support the contention that where a subsidence causing damage to the surface arises from excavations in mines a person who has not been concerned in making the excavation, and who happens to be in the possession of the mines before and at the time of the subsidence, is liable for the damage caused by the subsidence simply because he did not take measures to arrest the subsidence. It remains to consider the judgment of Lord Blackburn in the same case delivered in the House of Lords. Lord Blackburn dissented from the judgment of the other judges in the House of Lords, and it is contended that the reasons he gives for his dissent strongly support the contention of the plaintiffs in the present case. He refers to an expression used by Lord Justice Bowen in his judgment in the same case in the Court of Appeal. The Lord Justice had referred to *Whitehouse v. Fellowes*. In that case the trustees of a turnpike road had constructed a covered drain with catch pits to carry off the water from the surface of the road into the drain; but, in consequence, as the jury found, of the negligent way in which the catch pits were constructed and kept, the drain was insufficient to carry off the water, and it was diverted to the plaintiff's land and drowned his colliery. A statute limited the period for bringing an action against the trustees to within three months after the fact committed. The action was brought within three months of the particular damage complained of, but more than three months after construction of the drain and catch pits. It was held that, as an injury was done to the plaintiff by reason of the improper management of the catch pits, he was not bound to rest his complaint upon the original construction of the works, but that the continuance by the defendants of that negligent and improper condition of the road under their charge, if accompanied by great damage to the plaintiff, constituted a fresh cause of action. Lord Justice Bowen, in *Mitchell v. Darley Main*, says:—"Applying the reasoning of *Whitehouse v. Fellowes*, it seems to me that there has been not merely an original excavation or act done, but a continual withdrawal of support—that is to say, not merely an original act the results of which remain, but a state of things continued, and a state of things continued which has led to and caused the subsequent damage." Lord Blackburn, referring to that passage, says:—"If I could take that view of the facts I should agree in the conclusion. But I cannot take that view of the facts." It seems to be clear why he could not take that view of the facts. During the argument of the case in the House of Lords a statement was agreed to in writing between the appellants' and respondents' counsel, and part of that statement was as follows:—"That after the partial subsidence in 1868 the strata remained practically quiescent until the working of the coal in the next adjoining land in 1881." After that statement had been agreed upon, it was, I think, impossible to treat the case as if the facts proved had shown that there had been a continual withdrawal of support. Then Lord Blackburn proceeds to point out what in his opinion would be the consequence of assuming that in all cases of successive subsidences there had been a continual withdrawal of support. Lord Blackburn is not, I think, to be understood as saying that any such consequences follow from the judgment of the House. He did not agree with the law as laid down in that judgment. He did agree with the conclusion of law laid down by Lord Justice Bowen in the passage he referred to, but he could not agree in the view of the facts upon which the conclusion was founded. And he points out what would be, in his opinion, the consequence of holding the defendants liable upon the assumption of fact that there had been a continued withdrawal of support. When the passage of Lord Blackburn's judgment is carefully examined, it seems to me that it does not afford support to the contention that such consequences as he mentions follow from holding the Darley Main Colliery Company liable upon the grounds upon which the House of Lords held them liable. It remains to consider whether, on the general principles of law, the defendants can be rendered liable upon the ground that they have allowed a nuisance to continue on their land which has caused damage to the defendants. It is upon this principle that the learned writer of a valuable text-book on the Law of Support contends that the person in possession of the mines at the time when the subsidence took place may be rendered liable for the damage caused by the subsidence. ("Banks on Support," pp. 5-7.) There is a dictum of Mr. Justice Littledale in the case of *Laugher v. Pointer*, which is frequently quoted. That very learned judge, in the course of his judgment, says:—"And the rule of law may be that in all cases where a man is in possession of fixed property he must take care that his property is so used and managed that other persons are not injured, and that whether his property be managed by his own immediate ser-

vants or by contractors or their servants. The injuries done upon land or buildings are in the nature of nuisances, for which the occupier ought to be chargeable when occasioned by any acts of persons whom he brings upon the premises." The question before the Court in *Laugher v. Pointer* was whether the defendant could be rendered liable for the negligent driving of a driver who had been provided by a livery stable-keeper. No question arose as to the character of the act; the only question was whether the defendant could be rendered liable for the acts of a man who was not his servant, and it was with respect to that question that Mr. Justice Little-dale was referring in the passage in question. He was explaining that in some cases, where acts in the nature of wrongful acts had been committed by persons not the servants of the occupier, the occupier had yet been held liable on the ground that he is in law answerable for the acts of persons whom he brings upon the premises. It seems to me that the true rule is laid down by Baron Rolfe in *Reedie v. London and Great Northern Railway Company*. He says:—"It is not necessary to decide whether in any case the owner of real property, such as land or houses, may be responsible for nuisances occasioned by the mode in which his property is used by others not standing in the relation of servants to him or part of his family. It may be that, in some cases, he is so responsible. But then his liability must be founded on the principle that he has not taken due care to prevent the doing of acts which it was his duty to prevent, whether done by his servants or others." This leads me to consider the question, What act has been done which it was the duty of the defendant to take due care to prevent? The answer must be that he has not taken due care to prevent the subsidence. But what duty was there on his part to prevent the subsidence? He had taken no part in the excavation. The excavation was not wrongful. Until the damage ensued there was no cause of action, no cause of complaint against anyone. How, then, did the duty arise by which it became incumbent on the defendant before the subsidence took place to anticipate or prevent the subsidence? It is said that the defendant was bound so to use his land as not to injure his neighbour. So he was. But he has done nothing to cause injury to his neighbour; and unless he is under an obligation to prevent the consequences of an act done by his predecessor in title, he has not been guilty of any omission of duty for which he can be rendered liable. It is suggested that the excavated strata left without any support was a nuisance; but I do not think it was. Until the actual subsidence happened there was nothing unlawful in the state in which the land was left. At no moment prior to the subsidence can it be said that there was any duty upon anyone to provide artificial support, and therefore it seems to me that it cannot be said that the defendants are guilty of a default of duty in allowing a state of things to continue which was a perfectly lawful state of things. It was contended that the principle laid down in *Fletcher v. Rylands* applies. The principle decided in that case is thus shortly stated by Mr. Justice Blackburn in the Court of Exchequer Chamber, and the passage is cited with approval by the Lord Chancellor in his judgment in the House of Lords:—"We think that the true rule of law is that the person who for his own purposes brings on his land and collects and keeps there anything likely to do mischief if it escapes must keep it at his peril; and if he does not do so is *primâ facie* liable for all the damage which is the natural consequence of its escape." The present case does not seem to me to fall within the rule. The defendants did not create a state of things likely to do mischief; they did nothing to continue or keep up the state of things likely to do mischief, and they did not invade the plaintiff's right of property by suffering any mischievous thing to escape from their property on to his. It seems to me that there is no analogy between the two cases. In the judgment of Lord Halsbury in *Mitchell v. Darley Main* the case of *Fletcher v. Rylands* is referred to, not as affording an illustration of the principle upon which the right of action in *Mitchell v. Darley Main* rested, but as affording an example of a state of facts in which successive causes of damage would give rise to successive actions. It follows, from what I have said, that I cannot discover any grounds upon which the defendants can be held liable in law to take active steps to prevent the damage to the plaintiff's land resulting from an excavation which they did nothing to make or to continue. But I may observe that if in any case any such obligation were imposed upon them such obligation could only arise in cases where it is proved to be practicable for the defendants by artificial support to have prevented the subsidence. In the present case there is nothing to show that that would have been possible. I was not asked to leave any question to the jury on that point, but I think there is little doubt that if the question had been asked they would have found that it was not possible for the subsidence to have been prevented by any act of the defendants, unless, indeed, they had taken such steps immediately upon their entering upon their lease. The workings which occasioned the mischief were carried on by Sharp not later than 1889; the subsidence complained of took place after May 30,

1893. Although it may be possible in some cases soon after minerals have been worked out to prevent subsidence by providing artificial support, yet when a considerable period has been allowed to elapse after the workings have been carried on the roof of the workings falls in, and it is generally exceedingly difficult, if not impossible, to arrest the subsidence, which commonly begins in the lower strata some time before it reaches the surface. But I do not think it is necessary to speculate concerning this matter, because there is certainly nothing to show that the defendants could by any means have prevented the subsidence. In the result I enter verdict and judgment for the plaintiff for 50*l.* for the claim in respect of fields 197 and 201 and costs. On the other issues I find for the defendants.

SUSSEX ARCHÆOLOGICAL SOCIETY.

AFTER a term of service extending over rather more than ten years, Mr. John Sawyer has resigned his appointment as clerk to the Sussex Archæological Society, closing his official connection with the Society amid very cordial expressions on the part of the committee as to the manner in which his duties have been performed. The severance has been brought about in consequence of many of the duties hitherto falling to Mr. Sawyer's share having, owing to recent changes, passed into the hands of honorary workers, the services of a clerk, except for mere routine work, being no longer required. Full of knowledge of Sussex history and local traditions, Mr. Sawyer has during the past eight or ten years been the means of adding very materially to the interest in the Society by his careful attention to its publications and his attractively written guides to the places visited on the occasions of the annual excursions. In other ways familiar to members he has devoted himself to the Society, and it is hardly probable that he will be permitted to retire without recognition from his many friends among the members all over the county.

THE ARCHITECTURAL ASSOCIATION OF IRELAND.

THE annual excursion took place on Saturday, June 12. The party, numbering about twenty-five, assembled at Amiens Street in time for the 9 A.M. train to Drogheda. On the arrival of the train at Drogheda brakes were in readiness to convey the party to Mellifont; the drive thither was through an exceedingly pleasant country, the route taken being along the valley of the Boyne, passing by the scene of the historic fight where the last of the Stuart kings made his final effort to retain the crown. An obelisk to commemorate the victory of King William marks the spot. Close to this the road crosses the river into the county Louth by an iron lattice-work bridge. A little further on the way was through the beautiful demesne of Mr. R. H. Balfour, D.L., Townley Hall.

On arrival at Mellifont Abbey the party visited the remains of this fine Cistercian abbey. Of the church itself little remains but what suffices to mark the lines of the plan, which is of the usual Cistercian type; but the octagonal baptistery is a building unique in its character in Ireland portions of it are in good preservation, the mouldings of its richly-proportioned arcade of round arches being frequently wonderfully sharp. The detail is of a transitional type. The chapter-house is in much better condition, and, strange to say, still boasts its vaulted ceiling—not a common thing in Ireland. The detail is of Early Decorated character and is very good. A small handbook has recently been issued containing some illustrations by Mr. Scott, of Drogheda (a member of the Association), which gives an excellent account of the remains of the abbey. A striking thing is that beyond the plan of the church there is little or nothing left of that type of architecture generally associated in one's mind with a Cistercian foundation.

After luncheon the party drove on to Monasterboice, where the two admired examples of Celtic crosses were examined with much interest; there are also a few small and quaint tombstones of the last century. Some of the party ventured on the long climb to the top of the round tower, from which there is a wide view. Several photographic groups having been taken by Mr. Hudman and Mr. Coleman both here and at Mellifont, the party started back for Drogheda, which was reached sufficiently early to give time for a stroll round the historic town. Amongst the places viewed were the old city wall and St. Lawrence Gate, the constabulary barracks (an old and rather quaint Georgian building), the new Roman Catholic Church of St. Peter, the abbey, &c.

The members dined together at the White Horse Hotel.

The New Booking Hall at Waverley Station, Edinburgh was opened to the public on June 28.

NOTES AND COMMENTS.

THE old Ecole de Médecine of Paris, which is supplanted by M. GINAIN's building on the Boulevard Saint Germain, occupies three sides of a paved court, and covers a large area of ground. It now belongs to the city of Paris, and is to be converted into an historic museum of medicine and library of medical works. The building stands on the site of the old College de Bourgogne, and the first stone was laid in 1769. The Faculty of Medicine was constituted as a corporation towards the end of the thirteenth century, but until 1427 it did not possess a school. The licentiates and regents who formed the body of "scholares" used to meet in the parvis of Notre-Dame. The body-physician of CHARLES VII. subscribed 300 golden crowns towards building a school in the Rue de la Bûcherie. The hall, which used to hold 1,400 auditors, was used of late as a laundry, and the chemicals employed have acted injuriously on the architectural works. In the course of the restoration the discovery was made of a vaulted crypt, which is supposed to date from the thirteenth century, and formed part of the "Maison de Bedeaux."

AMONG the countless articles by foreigners on the event of last week, there is not one more deserving of consideration than the "Réflexions d'un témoin sur le Jubilé" by M. PAUL BOURGET, who is the favourite literary psychologist of the Parisian monde. He was invited by the trustees of the Taylor Institution, Oxford, to lecture on GUSTAVE FLAUBERT, the author of "Salammbô," and from his official position, although it was not to be held for a long time, he was eager to understand the people he had undertaken to instruct. To M. BOURGET the peculiarities of the English character were as apparent among the cottages around Oxford as in Piccadilly, Pall Mall, the Strand and Cheap-side. We are to him the only people who know how to conserve antiquity without any sacrifice of modern needs. In Oxford he found all the old buildings preserved without the sacrifice of one stone and all the Mediæval foundations. But at the same time it is not considered incongruous to make a MAX MÜLLER a fellow of All Souls College, an institution that was founded in order that there might be always priests to pray for the souls of the soldiers who fell at Agincourt. France, he says, has suffered because NAPOLEON taught the people to ignore the power of the past. He compares him to one of the monastic painters of the Renaissance, who filled long lengths of cloisters with their own works regardless of the primitive works which had to be sacrificed. And hence it is that for the past century France, when in difficulties, has sought for a new man with creative power, who was ready to sweep away whatever existed and to substitute new creations. It seemed to M. BOURGET to be no less strange how the claims of the present were never ignored amidst the enthusiasm. The announcement that business was carried on as usual expressed to him the spirit of the race. Nothing should be lost, neither time, nor trouble, nor money. The crowds in the streets had a definite idea of what they were to see, and consequently they went along their ways without any of the exclamations which are to be heard during festivity in Paris. But, says M. BOURGET, a London street is merely intended as a place to pass over; it is a sort of tool which is employed in business, and not an open club where one can remain and wax eloquent as in Paris. Never was its utilitarianism made more manifest than during the Jubilee week. M. BOURGET does not wish to see Paris transformed into an imitation of London, but he desires his countrymen to act like a true artist before the *chef-d'œuvre* of a rival. In other words, to endeavour to comprehend English ways instead of envying them or deriding them.

THE Compensation for Accidents to Workmen Bill which is now before the House of Commons has been carefully considered by the Faculty of Advocates of Scotland. According to the report a majority of the committee have approved of the principle of the proposed legislation. It was not proposed in the Bill that the new liability should be imposed upon employers in all trades. Certain trades in which it was proposed to impose it were mentioned in the fifth section of the Bill. The result would be, that from the mere nature of their employment some workmen

would have a claim to compensation for accident and others would not. A majority of the committee were of opinion that as the Bill was essentially of the nature of an experiment, and that as the trades selected and enumerated were those to which, if any, the new proposals might be tentatively applied, it would be undesirable, in the interests both of employers and workmen, to extend the new legislation to other trades till experience of its working was obtained. The committee also suggested certain alterations in the sections and schedules. A minority of the committee differed from the principle of the measure. They thought that the employer ought to be liable for any accident for which he could be proved to be in fault. But they objected to his being made to insure the servant against accidents whether arising from fault or not. A system of insurance to which both parties contributed had much to recommend it. But that was not the system of that Bill. Prior to the Bartonshill case in 1858, it was generally understood in Scotland that the employer was liable to his servant for the fault of another servant, just as he is to a stranger. The employer chose all his servants and supervised all. There might have been no injustice in making him liable for all. The abolition of the doctrine of common employment would have been a serious change in the law. But in placing a burden upon capital it would have come far short of what this Bill proposed. It was agreed to send copies of the report to the members in charge of the Bill and to Scottish members of Parliament.

THE French manufacturers appear to have discovered a market in Spezzia for tiles for floors, kitchens, dadoes, &c. These tiles are square, hexagonal and octagonal in shape, measure 10 by 10, 15 by 15, 20 by 20 centims., &c., are thin and light, but strong and on the whole well finished; the smaller sizes are of plain red cherry and dark colours, but the larger ones are of various coloured part designs (several tiles being required to make up a complete design). The importers generally undertake to lay them from 4 fr. 50 c. per square metre. The importation of these French tiles in 1896 showed an increase, notwithstanding the considerable arrivals of Italian-made tiles of good quality and similar dimensions. The total importation by sea and by rail was 2,965,264 thousands.

THE Arundel Society was to some extent an exponent of Ruskinism. By the elaborate coloured lithographs issued from the Society people who could not find time to visit out-of-the-way churches in Italy were enabled to realise the characteristics of many of the early painters. As there is now less admiration for that variety of art the subscribers were gradually reduced until at present the income does not meet the expenditure. Photographic illustrations were found to be more truthful than the lithographs, which, being produced in Germany, latterly gave occasion to much prejudice against them. The collection of water-colour drawings prepared for the lithographers is valuable and will no doubt be offered to some public gallery. But the admiration for GIOTTO, FRA ANGELICO, ORCAGNA and others is waning, although it may one day be revived.

WHEN the number of sculptors and students in England who can produce busts is considered, it would have been satisfactory to learn that all those of the QUEEN which are required during the present year were produced in Great Britain. Many of the commissions, it appears, have been secured by artists in Spezzia. Orders for Great Britain and the Colonies are generally received through British firms at Carrara. It is no wonder the prospects of the marble-workers are brighter than usual, and that full employment is to be obtained by sculptors. The output in 1896 exceeded that in 1895 by nearly 6,000 tons, the figures for the two years being 141,811 tons in 1895 and 147,609 tons in 1896. Block, ordinary and statuary marble amounted to 91,916 tons and sawn marble to 55,693 tons. The monthly output varies from 10,000 to 14,000 tons. There has been also an increased exportation to the United States, the Carrara merchants being anxious to push forward their shipments thereto before the new MCKINLEY tariff (which imposes a higher duty on Carrara marble) came into operation.



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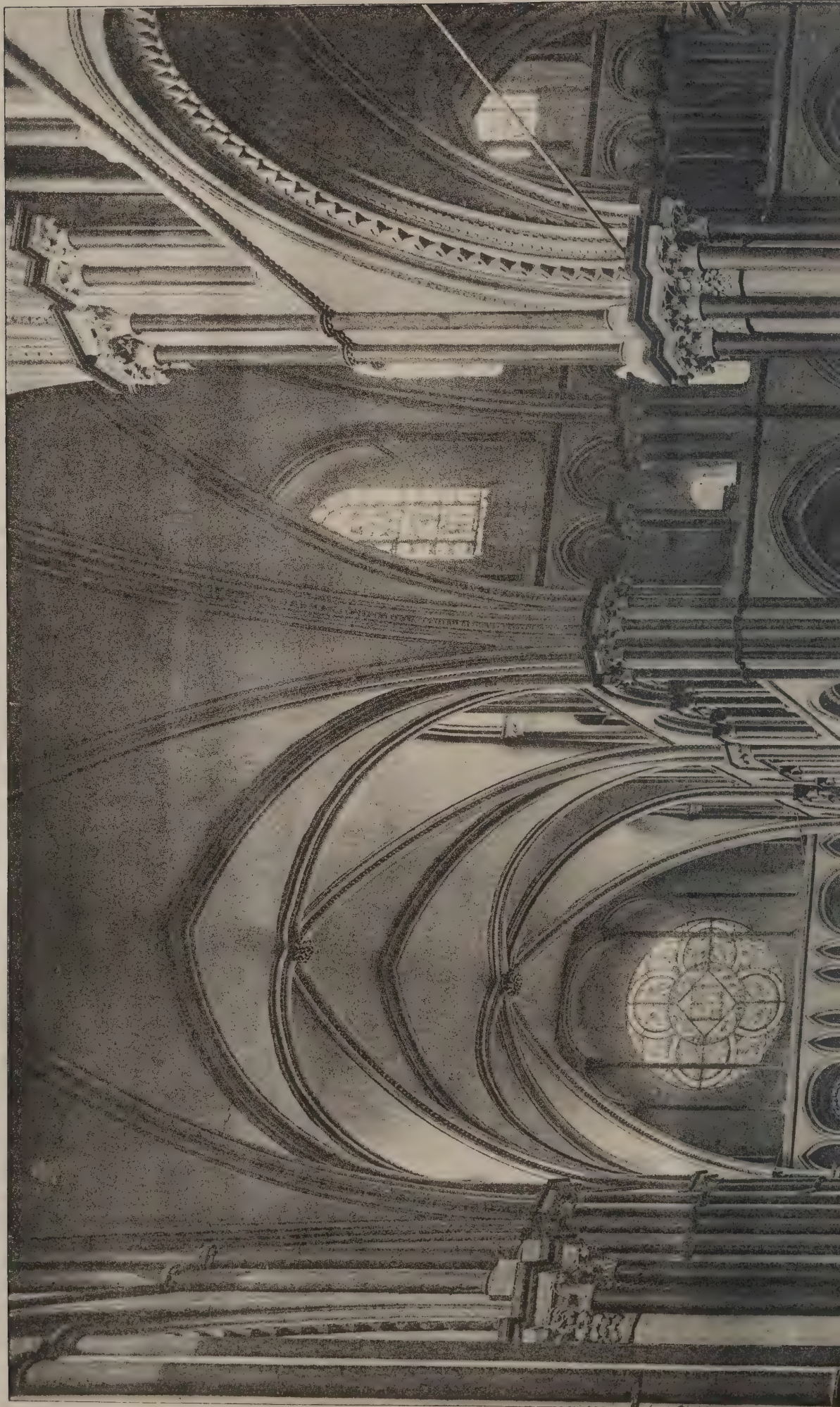
July 2nd 1897



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GENERAL VIEW FROM TOP OF GATEWAY.



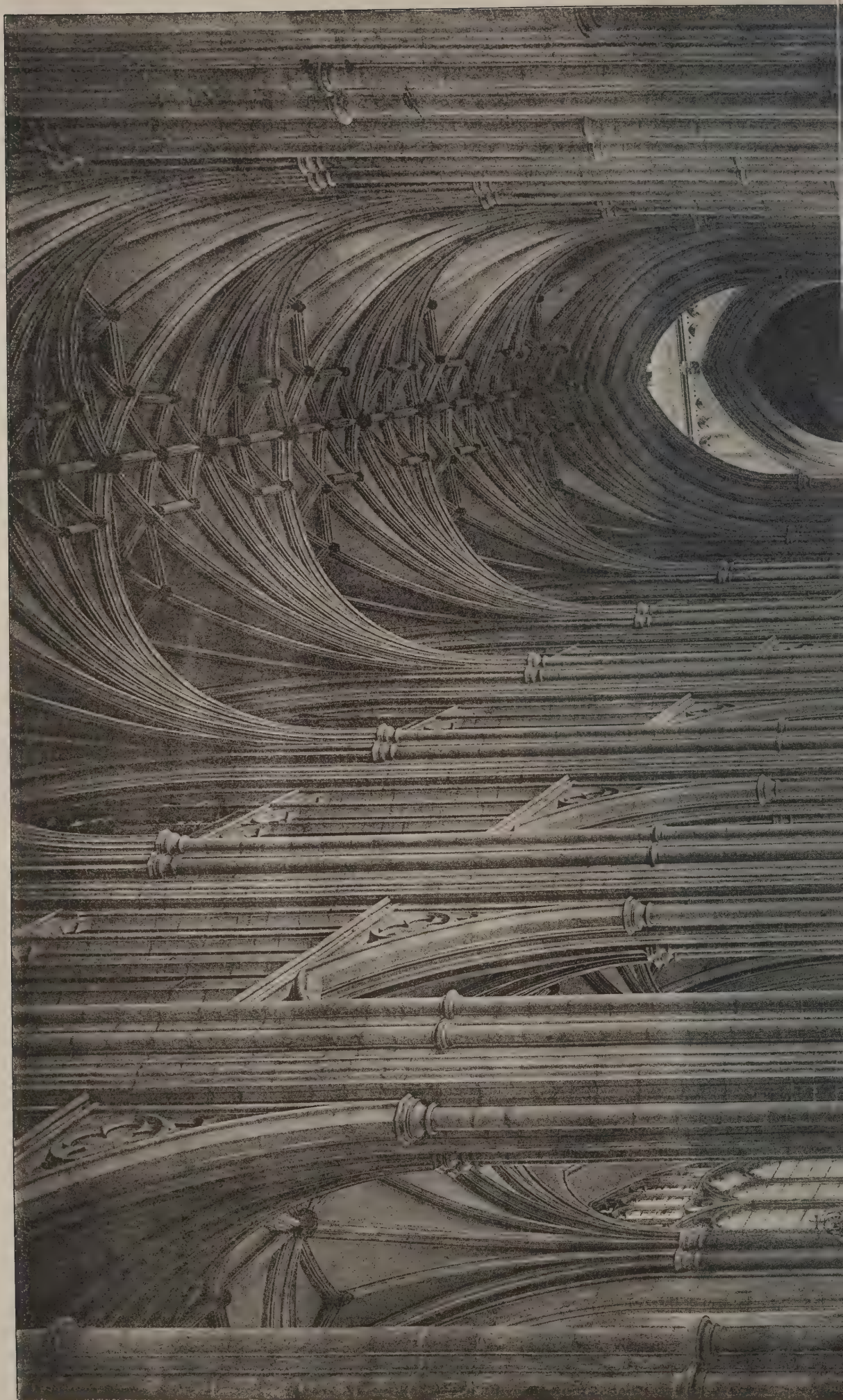


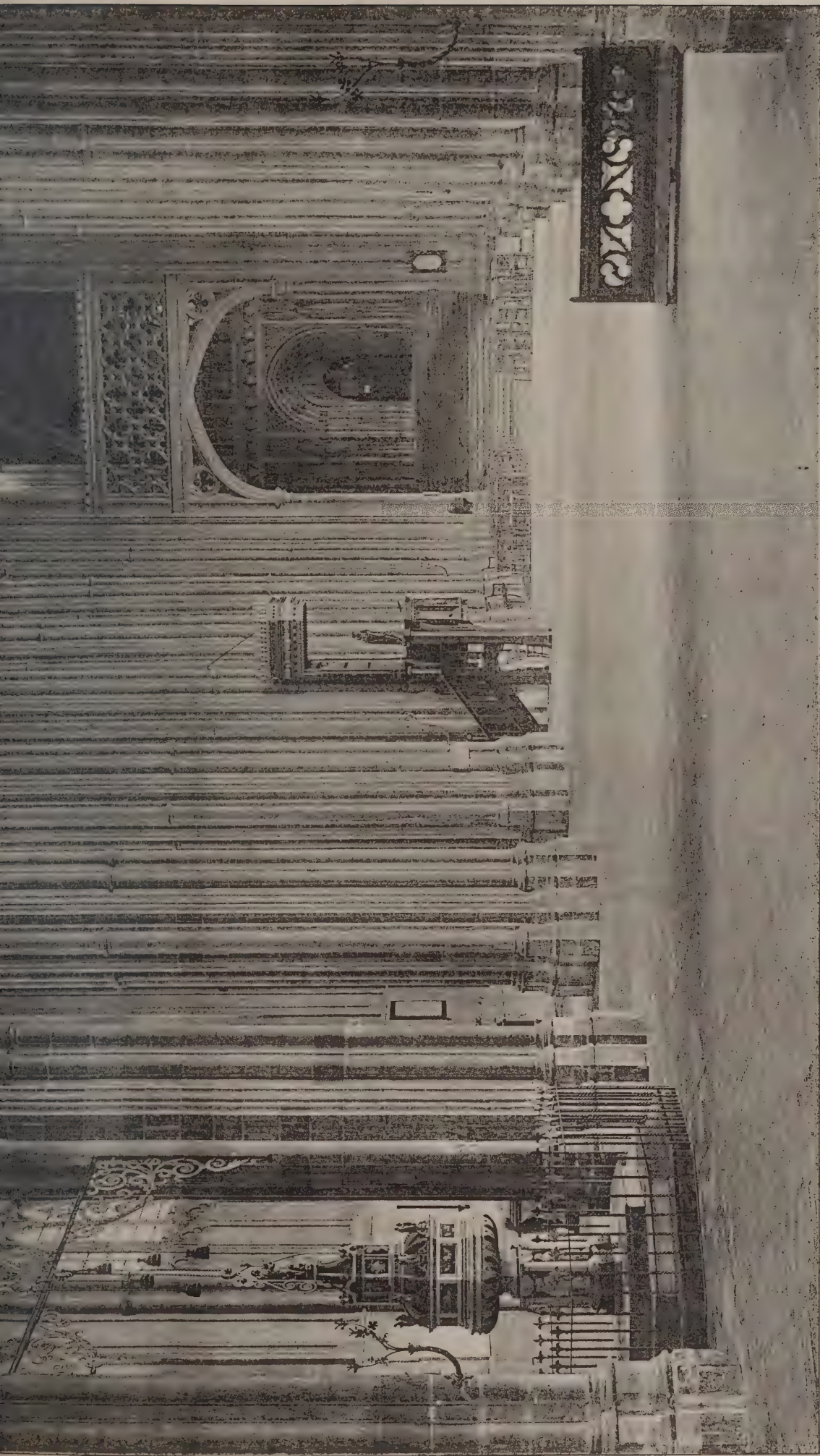


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CATHEDRAL SERIES, No. 51.—CANTERBURY: SOUTH TRANSEPT CHOIR.



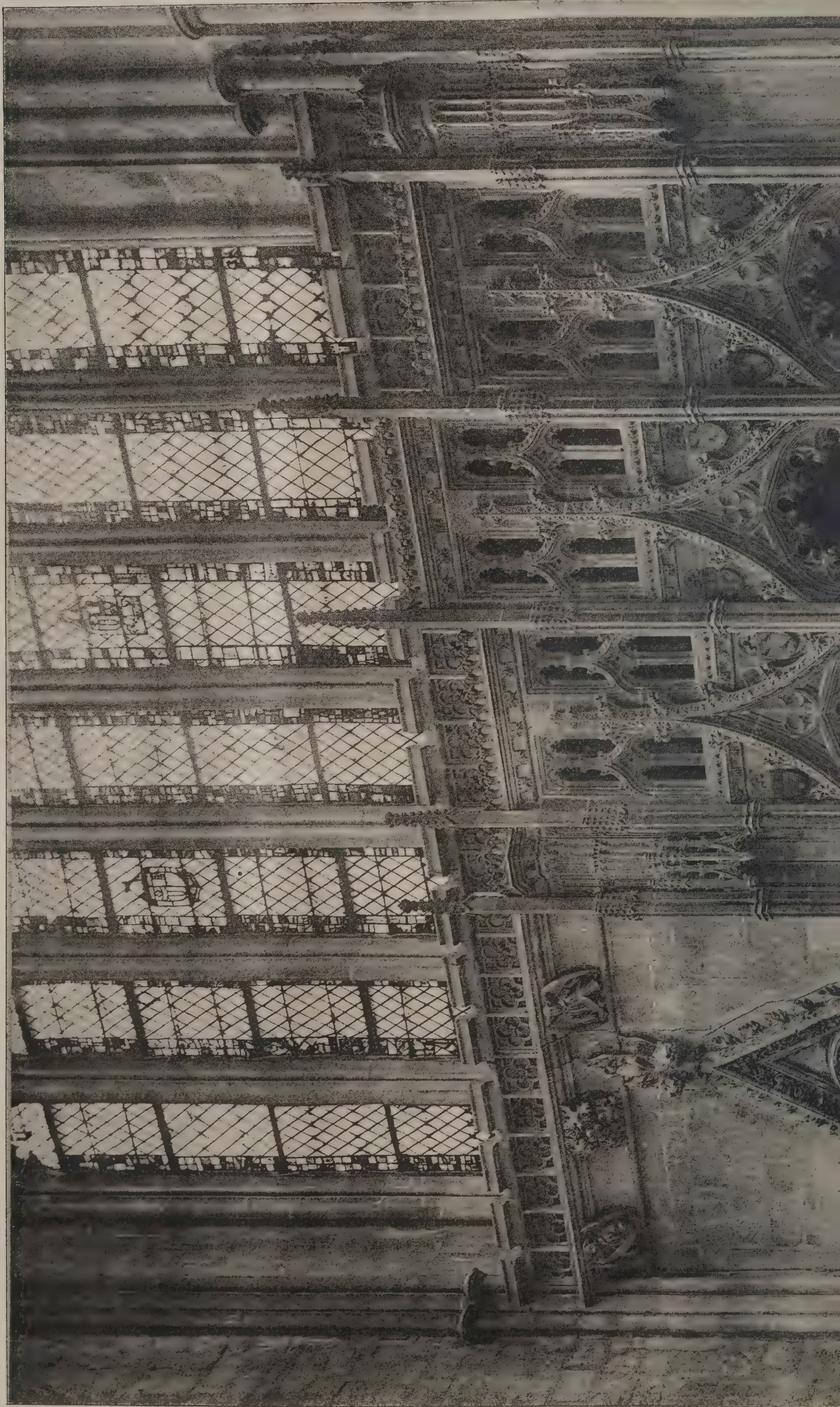


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CATHEDRAL SERIES, No. 52.—CANTERBURY: NAVE, LOOKING EAST.

The Architect, July 2nd 1897





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CATHEDRAL SERIES, No. 53.—CANTERBURY: TOMBS IN MARTYRDOM.
ARCHBISHOP PECKHAM and ARCHBISHOP WARHAM.

Notice.—Further Views of St. Paul's Cathedral will be continued in a future number.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: GENERAL VIEW FROM TOP OF GATEWAY.—SOUTH TRANSEPT CHOIR.—NAVE, LOOKING EAST.—TOMBS IN MARTYRDOM, ARCHBISHOP PECKHAM AND ARCHBISHOP WARHAM.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

ON Monday a meeting of the Institute was held for the purpose of the presentation of the Royal Gold Medal to Dr. Cuypers. The president, Professor Aitchison, A.R.A., delivered the following address:—

The last Monday in June is always a day when the members of the Institute feel proud and happy, happy because our meeting is graced by the presence of ladies, of distinguished visitors and of old friends; and proud because it is the occasion when Her Majesty the Queen is gracious enough to show her interest in architecture by giving her Gold Medal to a distinguished architect or writer. There is additional exhilaration this evening on account of Her Majesty's Diamond Jubilee, when the whole empire has rejoiced, and been thankful for the increase of liberty, knowledge, peace and plenty under her fostering care, and for the example of the virtues she has shown; but also because the medal is to be bestowed on a foreign architect, for this shows the breadth of Her Majesty's views and largeness of her sympathies. Our great art, that Aristotle calls one of the master arts of the world, rules over a wide domain, for wherever man has cultivated his intellect and faculties and raised his contemplation to a supreme being, sublime temples have been raised. In contemplating the glorious and captivating domain of art we are taken out of ourselves, and not only feel the ennobling flame that the fine arts kindle within us, but are forcibly reminded of the brotherhood of man. More than half of our solaces and delights are due to the great creators and discoverers who lived in remote ages and in countries it has perhaps never been our good fortune to visit, though we now have the glories of architecture brought home to us through the arts of drawing, engraving and photography.

However we may be delighted with the works of nature, which she has sculptured and painted for our solace and instruction, however greatly we may be moved by the sublimity of her mountains or awed by the resistless force of her waters, there is a charm about architecture that touches us more closely, for in its works we see forms of beauty designed by man for man's delight; while the colossal structures that man has created, though insignificant as compared with nature's works, still astonish us, for they recall to our minds that they have been the works of countless pigmies like ourselves, raised to excite emotions that still tell of the builders' gratitude to superior powers. Even the pyramids raised to the rulers of Egypt, whose outlines break the long line of the desert, show rather thankfulness for the honour once bestowed on their occupants than the pride of kings. The charms of certain masterpieces of architecture are not to be effaced from the memory, and vie with the recollection of nature's beauties, if they do not surpass them. I may mention the matchless perfection of the temples that crown the Acropolis of Athens, the hoary majesty of Nerva's forum, the sublimity of the interior of the Pantheon, the vastness, richness and striking forms of Santa Sophia and of that jewelled casket St. Mark's, as well as the more refined features of the Palazzi Vendramin, Manzoni and Cornaro-Spinelli, the Scuola de San Marco and the churches of Santa Maria della Salute at Venice and Santa Maria dei Miracoli at Brescia, while the wonders of the cloud-piercing fronts and spires of the Mediæval churches are equally ineffaceable.

Architecture not only throws a lustre on the reigns of kings, but in the monuments it erects sums up more completely than any other art the cultivation and tendencies of the nation, keeps its memory green, and when its glory has departed and all else has been swept away, still points to the greatness and intelligence of its people.

I have now to introduce to you the distinguished Dutch architect, Dr. Cuypers, on whom you are about to bestow the Gold Medal. It is usual to give a slight sketch of the life and works of the Gold Medallist in the interest of those who cannot be here, and many of those who would be here to-night are in the uttermost parts of the earth. So I must ask Dr. Cuypers to bear with me a little longer.

I can hardly think of Holland as a foreign country, so intimate has been the relation between it and England,—for did not Holland give us one of our revered kings, William of Orange, and many of our celebrated families?—and so warm is

still our sympathy with its soul-stirring efforts in the cause of freedom. Most of us when at school translated Grotius and the dialogues of Erasmus, that friend of Sir Thomas More whom he called "his darling." Who does not love the Dutch school of painting and feel at home with its creations? Who has not been enchanted by the power of Rembrandt and the vigour of Frank Hals, with the crystal purity of the colour of Peter de Hooze, with the woods of Hobbema, the rushing waters of Ruysdael and the beautiful architectural works of Van der Heyden? Who has not been fascinated by the dignity of those warriors and statesmen, and by the grace and loveliness of those high-born ladies that live for us again in the pencil of Vandyke; who has not in imagination shared in the hardships and rejoicings of such discoverers as Van Diemen and Tasman?

Dr. Cuypers follows a long line of distinguished Dutch architects to whom we owe the admired Mediæval churches, town halls and mansions, as well as the wondrous cathedral of Antwerp, and, in Renaissance days, the Villa Borghese and the Portal of the Vatican, designed by Van Santen, under the name of Vasanzio, for Pope Paul V., when Floris, Philip Vingboons, Van Campen and Post enriched their native country with their works, and Henrick built our Royal Exchange for Sir Thomas Gresham, all of which have been presented to us in the publication of Mr. Ysendyck. It is not usual to give the age of our Gold Medallist, but on this occasion the arrival of Dr. Cuypers' seventieth birthday this year has been the cause of almost national rejoicings in Holland; this points to something in his personality and career that has touched the hearts of his compatriots in a way that no mere quantity or excellence of his works could insure.

Dr. Petrus Josephus Hubertus Cuypers was born on May 16, 1827, at Roermond. In his nineteenth year he became a student at the Antwerp Academy, and got the prize for excellence and the gold medal for architecture in 1849. He began his practical career by the restoration of the Minster of Our Lady in his native town, and built his first church 1853. In 1864 he was awarded a crown for the William I. Museum, and up to 1894 he had built a cathedral and sixty-one churches and chapels; he had restored fifty-seven ecclesiastical buildings, mostly cathedrals and churches, and built museums, railway stations, mansions, villas, private houses and monuments, besides his great work of the Royal Museum at Amsterdam, some 450 feet long and 280 feet deep, with a central hall 70 feet wide and 260 feet long, the whole building comprising two quadrangles 130 feet long and 100 feet wide; it is built of brick with stone window jambs, mullions and bands. The style adopted is Late Gothic, just feeling the first breath of the Renaissance when cusps had been abandoned. This, however, is by no means all we have to be thankful for, as he started schools all over Holland, where the innumerable handy craftsmen who carry out architecture were taught the elements of design belonging to their crafts.

His motto is, "I believe, I love, I hope," and he says, "The love which binds together my beliefs and my hopes makes up my life." In his own house he has inscribed an apothegm of architectural wisdom:—"Study the old, in order to win strength and support to design the new."

It is clear that any architect who had carried out such an enormous mass of work must have been guided by fixed principles systematically employed; and when no detail has been allowed to pass without his own supervision, and is mostly from his own hand, it is obvious that his industry must be equal to his genius.

Sir, you are said by your contemporaries to be the one man in Holland who has done more than any other to point the way to higher things, and to follow out his own teaching. I gather from the admiration that you excite in Holland that your character is as much revered and loved as your genius is admired, for without the existence of peculiarly admirable qualities we cannot believe that you would have so endeared yourself to your countrymen, for you have falsified the poet's saying that—

"He who surpasses or subdues mankind,
Must look down on the hate of those below."

I now beg in the name of the Royal Institute of British Architects to invest you with Her Majesty the Queen's Gold Medal and to enrol you amongst that company of gold medallists that sheds such lustre on our Institute and on our country, and to hope, both on behalf of the Institute and myself, that you may, like so many great architects, live long to enjoy the honours you have so well merited and the love that you have called forth and to add to the number of those works with which you have already so largely adorned your native land.

The medal was then presented, after which Dr. Cuypers replied in French, the following being a translation of his acknowledgment:—

Mr. President,—Allow me to express myself in another language than in your national tongue, which I deeply appreciate and revere, but would fear to profane by speaking imperfectly before this august assembly. My own Dutch

speech, although it partly has a common base with yours, in that old Saxon which, had it not been for Charlemagne, would have become the universal Germanic or Teutonic language, is familiar to only a minority of the inhabitants of Great Britain, and would not suffice to render me intelligible in this chamber. I have recourse to the French language, which has numerous relations with yours—witness the denominations of the provinces of Normandy and Brittany in France—and like English, but in a less degree, is heard in the most distant countries of the terrestrial globe, everywhere that civilisation and liberty have established their glorious reign.

I feel, Mr. President, that I must, before and above all, express to you my sincere thanks for the words, too kindly and too flattering, which you have been good enough to address to me.

If it is true that all approbation of our work flatters our pride, what satisfaction must we not feel when this approbation comes from those of our colleagues for whom we have reserved a place of honour in our esteem and our veneration?

Yes, at this hour I dare publicly and solemnly say that, if I have had any success in my career as an architect, the example which has been given me by my colleagues in Great Britain has greatly contributed to it.

When I visited England for the first time, so as to study the great monuments of our neighbours, it was not only the ancient and majestic cathedrals, the characteristic churches of little towns and villages, the splendid colleges and other monuments of bygone ages which delighted and deeply impressed me, but, above all things, the wise lessons which my honoured colleagues Pugin, Scott, Street, Burges, Clutton and so many others—only to speak of those who have gone before us into eternity—had drawn from the work of the great architects of the Middle Ages and of antiquity.

It was here that I saw applied, with that correct, rational taste which characterises your glorious nation, the pure, true and unchangeable principles of our art, which must be true, utilitarian and practical, and at the same time not offend against those elusive canons of beauty wherewith God has endowed us, to be the immutable appanage of those who cultivate the arts.

It was particularly in your country, my dear colleagues, that I learned to estimate at its just value the charm which proceeds from correct and persevering application of the difference between materials, as much with respect to their properties, nature and qualities as with respect to their colour and other æsthetic features. It was here that I learned to appreciate the great advantages that result from the survival of the old co-operative guilds of arts and crafts, by which you have been able to maintain for the execution of your works practical and capable craftsmen, worthy of the share in the work that is entrusted to them.

It was in your country more than anywhere else that I noted and admired the happy application of the good principles of the past to the needs of modern society, in all the works of your great masters.

If, on the one hand, your fair and interesting land attracted me with its rich monuments and its great analytical architecture, on the other the welcome given me by my dear colleagues, from my very first visit, was such that I was able to profit by all the advantages that friendship and urbanity can offer. If the old masters were there to instruct me and to stimulate my ambition by the contemplation and the study of the masterpieces of great periods, the living masters, their worthy rivals, gave me their aid in procuring me access to, and serving as my guides in all hidden nooks of interest, in all celebrated museums, in the innermost of all sanctuaries of art.

It was in 1866 that I had the honour of being elected honorary corresponding member of the Royal Institute of British Architects, a title which is held in high esteem abroad, and in itself gives a certain influence and position to any architect.

And who will be astonished if it is known that this noble Royal Institute is the great school in which has been and is still being formed all that England can produce of that which is glorious and illustrious in architecture?

The preservation and the restoration of the historic monuments of your ancestors, the imitation of ancient models, the assimilation therewith of new buildings, the formation of a legion of artists fighting, without ever losing ground, against those errors of every kind with which the depraved taste of certain periods threatened the sanctuary of art—these are the first-fruits of this glorious institution.

Another great service rendered by you to the whole artistic world is to be found in the important travels that you have undertaken so as to study the monuments of the most distant countries, without regard to the manifold sacrifices that such enterprises inevitably entail.

The remarkable publications in which are printed the results of these artistic peregrinations are and will remain a splendid memorial of your Royal Institute.

If on this day I have thought it behoved me to pay homage

to the Institute for the great services which it has rendered to the artistic world in general, I will beg you to believe me, my honoured colleagues, when I add that I feel doubly happy in being able to express to you my keen appreciation of the distinguished honour with which you have gratified me.

I venture to request the honourable President to be kind enough to act as interpreter for his foreign colleague before Her Majesty the Queen of England, in order to express to her my deep gratitude for the fact that she has deigned to confirm the choice of the Institute by honouring me with the Gold Medal in the Jubilee year—the very year when so many millions of faithful subjects are blessing Heaven for having given them as a sovereign the most accomplished woman who has ever worn a crown.

EXPLORATIONS IN BABYLONIA.

A CORRESPONDENT of the *Times* writes:—To have unearthed the ruins of the oldest city in the world, the foundations of which were laid some 6,000 or 7,000 years before the Christian era, is a reward of which an explorer might indeed be proud. Such good fortune seems to have fallen to the lot of Mr. Haynes, who for nearly five years has been in charge of the American expedition engaged in excavating the great mounds of Nuffar, in Northern Babylonia, the site of the ancient city of Nippur, the sacred city of Mullil or the "Older Bel" of the Semites.

The history of the expedition which since 1888 has worked upon this site is a remarkable one, and its great work has been so quietly done that it has attracted but little attention except among students of Assyriology. The work was undertaken by the University of Pennsylvania, the funds, which have amounted to about 70,000 dols., being provided by a small committee interested in the work. The expeditions of 1888-90 partook rather of a prospecting survey, and were under the direction of Dr. Peters. The trial trenches produced a harvest of about 10,000 tablets and inscribed objects, among them several records of Sargon I. and his son Naram-Sin, whose date, B.C. 3800, was by many regarded as the starting-point of Babylonian history. Troubles among the Arabs and the usual difficulties with the Porte delayed the work for three years. In 1893 the explorations were renewed under the charge of Mr. J. H. Haynes, and they have been carried on continuously ever since, and have produced results such as were never dreamt of even by the most ardent advocate of Babylonian explorations, and the history of civilisation has been carried back to an antiquity never thought of. The cause of this triumph is not far to look for. Hitherto, with the exception of the short expeditions of Dr. Budge and the late George Smith, the work of exploration has been entrusted to men who, able as they were as directors of the excavations, were in no sense of the words either archaeologists or Orientalists. The labours of Layard and Rassam obtained the magnificent collections of the British Museum, but they contributed little to our knowledge of the archaeology of the cities they explored. The methods of systematic research such as were employed by Curtius, Schliemann and Petrie, working on strictly scientific principles, laying bare stratum after stratum of the ruined city, noting with care the position of every object, no matter how minute, and above all the aid of photography, had never been applied until now, and the result is a complete revolution in our knowledge. By this method the history of the excavated city may be read like a book, each stratum as it is uncovered furnishing us with a chapter of its long-lost history. The story of Nippur, as read in its ruins, is indeed a remarkable one.

The great mounds of Nuffar are situated on the east bank of the now dry Shat-en-Nil, a great main artery navigation canal which once connected Babylon with the Persian Gulf. The central feature of the ruins is a vast conical mound, called by the Arabs Bint el Amir, "the Amir's daughter," which rises to a height of nearly 29 metres* above the surrounding plain. This mound marks the site of the great ziggurat or temple stage tower first built by Ur-Gur or Ur-Bahu, as he was formerly called, about 2800 B.C., and subsequently repaired and added to by later kings. This vast structure was the central point of the explorations by Mr. Haynes.

We have long been familiar with another of the great stage towers erected by Ur-Gur at Mugayyar, the ancient Ur; but the one at Nippur is the first that has been thoroughly explored. The tower rests on a basis 59 metres by 39 metres, and is built, like most of these Babylonian towers, with the angles to the cardinal points. It appears to have consisted, like that of Ur, of three stages only, not seven, like the later towers at Babylon and Khorsabad. Each stage had a thick coating of plaster, composed of clay mixed with chopped straw, and to protect the lower stage from the winter rain it was faced with kiln-burnt

* In this article the metric system is used, as by Mr. Haynes and Dr. Hilprecht in their reports.

bricks and a coating of bitumen. The ascent was on the south-east side, and here it would seem Mr. Haynes has made a most important discovery. Two walls of burnt brick, 3.40 metres high, 16.32 metres long and 7 metres from each other, were built out into the temple courtyard, and this causeway was filled in with crude bricks and formed a broad roadway leading up to the tower. The whole temple enclosure is surrounded by a massive wall, of which more than 30 courses are still visible.

The arrangement of this temple and tower of Ur-Gur bears a most striking resemblance to the early Egyptian pyramids, especially Medum and the stepped pyramid of Sakkara, while the causeway recalls that of the second pyramid of Khafra, which connects it with the so-called temple of the Sphinx. The question often suggested by archaeologists has been, Were these stepped pyramids connected with the temple towers of Chaldea or borrowed from them? There is now, however, a possibility of our reversing this question, in the light of these discoveries at Nippur. The pyramid we know was but an elaboration of the Mastaba, and the resemblance between these and the towers at Ur and Nippur is most striking. Dr. Hilprecht and Mr. Haynes maintain, upon very good ground, that Ur-Gur was the first to build these ziggurats, and there is certainly no trace of such edifices in any of the older cities, those at Tello or Lagash and Abu Habba, the ancient Sippara, being both later. At no period in early Chaldean history was there so close a contact between Egypt and Chaldea as during the dynasty of Ur-Gur Dungi and Gudea of Lagash. These rulers, as we know from their numerous inscriptions found at Tello by M. de Sarzec, were in constant communication with Egypt by sea and through the Sinaitic peninsula. It was from this region that they obtained the hard diorite and porphyry for their statues and door sockets. The statue of Gudea, seated and holding the plan of a temple on his knees, is most Egyptian in character, the attitude resembling that of statues of Khafra and Menkara; moreover, the scale engraved upon the tablet gives the Egyptian and not Chaldean cubit. Indeed, as Mr. Boscawen has pointed out, the statue of Gudea, the architect, with the plan on his knees bears a most striking resemblance to the Egyptian figures of Imhotep, the Egyptian god of mathematics, who may be regarded as another form of Pthah the "architect." In the face of this evidence from Nippur we may have to reconsider the question of Chaldean influence on Egypt, and, indeed, possibly reverse the old theory. The tower rests upon a massive brick platform of crude brick. Excavations conducted below this revealed the existence of a second pavement of much finer construction, being built of kiln-burnt bricks of great size, the dimensions being 50 cm. square and of great thickness. Nearly the whole of these bricks were inscribed, and bore the stamps of Sargon I. and Naram-Sin, his son, and its date, therefore, is just a thousand years prior to the buildings of Ur-Gur, namely, B.C. 3800. From the inscriptions of these kings we know that they both built large portions of an older temple of Mullil, for the bricks bear the inscription, "builder of the temple of Mullil," and dedicated a number of vases to the temple inscribed with their legends. These buildings have been entirely removed, and the surface of the vast platform levelled for the reception of the edifices of Ur-Gur.

Of the old temple there is evidence afforded by a discovery to which we shall shortly refer. Proof, however, of the great buildings of Sargon and his son is afforded by some excavations to the north-west of the temple. Here was a line of mounds which marked a rampart, and Mr. Haynes in 1895 cleared a portion of it and unearthed one of the most extraordinary pieces of masonry ever discovered. The foundation consisted of a solid bed of clay mixed with straw and puddled down, resembling some of the constructions found by Dr. Schliemann at Hissarlik. Upon this foundation and plinth was constructed a solid brick wall, 52 feet in thickness and rising to an unknown height. The builder of this wall was Naram-Sin, whom so many have regarded as a mythical king. It is probable that this rampart formed also a broad roadway round the city, and it may possibly, as Mr. Haynes suggests, have had a row of chambers in its upper part. A similar wall, but less than half as thick, was found by M. de Sarzec at Tello.

Directly to the south-east of the great tower and close to the great rampart Mr. Haynes discovered a chamber 11m. long, 3.54m. wide and 2.60 high. As there was no doorway it was evidently a vault entered from above. Its floor rested upon the platform of Naram-Sin, and it formed a communication between the two strata. The inscribed bricks proved it to have been built by Ur-Gur. What was its purpose is explained by the discovery of a second chamber of the same kind immediately below it. In this second chamber a brick stamp of Sargon was found embedded, and broken stamps and some few tablets were found in the room. The explanation is now easy. Round the walls ran a narrow shelf, on which some tablets and brick stamps were found. The chambers were the archive chambers of the temple; the smaller one that of Sargon, which had been partly restored by Ur-Gur, while the second was that of the king, built up to the level of his own pavement.

It is clear that at some time between the time of Ur-Gur, B.C. 2800, and the rise of the Kassite dynasty B.C. 2200 the archive chamber had been broken into and large numbers of objects carried away and the rest broken and scattered. There can be little doubt that this disaster took place during the terrible Elamite invasion in B.C. 2285, when all the principal temples were pillaged and their treasures carried to the Elamite capital. We have a proof of this afforded by a small disc of agate found in the ruins, which bears on one side a dedication by Dungi to Mullil, and on the other a dedication by Barnaburyas, B.C. 1400, which states that it was taken from "the Palace of Susa, in the land of Elam." The amount of *débris* from the pavement of Naram-Sin to the top of the mound is 11 metres in height, and this, we know, took close on 4,000 years to accumulate. Mr. Haynes, encouraged by the success of his work in the upper stratum, proceeded to excavate to reach the virgin soil, which he did at the depth of 9.25 metres, passing through the *débris* of ruined buildings, accumulations of broken pottery and fragments of inscribed stone objects and well-constructed drains. These remains prove the existence of at least two temples below the pavement of Naram-Sin, which at the most rapid rate of *débris* accumulation cannot be assigned to a later date than between six and seven thousand years before the Christian era. This lowest stratum has been much disturbed and the buildings pillaged; still sufficient remains to reveal to us earlier phases of Babylonian civilisation than we have ever seen. The first structure discovered was an altar of sun-dried bricks, 4m. by 2.46. The upper course had a rim of bitumen, and upon the altar was a large deposit of white ashes. Round the altar was a low wall marking the sacred enclosure. Outside of this enclosure we found two immense vases of terra-cotta. These great specimens of early pottery were each 63.5 centimetres high, and decorated with rope pattern. We have here in this simple, sacred precinct the germ from which sprang the great temples of Chaldea—the altar, with its temenos, entered only by the priest, and the two great vases for purification, replaced in after times by the greater and lesser *absu*, placed before the temples. A somewhat similar construction was discovered at Sippara, but its archaeological value was not recognised. South-east of the altar was found a remarkable structure, a brick platform, 7 metres square and 3.38 metres high, built of fine unbaked bricks. Round the base of this Mr. Haynes found a quantity of water vents, which indicated a connection with some receptacle below, and on sinking beneath this solid mass he found a drain passing underneath the platform, in the roof of which was the earliest known keystone arch. It is 71 centimetres high, and has a span 51 centimetres. The bricks are well baked and joined with stiff clay as mortar. Thus the priority of Chaldea in the use of the keystone arch is clearly established.

This structure was over 7 metres below the pavement of Ur-Gur and 4.57 below that of Naram-Sin, and, since there were no massive ziggurats or great temples to crumble into ruin, it must have taken many centuries to build up so great a mass of *débris*, and an estimate of from 1,500 to 2,000 years before the time of Sargon does not seem too high.

Having described the various strata of this remarkable site, it is now time to devote some consideration to the numerous monuments and inscriptions that have been recovered. The harvest has been an ample one. Over 26,000 tablets, as well as numerous inscribed fragments of vases and stelæ, have been recovered from this site. It is therefore clear we have no lack of material. It must be remembered, as we have already said, that the record chambers of both Sargon and Ur-Gur were sacked by the Elamite invaders of Kudur-Nakhunte in B.C. 2285, and this will account for so few inscribed records being found in the lowest strata. That, however, there had been numerous records of the pre-Sargon period which had been removed to the treasury of Sargon, and subsequently to that of Ur-Gur, is shown by a most important find. Under a pavement of Ur-Ninip, a king of the dynasty of Ur-Gur, were found quantities—some hundreds—of broken vases and other objects that had been votive offerings to the shrines of Mullil from the earliest times. Among these were some of the most archaic type, even more pictorial than those discovered by M. de Sarzec at Tello. Among these was a large stone boulder inscribed with a linear inscription of a king named Lugal-Kigub-Nidudu. Upon this we find a second endorsement by Sargon, written years after in arrow-headed characters. Here we have a manifest proof of the priority of this monarch to Sargon. Among these broken fragments, purposely destroyed, were the fragments of over a hundred vases dedicated by a king named Lugal-zaggi-si to the temple. From these texts Professor Hilprecht, almost at the loss of his eyesight, has constructed a complete text of 132 lines written in a most archaic character. Fragments of similar vases were found beneath the Sargonite pavement. The most conclusive proof, however, is afforded by the examination of these inscriptions along with the earliest monuments from Tello, where they are found to form a com-

plete historical series relating to affairs of which no mention is found either in the time of Sargon or after.

All of these records relate to a series of primitive wars, and form certainly, whatever their age may be, the oldest historical records known. The earliest of these is the inscription of "Eshagsagana," written in most archaic characters; this monarch is styled "lord of Kengi"—that is, Lower Babylonia, "the land of channels and reeds." In his time the chief enemy of Babylonia was the city of Kish, the modern El Hymer, whose priest ruler had entered into alliance with some fierce tribes called "the hosts of the Land of the Bow," a people regarding whom we shall have some remarks to make shortly. The first inscription records a war against them by the Babylonian king. It describes how the Babylonians "conquered the King of Kish and his ally," the evil-hearted "horde of the Land of the Bow," spoiled his city and burned his property, carrying away the statue of the king, his bright silver and his furniture which he dedicated to Mullil. The next inscription in this sequence is one of the king of "hordes of the Bow" who had had his revenge and conquered Babylonia. This inscription is engraved upon the vases which he dedicated to the temple. It begins by an ascription to Mullil, "the lord of the world," from "Lugal-zaggi-si, King of Erech, the son of Ukus, high priest of the Land of the Bow." Thus we see that the conqueror had established himself in the ancient capital of Erech, and from his inscriptions we learn also that he ruled in Ur-Larsa as well as in Nippur. The king then describes his empire as extending from the Lower Sea of the Tigris and Euphrates to the Upper Sea (Mediterranean), and as being granted dominion over all lands from the rising to the setting of the sun, whom he has caused to dwell in peace. How long this foreign dynasty ruled we do not know; it was, however, followed by a dynasty whose capital was Ur or Mughier. In the inscriptions of Lugal-Kigub-Nidudu found with the above we learn that he made Erech "the seat of lordship and Ur the seat of sovereignty." The closing episode of this first of wars is supplied by a monument discovered by M. de Sarzec at Tello, the celebrated stela of the Vultures now in the Louvre. In this monument erected by the King of Lagash, when a dynasty of kings was established after that of Ur, we have the record illustrated by sculpture of the king, who made a victorious campaign and utterly defeated the "hordes of the Land of the Bow."

After this, neither in the campaigns of Sargon nor his son, nor in any chronicles of the Babylonian empire, have we any record of these people. Who were they, then? Professor Hilprecht has put forward in a most dogmatic manner a theory that they are to be identified with the Semitic tribes of North Mesopotamia, and that the "City of the Bow" was Harran. He cites no ancient authority, no pre-Sargonic mention of Harran, but only a statement of Albiruni "that Harran was built in the form of a crescent moon," and that the plan of the ruins resembled a bow. It is surprising to see so brilliant a scholar using so feeble an argument. It is rather to the plains of Central Mesopotamia and the lowlands between the Tigris and the Kurdish mountains that we must look for the home of these nomadic warriors. This region was always the home of warlike nomad tribes, and the people of the Bow only preceded the host of the Manda, or Barbarians—the Gaim of the Hebrews—who, until the fall of the Babylonian Empire, were the dreaded foes of the Chaldeans. As to their Semitic character there is every reason to regard them as akin to the Sumerian. There no doubt was a variety of tribes among them, but their inscriptions are written in Sumerian and there is only one word with a suspicion of Semitic origin, and on this no argument can be based. It is enough that through the Sumerian they have restored to us the earliest chapters of the world's history. Indeed, the style of Professor Hilprecht's otherwise excellent memoir is not such as commends itself to scholars. No doubt he is making known the greatest discoveries of modern times, but there is no need to substitute personal dogmatism for scientific facts. It is waste of time to advance on slender basis theories which have to be corrected in subsequent parts.

We have been able to give only a brief account of the wonderful work of this campaign, which reflects so much credit on its organisers, and above all on Mr. Haynes. For thirty-two months he lived alone among the wildest Arab tribes in Mesopotamia, in an atmosphere of fever varied with cholera. One determined, but fortunately unsuccessful, attempt was made upon his life; yet amid all these surroundings he lived and did the work of three men. It is no over-praise to say that Mr. Haynes is justly entitled to take his place in the front rank of explorers along with those who have restored to us the first chapters of the world's history.

At Solano, in the province of Ciudad Real, Spain, the wall of a church fell in, killing nine children and injuring several others.

THE LIMITS OF SCULPTURE.

SCULPTURE being the art of conveying ideas by means of form only must of necessity reject, as irrelevant or inexpressive, all those objects whose chief charm or power is derived from that other main ingredient in nature, colour. Not only this; it must so select and arrange its lines or forms that they shall tell thoroughly to their purpose unaided by it, and this power in them is gained not by servile imitation, but by a study of their principles. In nature the two, form and colour, are blended together to carry out one purpose; but the latter is often so predominant over the former, that the eye becomes satisfied with the impression received from it alone, making no inquiry beyond. This is strongly illustrated in the plumage of birds, and the colour of insects or flowers, whose brilliancy is such as almost to obliterate from the mind the remembrance of their shapes. Sculpture, however, has but one of these means in her power, and to this one she must apply all the force she can, to accomplish what in nature is effected by the two combined.

In looking at nature, the eye never questions the correctness or possibility of any of her forms. Reason satisfies us, without effort, of their truth, if not always of their beauty; where the mind can see and comprehend the position or action of a part, it takes the rest for granted, and acknowledges at once the presence of the whole. Not so, however in art; here the eye, conscious that it is looking on the work of human hands, liable to error, becomes suspicious, and everything must in consequence be so defined as to leave little or nothing to imagination, and satisfy it, not only of the completeness as a whole, but of the proper proportion of each distinct part.

Lines and forms, the medium through which sculpture works, have certain meanings attached to them, even in their most simple and primitive character, dependent, perhaps, upon the laws of gravitation. Thus, a perpendicular line is expressive of life or fixedness, a horizontal one of sleep or death, a diagonal one of action or volition. Hogarth was the first to define the serpentine line as the one of grace, from its partaking, perhaps, of some portion of all the other three; and from the pleasurable sensation the eye experiences in travelling undisturbed along its ever-varying and gently-changing surface. Among serpentine lines, those which undulate slightly, departing but little from the straight line, are indicative of easy and elegant motion; while tortuous or angular ones betray strong and powerful, quick and animated action. Parallel or straight lines, from the sameness of sensation produced, have a tendency to create weariness, unless interrupted by stops or resting places, on which the eye can pause in its otherwise monotonous course, while sharp rectangular ones are apt to offend, from the sudden exertion necessary in the visual organ, to enable it to alter abruptly its direction. Forms have again their meaning derived from the same laws. The pyramid or cone, when standing on its base, impresses the mind with the feeling of firmness or stability; while, when on its apex, it conveys the idea of lightness or instability; and the same, when diagonally placed, expresses swiftness, assuming as it does the shape of the arrow head, and the general form of all animals whose predominant property is speed. There is in nature, amidst all her endless variations, a constant approximation to geometrical shapes, that is to say, to shapes one-half of which reflect the other. The world itself is nearly round, no animal in it is created that cannot be divided into two similar halves. The star in the heavens, by its rays, becomes almost regular in its form, while the star-fish on the shore is guided by the same law; the tree, wild as it appears, shows the same disposition in its growth. The poplar is the elongated oval, the fir the cone. Gather a branch of the myrtle and every leaf has its opposite; the flowers are made up of parts radiating from a centre and tending to one simple and nearly geometrical whole. Forms, unmeaning when single, become, when united in the kaleidoscope of nature, pleasing to the eye, as well as regular and geometrical in their character. That positive regularity of form is never attained in nature is neither a proof of her weakness, nor of the absence of the principle. He who so made his works that, while each should be subservient to its individual purpose, the whole should be agreeable to the eye of man, was too wise to do that which would have destroyed one of their chief charms, variety. This law is not intended to create monotony, but as the key-note for preserving harmony amidst all the music of creation.

The sculptor attends to these rules, he selects the lines which best express the fixedness or motion, the life or stillness, that he may require; he arranges his figures or groups in shapes that are in themselves indicative of their character or feeling; he goes near to regular forms and so obtains order, but at the same time takes warning from nature not to spoil variety by too near an approach. Regularity of arrangement, however, is admissible in sculpture in a greater degree than it is found in nature, for sculpture may be said to be the twin-sister to architecture, being ever found more or less associated with her. Hence, by partaking somewhat of the formality of the latter, she unites herself to a certain extent in sentiment with her; while

by her greater departure from positive geometrical forms and her nearer approach to those of nature, she becomes the connecting link between the two. What we have just explained is well illustrated in the antique group of the "Laocoon and Sons," in which an almost endless variety of tortuous lines expresses the strong action caused by the agony; while the placing of the two sons, somewhat formally, one on each side of the father, preserves due order amidst all the horrors of the scene.

Sculpture is an art intended not merely for the gratification of a day, but for the pleasure and instruction of ages. Everything, therefore, which relates only to the fashion of a moment, or that is in contradiction to the never-changing principles of nature, is in it so much wrong. The ancient Greeks made their figures nude or partially covered with drapery—not silk, satin, velvet or cotton, but with drapery, cut neither into coat, waistcoat nor trousers, but hanging according to the natural laws of gravitation, which regulated its folds then as it does now. The waists of their figures are not short, like those of the last generation, nor long, like the present. No part is unnaturally compressed or increased beyond its proper proportions. The divisions of the human frame are left where nature intended them to be; man walks forth from their hands as he first walked forth from the hand of his Maker, and so long as his laws remain the same, so long will the reputation of these great works last.

The only legitimate exception to this rule is portraiture, a species of sculpture which, while it acknowledges tributary obedience to the general laws of the art, asserts for itself the right of making regulations of its own, for carrying out more effectually its particular purposes. So much discussion has taken place, and such a variety of opinion exists on this subject, that it may be well to devote a few lines to it. Sculptors who draw their inferences and rules of art entirely from ancient examples contend that all indications of the dress or manners of the period to which the person represented belongs should be obliterated in a portrait-statue; that costume should be thrown aside, and scarcely aught, save the face, be literally transferred from nature to the marble or bronze. This is called idealising a statue, and idealising it is, there is no doubt, in one way of speaking, for but little of the individual character of the original enters into the composition. It is, however, a mistaken view of the question; for the primary object in portraiture, whether in painting or sculpture, must be to record, in a pleasing and appropriate manner, the personal resemblance of the original; to hand down to posterity the bodily form, in which is contained those mental powers that make him admired or beloved; to give to the eye permanently that which no history or biography will be able hereafter thoroughly to convey to the imagination. For the accomplishment of this he must be represented surrounded by those circumstances that mark the time in which he lives, and the employments in which he is engaged. Suppose, for the sake of argument, all portrait-statues to be made after the fashion above alluded to, as they too frequently are when entrusted to artists who are too bigoted to the ancient practices of their profession to apply the powers of reason to their works—suppose, we say, all portrait-statues to be made nude, or clothed only with simple drapery, which neither marks age nor country, and that they are at some future period recovered from the ruins of a decayed nation, as have been the statues of ancient Greece, with scarcely anything to distinguish them one from another, beyond perhaps some vague allusions to them found in the works of contemporary writers, or, at the best, a stray medal or coin that appears to bear some faint resemblance to them—what will enable the antiquarian or historian of that future age to distinguish between the representation of a Chaucer or a Spencer, a Newton or a Bacon, a Shakespeare or a Milton, a Pitt or a Peel, a Watt or a Stephenson? There is besides an inherent character in portrait faces which no ingenious treatment in sculpture can completely harmonise with that general representation attempted in what is conventionally called the classical style. By removing the peculiarity of the general form and depriving the figure of its dress and customary accessories the individuality of the face becomes more apparent and incongruous. The work under this sort of treatment amounts at the best but to a sort of bastard idealisation.

It is not intended in this argument to advocate positive, literal copying in matters of costume. A statue is not erected to commemorate the dress, but the man; it is sufficient, therefore, if the former be so indicated as to give the general impression of belonging to its wearer and his times. Such peculiarities in it as are unimportant or offensive to good taste, or that detract from the broad treatment of the work, should be omitted or judiciously concealed. An artist of right feeling finds no great difficulty in this, though perhaps nothing serves so much to distinguish his work from that of inferior men as due attention in this particular. There are many kinds of modern dresses, as well suited to sculpture as the most simple drapery, such as the robes of our princes and peers, our judges and clergy; and it is rarely that an opportunity is wanting in a

statue of selecting one or other of these. Even the ordinary modern dress worn in our streets may, by a little modification and treatment, be so approached in marble as to give a general impression of identity, and yet not be ludicrous or offensive to those who may hereafter have to look at the work when the fashion shall have changed or entirely departed. Were a proof wanting that this is the correct method of solving the question, we might quote the opinion of Flaxman, as shown in his works. Though the most imaginative sculptor England, or perhaps the world, ever produced, his portrait-statues are singularly literal; in fact, if they have a fault it is the too close adhesion to the detail of modern dress; evidently showing that he felt the sound judgment of not departing from those things that mark identity of person and period. His figure of Sir Joshua Reynolds in St. Paul's Cathedral is an instance of judicious choice of costume, and will bear comparison with most works of the English school; and his statue of Pitt is another instance of close attention to this point, notwithstanding which it is a thoroughly characteristic work, simple and elegant, dignified and statesmanlike.

It is generally felt that good ideal sculptors rarely send forth successful portrait-works. The reason is obvious, though not often inquired into. The general system of their training is in opposition to the attainment of the power necessary for producing strongly characteristic likenesses. They are taught in their studies to avoid all that is individual, and to extract beauty from nature by sifting and selecting from her works that which is general or universal in its application. In ideal works, character, it is true, must be mixed up with beauty, but that character must be of general nature, as illustrated by classes; and, as such, is perfectly distinct from that necessarily strong feature in good portraiture—individuality. This individuality the portrait-sculptor, instead of rejecting, has to seize strongly upon, to portray in his statue, and even to increase in power, that it may make a lasting impression on the spectator. This he must do, not by exaggeration of form, manner, attitude, or expression—for that of course would be caricature—but by depicting the person under suitable circumstances, and engaged in employments appropriate to him, and that tend to bring forward his best and most striking expression and attitude. The artist must select, too, from the component parts of individuality such as are pleasing and to the purpose, and reject such as are otherwise. This is what is vulgarly called flattery, but it is no departure from the truth otherwise than in not telling the whole of it. The peculiarities, whether personal or mental, are not changed; it is merely that the best only are brought out to view and the others veiled from the sight, but gently hinted at or, maybe, altogether omitted.

It will be easily seen, therefore, that the requisites for success in the two walks of art are somewhat different, if not wholly opposed to each other, owing to individual character and abstract beauty being such essentially contradictory qualities, as is shown by the circumstance that the one may be exaggerated and so become caricature, while the other is incapable of being either conceived or represented in excess.

Material must always have a powerful effect in regulating the style or manner of sculpture, and in limiting its efforts. To the ponderous blocks of syenite and granite, so unmanageable to the workman, we are indebted for many of the peculiarities belonging to Egyptian art. The beautiful marble of the Greeks, capable of delicate finish, and yet possessing within itself the elements of strength, helped them in a measure to the execution of their light, elegant and lifelike figures. The softer materials employed by the Gothic sculptors of the Mediaeval ages obliged them to resort to long draperies and other contrivances to render their statues durable. A due consideration of the material in which a work is to be executed is one of the primary studies of the sculptor, and affects his design as well as his execution. An attempt to exceed the limits which that material puts upon him may be considered not as a proof of genius, but rather as a misunderstanding of his art. For instance, if his work be intended for marble, he will endeavour, while he retains the lightness and elegance necessary for his subject, so to arrange the parts that they shall be durable and at the same time capable of being with tolerable facility carried out in execution. While he attempts the introduction of nothing that cannot be perfectly expressed in such material, he will often strengthen many features of his work when he wishes them to tell forcibly, even beyond what he is justified by nature, knowing that otherwise their effect must be weak in consequence of the substance being colourless and semi-transparent. To this, which may be considered as a question partly of light and partly of material, the English sculptors scarcely give due attention; they are accustomed to work their figures and groups in studios where the windows are constructed so as to produce upon them strong decided lights and shades, and the result is that when they are brought out into the broad open air their forms are found to be insufficiently defined, the white pellucid marble absorbing and amalgamating the little contrast of light and shade which they receive. The style of touch in

the English school is more suited to painting than to sculpture, and the general appearance of the surfaces may be compared, criticising them severely, to what by judges in horse-flesh is termed "gummy." The foreign sculptors, however, seem to calculate better on the changes of light and shade which their work has to undergo, as well as on the nature of their material; and in this respect are decidedly superior. If the work be intended for bronze, the sculptor is free from fear as to the fragility of parts, and can proceed without any regard to that circumstance, but he has others connected with his material to influence him; he knows that his statue will eventually be of a dark opaque colour, so dark that often, when standing between the sun and the spectator, little except the marginal outline will be visible; he must therefore so design it that it shall tell effectively, unaided by aught save that outline, the internal details or minutiae becoming comparatively valueless, except that so far as they help to make up the boundary line from different points of sight. Many things therefore are forbidden that would probably in the white marble help to give interest, but which in the dark bronze would detract from that clear definition of form which must always be apparent in every view.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.

CHATSWORTH HOUSE was this year selected for the excursion, which took place on Saturday last, of the members of the Sheffield Society of Architects and Surveyors. An early start was made, and the drive to Baslow was by the direct road, luncheon being ready at the Devonshire Hotel when the party arrived. The Duke of Devonshire placed the whole of Chatsworth and its grounds at the disposal of the members, and there was no check whatever upon the party seeing anything that could interest them as professional men and lovers of all that is beautiful and rare in art. Mr. Gilson Martin, F.S.I., his Grace's steward, met the members at the main entrance and accorded them a hearty welcome. Mr. B. Bagshawe, who is a "lay" member of the Society, was appointed cicerone, and fulfilled the duties of his office admirably. He has a rare knowledge of Chatsworth, of its history, its architecture and its many treasures, and without loss of time was able to conduct the party to places of the deepest interest to them. He was ever ready with explanation, suggestion and reminiscence, and his able guidance made the visit doubly enjoyable. Peculiarities of the stonework at the entrance having been commented upon, a visit was made to that portion of the house usually shown to the public, and here there was much to admire, though to many the sights were no new pleasure. The members were then privileged to visit the library, where Miss Martin was in readiness to display the many treasures it contains. A long stay was made here, and among the numerous valuable books examined were Claude Lorraine's "Liber Veritas," several of the famous Inigo Jones's sketch-books, one including a diary of his stay at Rome, and another containing many exquisite designs—some coloured—for masque costume, &c.; early Caxtons and the first book printed in the English language, valuable illuminated books, a curious volume of surveys of the Cavendish estate at the end of the sixteenth and the early part of the seventeenth century, early plans of Chatsworth House and sketches and manuscript memoranda of Watson, the person principally engaged on the carved stone and woodwork at Chatsworth at the end of the seventeenth and the beginning of the eighteenth century. Leaving the library, the grand suite of private apartments was traversed, and an opportunity was given of examining the magnificent works of Holbein, Tintoretto, Rembrandt, and other great artists of their time. A move was made for the two galleries containing the most valuable collection of original works by old masters in the possession of any private individual. None of the great Italian, German, Flemish, French, Venetian, Spanish and other schools are unrepresented, and the paintings were a revelation to most of those present. Amongst them are the works of Raphael, Michel Angelo, Rembrandt, Rubens, Leonardo da Vinci, Poussin, Claude, Salvator Rosa, Correggio, Luca Signorelli, Vandyke and many others. The pictures, of course, are not of large size, and the two galleries are filled with them. Hours would be insufficient to make a real inspection of the grand collection, and it would take days to observe and study them as they deserve. The late Mr. Reid, of the British Museum, made a careful catalogue of the collection in recent years, and many of the more valuable drawings were autotyped years ago by Messrs. Braun, of Paris, from whom facsimiles are still obtainable. Among other rooms visited were two private ones, containing a collection of exquisite water-colour drawings, principally beautiful examples of David Cox and William Hunt. The famous sculpture gallery also proved most interesting. Here the vice-president, Mr. Joseph Smith, proposed a hearty vote of thanks to the Duke of Devonshire for the privilege he

had accorded the members, to Mr. Gilson Martin for his kindness in personally conducting the members through the house, and to Miss Martin for the manner in which she had placed the treasures of the library at the disposal of the visitors. The resolution was seconded, supported and warmly carried, and Mr. Gilson Martin, in reply, expressed the pleasure it had given his Grace to grant permission to view the house, and to him (Mr. Gilson Martin) to accompany the party. The admirable services of Mr. Bagshawe as cicerone were also cordially acknowledged.

Afterwards the gardens, with their many artificial wonders, and the electrical apparatus, for which water power is utilised for lighting the whole of the house, were examined. The fountains, including the Emperor, which throws a jet of water 270 feet high, were playing in honour of the visitors, but there was not time to remain in the cool air in their vicinity, as there had to be a long discussion regarding the exterior of the house and the cheap rate at which much of the beautiful carving was executed. The tour concluded with a visit to Queen Mary's Bower, and many were the opinions hazarded as to the time of erection and object of the strange, moat-surrounded building. No satisfactory conclusion was come to, but there was general agreement that the building was erected before the time of Queen Mary. This concluded the tour, the members having devoted about 3½ hours to their work of pleasure.

TESSERÆ.

King John's Tomb, Worcester Cathedral.

THE body of the king, royally attired, was conveyed to Worcester; over his head was placed a monk's cowl, as a sort of cover for all his sins and a passport to heaven. He was interred between St. Oswald and St. Walstan, whose graves are in the chapel of the Virgin, at the eastern extremity of the cathedral. Thence, in all probability, his remains underwent translation to their present situation, before the high altar in the choir. The effigy of John, carved in grey marble, which forms the superstructure of his present tomb, was originally the lid of the stone coffin that contained his remains, and in its first position must have been placed on a level with the floor of the building within which he was interred. His head is adorned with a crown of state, and supported by two bishops, undoubtedly intended for Oswald and Walstan, between whose remains he, as before mentioned, actually reposed. He is represented as wearing a dalmatic of crimson, lined with green, the neck and cuffs edged with a gold and jewelled border; his tunic is yellow, or cloth of gold; he is girt with a belt; on his hands are jewelled gloves, a ring on the middle finger of the right hand, which supports a sceptre, while his left grasps a sword; he wears red hose, golden spurs; his feet have on them black shoes, resting on a lion. Valentine Green, F.S.A., the historian of Worcester, published a pamphlet, giving a very interesting account of the opening of the tomb of King John, on July 17, 1797. The state of the king's mortal relics showed that they had been at some previous time disturbed, and seemed to favour the conjecture of their having been translated from the lady chapel in the cathedral into the choir, most probably about the time of Henry VII. The skull was found turned completely round, and presented what anatomists term the *foramen magnum*, or aperture through which the spinal marrow passes. The upper jaw lay near the right elbow. The agreement of the dress on the body with that of the effigy on the tomb was very remarkable, and shows, as in the instance of Henry II.'s figure, that these effigies very faithfully represented the defunct as he lay in state. John had, however, no crown on his head or gloves on his hands. In the place of the former was found the celebrated monk's cowl, confirming the minute accuracy of the chronicles. This sacred envelope fitted the head very closely, and had been buckled under the chin by straps, parts of which still remained. The body had been covered with a crimson robe of damask, of strong texture, reaching from the neck to the feet, as in the effigy. Part of the embroidery was still perfect near the left knee. His left arm was bent towards his breast, and the hand had grasped a sword, in the same manner as the figure on the tomb; the cuff of this arm still remained lying on the breast. The sword was much decomposed, and its parts found at intervals down the left side; the scabbard was much more perfect. The covering of the legs (the precise nature of which was not ascertained) was tied round the ankles. These were probably the red hose seen in the effigy.

Sir Henry Raeburn's Daily Life.

He rose at seven during summer, took breakfast about eight with his wife and children, walked into George Street and was ready for a sitter by nine; and of sitters he generally had for many years not fewer than three or four a day. To these he gave an hour and a half each. He seldom kept a sitter more than two hours unless the person happened—and that was

often the case—to be gifted with more than common talents. He then felt himself happy, and never failed to detain the party till the arrival of a new sitter intimated that he must be gone. For a head size he generally required four or five sittings; and he preferred painting the head and hands to any other part of the body, assigning as a reason that they required least consideration. A fold of drapery, or the natural ease which the casting of a mantle over the shoulder demanded, occasioned him more perplexing study than a head full of thought and imagination. Such was the intuition with which he penetrated at once to the mind that the first sitting rarely came to a close without his having seized strongly on the character and disposition of the individual. He never drew in his heads or indeed any other part of the body with chalk—a system pursued successfully by Lawrence—but began with the brush at once. The forehead, chin, nose and mouth were his first touches. He always painted standing and never used a stick for resting his hand on, for such was his accuracy of eye and steadiness of nerve that he could introduce the most delicate touches or the utmost mechanical regularity of line without aid or other contrivance than fair off-hand dexterity. He remained in his painting-room till a little after five o'clock when he walked home through the Edinburgh streets and dined at six.

Westminster Abbey.

The incorporation at Westminster of the palace and abbey from its earliest days is a likeness of the English constitution, a combination of things sacred and things common. The abbey is secular because it is sacred, and sacred because it is secular. The vast political pageants of which it has been the theatre, the dust of the most worldly laid side by side with the dust of the most saintly, the wrangles of divines or statesmen which have disturbed its sacred peace, the clash of arms which has pursued fugitive warriors and princes into the shades of its sanctuary, even the traces of Westminster boys who have played in its cloisters and inscribed their names on its walls, belong to the story of the abbey no less than its venerable beauty, its solemn services and its lofty aspirations. Go elsewhere for your smooth polished buildings, your purely ecclesiastical places of worship—go to the creations of yesterday, the modern basilica, the restored church, the nonconformist tabernacle, but it is this union of secular with ecclesiastical grandeur in Westminster Abbey that constitutes its special delight. It is this union which has made the abbey the seat of the Imperial throne, the sepulchre of kings and kinglike men, the home of the English nation, where for the moment all Englishmen may forget their differences, finding underneath its roof echoes of some memories dear to each.

Thomas Stothard's Narration of his Early Days.

My father was a native of Stretton, near Doncaster; he came to London while a lad, and when he married took a sort of hotel in Long Acre, which was much frequented by coach-makers. I was born there in the month of August 1755. I was an old child, and a sickly and ailing one; my father, anxious about my health, sent me when only five years old to his brother in York, but as he lived in a close part of the city I was removed to Acomb, a small village two miles north of York, and put under the care of an old douce Scotch lady—a sound Presbyterian, who loved to keep her house in order and all that was in it. As this was the Kensington Gravel Pits of York I soon began to grow strong, and I remember that I also grew solicitous to be doing something. I soon found employment, which has now afforded me full seventy years' pleasure—I became a painter. This came rather curiously about. My Scotch friend had two sons in the Temple, London, who had sent her some of Houbraken's heads, with an engraving of *Blind Belisarius* and other prints from the graver of Strange; as they were framed she had them hung up in a sort of drawing-room, and rarely allowed any one to look at her treasures as she called them. One day I ventured to follow her into this sanctuary; she was pleased with the earnest looks with which I regarded the heads and groups, patted me on the head, and said I should often see them since I seemed to like them so much. I became an almost daily visitor to the room, and I began to wonder how such things were done; I was told they were done with pencils. Though the old lady told me this she little expected the result; in short, she missed me from her side one day, and found me standing on a chair trying to imitate with a pencil one of the heads before me. She smiled, clapped my head and bade me go on, adding, "Thomas, ye are really a queer boy." I did little else now but draw, and I soon began to make tolerable copies. I lived at Acomb till I was eight years old, when I left my old Scottish dame with tears in my eyes and went to school at Stretton, the birthplace of my father. I continued drawing, and even attempted to make sketches from life. Some one told me that engravings were made from paintings in oil-colours; I longed to see a painting, and shall never forget the delight with which for the first time I looked upon one. I resolved to paint in colours, and wrote

to my father to send me some. I was, however, too impatient to wait their coming, but going to a cart and ploughwright, I begged black, red and white oil-colours from him, and commenced to make a picture. I painted a man, I remember, in black paint, and then tried with the red and white to work it into the hues of life. It was a sad daub; I still persevered, and soon learned to handle my brush with more skill and lay on my colours with better taste. I was soon afterwards removed to London, where all manner of facilities abounded—you know the rest.

The Equestrian Groups on Monte Cavallo, Rome.

In the ruins of the Baths of Constantine were found the two grand colossal groups of a *Young Man and Horse*, which now stand on the summit of this hill, and from which are derived its modern name of Monte Cavallo, an appellation which is still the most in general use, although a feeling of Classical taste has revived the ancient one of the Quirinal. If the inscriptions on these statues be genuine they are the works of Phidias and Praxiteles; and the antiquarians, who always contrive to blunder even where it would seem to be impossible, by an absurd anachronism pronounced them to be rival groups of these two great masters, representing *Alexander and Bucephalus*, although the Athenian sculptor was dead before the Macedonian hero or his horse was born. They are now supposed to represent Castor and Pollux, and are still believed to be by Phidias and Praxiteles. They are certainly extremely spirited and grand in their conception, but destitute of finish; and more than all, of that high pre-eminent perfection which ought to mark the works of the first of sculptors. Their resemblance is so close in style that one would be tempted to consider them works of the same age, if not of the same artist; and they approximate so nearly in design that one might almost be permitted to hesitate before pronouncing them to be productions of masters so great, yet so totally dissimilar. It must at least be acknowledged that Praxiteles has made but a very slavish copy from the group of his great predecessor. But any one who has studied the undoubted works of Phidias in the Elgin marbles, or felt the beauty of the masterpieces of Praxiteles, even in their ancient copies, will perhaps require something more to convince him that these groups are the work of either of these great masters than an inscription the antiquity of which is dubious, and which, even if admitted, may, like half the inscriptions on ancient sculpture, be false. It scarcely seems that their excellence is sufficient to have induced the Romans to bring groups of such colossal size from Greece; neither is it probable such a circumstance would have passed unnoticed by ancient writers; and if they were executed at Rome it is certain that Phidias, at least, never came there to make them. But, whether or not the works of these great masters, they are fine pieces of sculpture, and are placed to great advantage on the summit of the Quirinal Hill. It would be in vain now to look for its three summits, the Collis Salutaris, the Collis Mutialis, and the Collis Latiatis, since one only can now be distinguished, and which of the three that is we have no means of ascertaining.

The Study of Ancient Art.

The works of the ancients can never be studied too much, but they may easily be studied improperly. The prime object which ought always to be kept in view, as the only means by which we can ever hope to rival them, is the rediscovery, in its fullest extent, of the principle on which they were formed, which none of the moderns have yet comprehended nor probably attempted, scarcely suspecting its existence; the best of them have, in general, contented themselves with selecting some favourite figure and using it on all occasions indiscriminately, as a rule of proportion, absurdly forgetting that, if it was exactly proper in any one instance it must necessarily be more or less improper in all others. Thus, in escaping the meanness and vulgarity of common nature, they confounded all distinction of character, and became incurable mannerists, insipid or extravagant, according to their choice of a model. Nor is this the only evil to be dreaded and guarded against in the imitation of the antique statues; for though, as Rubens justly observes, we can never consider them too attentively or study them too closely; though in order to attain perfection in painting it is necessary to understand them, nay, to be so thoroughly possessed of this knowledge that it may diffuse itself everywhere (for in this degenerate age we can produce nothing like them), yet it is no less certain that ignorant painters and beginners, who make no distinction betwixt the figure and the stone, the form and the material of which it is composed, often learn from them somewhat that is stiff, crude, liney and harsh in respect to anatomy; by which, while they take themselves to be good proficient, they do but disgrace nature instead of ennobling her, losing all her warmth and feeling; and giving us marble tinged with various colours in the place of flesh. In sculpture it must be remembered that, without any fault in the work or the workman, many outlines and shadows appear hard, dense

and opaque, which in nature are softened and harmonised by the colour and transparency of the flesh, skin and cartilages, and that the lights also are extremely different from the natural, the hardness and polish of the material giving them a lustre and a sharpness which dazzles the eye and raises the surface beyond the proper pitch.



The Illumination of St. Paul's Cathedral.

SIR,—The above building was illuminated on the night of June 22 according to my method, viz. by means of searchlights placed on buildings surrounding the cathedral. It is now over two months ago that I suggested to the Dean of St. Paul's, and also the City surveyor, my system of illuminating the most conspicuous building in the City of London. The reasons why I suggested this method of illuminating the masterpiece of Sir Christopher Wren were as follows:—Firstly, the possible danger of fire by attaching electric lamps to the dome, which is a timber construction. Secondly, by lining out the cornices, ribs on dome, &c., by means of thousands of glow-lamps the grand outlines of this architectural masterpiece are cut up and destroyed. My method was to brilliantly illuminate the dome and west front by means of from 80 to 100 powerful searchlights, each of 2,000 nominal candle-power. In conjunction with a well-known and practical firm of electrical engineers I entered thoroughly into the matter, and we arrived at the conclusion that the above number of searchlights would be required to make the illumination of St. Paul's Cathedral a perfect and undoubted success. I also proposed to change colours about twenty times per minute, so as not to make the illumination monotonous. For the above purpose I submitted an estimate to the Corporation of London for 765*l*. This included the wages of workmen employed in manipulating the projectors, the cost of electric current, rent of stations and all other incidental expenses. The City surveyor informed me that the Corporation intended to do the work as cheaply as possible, and I understood that they would only illuminate the dome (according to my method) by means of from twenty-six to thirty-six searchlights, and that the expenses would be from 150*l*. to 200*l*. To my surprise, I notice in a contemporary of yours that the expenses attached to the above illumination would amount to about 1,400*l*. If I had not on May 19 last, in a letter to the *City Press*, drawn the attention of the Cathedral authorities as well as the Corporation of London to the danger of fire by attaching lamps to the timber dome of St. Paul's, this method would have been adopted, as not one person in a hundred was aware that the dome is a timber construction. I fail to see how the City authorities have done this work as effectively and cheaply as they professed, as my estimate was nearly half of what they have now spent, and they have not employed as many search-lights as I proposed in my above estimate, while the west front was not illuminated as I suggested. They refused my estimate on the plea of expense, and then they spend nearly double the amount (employing less lights) in illuminating St. Paul's Cathedral and adopting my original system. I claim to be the originator of this method of illuminating the most conspicuous building in the City of London, and, to my knowledge, my system has not before been employed in the illumination of a public building in London. I notice in a building paper (published on Saturday) that, in speaking of the illumination of St. Paul's Cathedral, they say, "It seems a pity that they did not line out the architecture in lights, &c., and that there seemed to be a needless fear of fire, &c." It is evident that the writer in the above paper is ignorant of the danger of fire by attaching electric lamps to dry timber of over 200 years' standing. Trusting that you will favour me with space for this letter, I am, sir, your obedient servant,

HENRY H. B. SANG,
Architect and Artist.

Liskeard Church Tower.

SIR,—I shall welcome *bona fide* criticisms, information or communication from you or from your readers on the letters passed between Chancellor Paul of Truro and myself re Liskeard Church tower, which you kindly published some two or three weeks ago. I would ask:—(1) Has the Chancellor power to refuse a faculty without trial or open court when no opposition is lodged against it? (2) Has he power to reject plans, sanctioned by every vestry, every public meeting, and selected by a disinterested and eminent architect? (3) Has he power to insist on our rebuilding a small semi-Norman tower

(much of this tower is of the 17th century) to a large Perpendicular nave, built long after the erection of the original tower?

This tower is admitted by several expert architects, and also by the Chancellor, to be in a dangerous condition, and that it must come down.—Faithfully yours,

J. NORRIS.

Liskeard Vicarage, Cornwall:

June 28, 1897.

In a letter to his parishioners, dated June 24, 1897, the Rev. J. Norris writes:—

I am full of hope that Chancellor Paul will yet see the wisdom of bestowing upon us—even if we are in the wrong, of which we are not aware—an open court, or giving to us a private audience, that the present friction may be removed and the former spirit of goodwill may be restored. An open court or audience would and will show where and in what the error or mistake lies. To the pure all things are pure—to the lights of justice and equity we wish to bow. There can be nothing against honest and candid discussion. We ask for no more. It would be useless applying for faculties, or of getting the best plans procurable, of spending—as we have done—much money, if the friends of the Church, who are willing to give their time, money and labour, are to be nonsuited without any trial or court.

Strange, but true, the present church was re-roofed, the lady chapel gallery re-erected, the pulpit and reading desk removed, all the stained-glass windows put in, organ gallery removed, new organ chamber built, the handsome reredos placed in its present position, the old vestry pulled down and the present clergy vestry erected and I know not what, without any application for faculties, each one and all according to Church law required such costly powers; and when we, rightly or wrongly, apply for a faculty, we are not allowed an open court or private audience. We are open to conviction. We are advised by our Bishop if we cannot accept his Chancellor's decision to go to the Court of Arches. I hope we shall do nothing of the kind.

I think the following letter, issued by Messrs. L. C. Foster and R. A. Courtney on March 12, 1892, is one of the strongest I have seen or read in favour of pulling down the present tower and the erection of a new tower:—

"There is, however, another portion of the work which your committee would like to see carried out, and that is the rebuilding of the tower. You are doubtless aware that the late Miss Pedler, who died on November 20, 1890, left the sum of 1,000*l*. towards this object, provided that within ten years of her death a new tower was erected at a cost of 3,000*l*. It will, therefore, devolve on the parishioners if they desire to secure the benefit of the 1,000*l*. to determine what course they will adopt, as if the tower be not erected, the amount will be paid over for the benefit of Truro Cathedral, and so be lost for the use of the parish. The shaky and dilapidated condition of the tower is well known, and it must be either rebuilt or a considerable sum be expended before long in order to strengthen and secure the present structure. The committee desire that a tower worthy of the church should be erected, and they believe that with the hearty co-operation of the parishioners and others, who are and have been associated with the town, that a balance of the necessary amount can be raised and the work carried out."

GENERAL.

Mr. E. Guy Dawber, of 22 Buckingham Street, Adelphi, has taken into partnership Mr. Francis A. Whitwell, and the firm will in the future be Messrs. E. Guy Dauber & Whitwell.

The New Catholic Church of SS. Peter and Paul, Bolton, was opened on Wednesday. The scheme, which the Bishop of Salford has described as the greatest undertaking in connection with any church in his diocese since he was consecrated, has cost, with a fine new assembly hall opened some time ago, something like 18,000*l*. The church, from an architectural point of view, will rank as one of the handsomest in Lancashire, the interior being rich in appearance, marble entering into a portion of the edifice.

An Archaeological Discovery of considerable interest has been made near Thermopylae, between the old barracks and the water mills. It consists in the laying bare of sarcophagi containing bones, earthenware and glass vases, bronze coins, medals, &c. It is believed that the skeletons are the remains of Leonidas's Spartans.

The Mayoress of Southport laid on the 26th ult. the memorial-stones of a new Wesleyan place of worship, to be called the Victoria Chapel. The total cost of the building will be 5,000*l*. The church will be in the late Gothic style of architecture, and will provide seating accommodation for 850 people. Messrs. Green & Brockbank, of Liverpool, are the architects, their designs having been selected in competition, and the contractors are Messrs. Duxfield Brothers, of Southport.

The Architect.

THE WEEK.

THE County Council having been invited to give evidence before the Royal Commission on the Metropolitan Water Companies, have decided upon a series of principles which it is believed will express the opinion of a majority of the Council. They are as follows :—(a) That in the opinion of the Council the water supply of the metropolis should not continue in the hands of private companies. (b) That in the opinion of the Council the undertakings of the metropolitan water companies should forthwith be purchased at the fair and reasonable value of the same, regard being had to the rights, special circumstances and obligations of the companies. (c) That the management of the water supply should be effected either (1) by the London County Council supplying its own area directly and outside authorities in bulk at a fixed price; or (2) by the London County Council supplying its own area only, and the outside authorities supplying their areas; or (3) by a new body supplying directly the whole area both within and without the county. (d) That in any case, as the County of London contains 87 per cent. of the rateable value and over 79 per cent. of the population of the whole area supplied by the metropolitan water companies, and will thus be liable for more than four-fifths of the purchase money, it is desirable that the London County Council should, in the first instance, be the purchasing authority on behalf of the population of the whole area concerned. (e) That if the undertakings of the water companies are not acquired it is essential that effective powers of control should be given to the County Council, and, further, that the position of the companies should be reconsidered and the law amended, particularly as regards their power to make and recover rates and charges and divide profits, and their obligations respecting the supply of water. It will be observed that attention is concentrated on the existing supply, and that the rights of property are fully respected. The question of increasing the supply by drawing water from other sources would be considered at a future time.

ON the 20th inst. the annual meeting of the Sussex Archaeological Society will be held in Worthing. That pleasant watering-place is not suggestive of antiquity, but in the neighbourhood there are subjects which would require not one but several days to do them justice. Sompting Church, which is to be first visited, is supposed to date from the eleventh century, and it is believed that the tower is Anglo-Saxon. But it has lost much of its character by repeated restorations. It continues, however, to be one of the most interesting churches in Sussex. Broadwater Church, which will also be visited, is transition Norman and has been carefully preserved. There are three brasses of a fine sixteenth-century monument of Lord DE LA WARR. Another church which is to be visited is West Tarring, which has a Perpendicular tower. The marble mosaics of the Apostles which Mr. BUTTERFIELD designed are still deserving of attention. The Archbishops of Canterbury possessed a palace here of which there are remains. On Highdown Hill there are some earthworks, and an experiment in excavation will take place during the visit. At Ferring the collection of antiquities discovered by Mr. HENTY will be on view. Altogether the members have a chance of spending an agreeable day amidst scenery which has many attractions.

It cannot be expected that judges are always to be of one mind in their decisions, but it becomes a serious affair when a public health Act is rendered useless because courts will not look at a subject except from one point. Glasgow is at present in the position of possessing powers to aid in the advancement of sanitation, but owing to the variance

between the courts they are of no avail. The Police Amendment Act of 1890 provides that, "If the drains be found defective, the owner of the premises shall be bound, on an order to that effect being given by the police commissioners, to carry out all necessary operations for removing defects in structure, or doing such acts as may be requisite to prevent risk to health, and, failing compliance with such order, the police commissioners may do such work and recover the expense as damages from the owner." The section seems effectual until an attempt is made to put it into operation, and then it is found that, like thousands of clauses in other Acts, it is of no avail to sanitary authorities. The Corporation of Glasgow on the strength of the section ordered the drainage of a house in Garngad Hill to be improved. The owners declined. The sanitary inspector's notice was disregarded and then the Corporation carried out the necessary operations. The work cost 80*l.* 10*s.* 8*d.* The owners declined to pay and were sued. In one Court a decree was granted for the amount. But that judgment was reversed by the judges of the Second Division. After playing a sort of game of legal seesaw in various courts the case was brought before the House of Lords by the Corporation. Their lordships pointed out that the Corporation did not so much "remove defects" as construct a new drain. But then the question arose, How was it to be discovered that the new drain was solely used to prevent risk to health? The Court of Session had not imparted information on that point. Without some knowledge of local conditions it was impossible for their lordships to say how far risks to health were removed. The case was accordingly sent back to the Court of Session in order that it could be stated whether the work was necessary to prevent those risks, and until a decision on that point is given the owners of property can have their way and neglect remedies which jeopardise the sanitation of Glasgow.

IN the interim report of the Departmental Committee on Electrical Generating Works which appeared this week, the following suggestions are given for diminishing the risks from underground mains :—"Concentric mains are often employed with a central high-pressure wire or cable, and an external group of wires insulated from the central cable. The outer wires are in general insulated again, and the whole is often enclosed in a lead tube. If the outer conductor is efficiently connected with earth at the generating works, no part of it will attain a dangerous pressure, and the risk of handling such a cable is greatly reduced. Transformers and the metal cases in which they may be enclosed, if not efficiently connected to earth, are a source of danger in the event of 'running to frame,' or of any deficiency in the insulation of the high-pressure wire or cable. If there is any moderate insulation leakage the earth-connected case cannot become charged; or if the insulation fail, and the high-pressure main becomes connected with the casing, the extra strong current resulting will blow the fuse in the transformer or its chamber, or at the central station, and disconnect the faulty part from the circuit. So long as no highly-charged metal is exposed and the conditions indicated are correctly fulfilled, it would appear almost impossible for accidents to occur to men at work outside the transformer casing. By efficient earthing is meant metallic connection to some good conductor which is in contact with damp soil over a considerable area. An earth cannot be considered efficient unless, under all weather conditions, in case of accidental contact with metal charged to high pressure, it will secure the passage of a current sufficient to blow the fuse employed for the protection of that metal. The best earth often available is the system of cast-iron pipes, through which the cables pass, provided all the joints are metallic. A mere bolt or rod in brickwork, concrete or in the ground, especially when that is liable to become dry, would be useless as an efficient earth in the case of metallic connection with high-pressure supply, but it might be sufficient to discharge the very small leakage that would occur with sound and, ordinarily speaking, perfect insulation. Transformers become warm in working, and thus the chambers, especially if well ventilated, are apt to become very dry."

CANTERBURY CATHEDRAL.—II.

CANTERBURY Cathedral is by some visitors supposed to exemplify an architectural climax and for the greater honour of St. THOMAS À BECKET. The choir, it is said, is raised several feet above the nave, the altar is higher than the choir, Trinity Chapel is higher than the presbytery and BECKET'S Crown dominates all. If, however, the last division be called simply a corona, apse or circular chapel, without any reference to the Martyr, then the theory of a climax will be less apparent. But the ascribing of the part that closes the noble perspective to him is easily understood. Although the memory of the archbishop pervades, as it were, the entire cathedral, there is, strange to say, no portion of it which is dedicated to him. There never was a BECKET Chapel in the Cathedral, and at present we can see no monument to him. When CROSS'S painting of the murder was hung in the "Martyrdom" a few years ago, it was considered to be a necessity, for it helped to indicate where the deed took place. It was not until half a century after the archbishop's death that a shrine for his remains was prepared, and then it was placed in the Trinity Chapel, which corresponded with the lady chapel in other buildings. That chapel henceforth became the goal of the pilgrims. It is recorded that while in one year a sum of nearly a thousand pounds was offered at BECKET'S shrine, not more than 4*l.* was offered elsewhere.

If we bear those facts in recollection the adaptation of the plan shows excellent judgment. It was necessary to set apart the choir for the use of the monks, and to preserve it as carefully as possible from disturbances. Accordingly we find that the entrance from the nave is as narrow as if the daily attacks of enemies were anticipated. The stalls were backed by screens of masonry, and, in fact, the central part of the church was jealously enclosed. Where were the crowds of pilgrims to go through their devotions when they could scarcely obtain a glimpse of the high altar? The plan suggests by the number of small apses that at one time there were more altars in Canterbury than in any of the other English cathedrals. Not only were they to be found in Trinity Chapel and the corona, but in the transepts, private chapels, and it may be along the nave. It is, indeed, difficult now to imagine the almost festive appearance which the interior of the cathedral presented when, as Dean STANLEY says, "bright colours on the roof, in the windows, on the monuments; hangings suspended from the rods which may still be seen running from pillar to pillar; chapels and altars and chantries intercepting the view, where now all is clear, must have rendered it so different that at first we should hardly recognise it to be the same building." A great many of the pilgrims would be fascinated by the multitude of wonderful objects, and it would be the aim of the authorities to encourage them in order to prevent the rush of a crowd to the Trinity Chapel. But the pilgrimage would be fruitless which did not comprise some prayers before the shrine. The approaches with their flights of steps were enough to check the advance of more than a limited number of people, and hence it is that although cripples and invalids daily visited the cathedral, there are no records of the sacrifice of the weak to the strong. Safety was insured by the arrangements of the architects.

Trinity Chapel was deprived of its principal treasure by HENRY VIII., but it is in excellent preservation, and apart from its historic interest—for it still contains the monument of the Black Prince—is worth reverent study from its architectural character and as the work of WILLIAM the Englishman. BRITTON was so enthusiastic in his admiration of it as to declare there was not a building in England or on the Continent that was worthy of comparison with it. Professor WILLIS is more sober in expressing its value, but what he says suggests the importance of the chapel:—

The Trinity Chapel of the Englishman is under the influence of the French work, of which it is a continuation, and accordingly the same mouldings are employed throughout, and the triforium and clerestory are continued at the same level; but the greater level of the pavement wholly alters the proportion of the piers to their arches, and gives a new and original and at the same time a very elegant character to this part of the church compared with the work of the Frenchman, of which at first sight it seems to be a mere continuation. The triforium also of the Trinity Chapel differs from that

of the choir, in that its four pointed arches instead of being, like them, included under two circular ones, are set in the form of an arcade of four arches of two orders of mouldings each. The mouldings are the same as in the choir, but the effect of their arrangement is richer. Also in the clerestory two windows are placed over each pier-arch, instead of the single window of the choir. The mixture of the two forms of arches is still carried on, for although the semicircular arch is banished from the triforium, it is adopted for the pier-arches. However, in the side aisles of the Trinity Chapel and in the corona our English William appears to have freed himself almost as completely from the shackles of imitation as was possible. In the side aisles the mouldings of the ribs still remain the same, but their management in connection with the side walls and the combination of their slender shafts with those of the twin lancet windows, here for the first time introduced into the building, is very happy. Slender shafts of marble are employed in profusion by William of Sens, and Gervase expressly includes them in his list of characteristic novelties. But here we find them either detached from the piers or combined with them in such a manner as to give a much greater lightness and elegance of effect than in the work of the previous architect. This lightness of style is carried still further in the corona, when the slender shafts are carried round the walls and made principal supports to the pier-arches, over which is placed a light triforium and a clerestory; and it must be remarked that all the arches in this part of the building are of a single order of mouldings instead of two orders, as in the pier-arches and triforium of the choir.

There is in one of the windows a sketch of BECKET'S shrine which stood in the Trinity Chapel, but only an elaborate painting could do justice to a work of art which ERASMUS described as "a coffin of gold, together with inestimable riches, gold being the meanest thing to be seen there; it shone all over and sparkled and glittered with jewels of the most rare and precious kinds, and of an extraordinary size, some of them being larger than a goose's egg." According to STOW, at the time of its seizure by THOMAS CROMWELL it was about a man's height, the lower part of stone, the upper part of timber. Within it was an iron chest containing the relics. The woodwork of the shrine was on the outside covered with plates of gold, damascened with gold wire. The gold ground was again covered with jewels of gold, such as rings which were fastened with gold wire, many of them having stones in them, besides brooches, images, angels, precious stones and great orient pearls. The spoil of the shrine in gold and precious stones filled two great chests, and it required six or seven men to carry one from the chapel.

The necessity to accommodate large but fluctuating crowds that were not always inspired by devotion alone was not without effect on those who took up the work of LANFRANC and ANSELM, of WILLIAM OF SENS and the English WILLIAM. They created a type of cathedral that might almost be called novel, one in which opportunities were given for the display of reverence not only to the Martyr but to other representatives of sanctity. Apparently the builders could not obtain the geometrical skill to lay out a long axis, for the plan shows there are deviations which are not to be explained by any theories of symbolism or optical effect. One flight of steps at least, with the king's screen or organ gallery, of A.D. 1304, can be credited to HENRY D'ESTRIA, who held the office of prior for nearly fifty years. The great transept was erected by Archbishop SUDBURY in 1379.

A more important work was the rebuilding of the nave and "Martyrdom" transept, under the direction of THOMAS CHILLENDE, of CHYLLINDENE, who was prior for over twenty years between 1390 and 1411. According to the custom of the time, an almost complete demolition of LANFRANC'S work was considered necessary, the plinth of the aisle walls alone remaining. It was about the same time that WILLIAM OF WYKEHAM, who was in his seventieth year, began the restoration of Winchester Cathedral. He was less thorough in dealing with the nave than was CHILLENDE at Canterbury, and yet, in spite of the economy which utilised a large part of the earlier work, he was able to produce a wonderful result, for, as Bishop LOWTH says, "There is no fabric of its kind in England, after those of York and Lincoln, which excels the nave and aisles of the cathedral church of Winchester in greatness, stateliness and majesty." As we have already suggested, it is difficult to determine precisely what share the WYKEHAMS and CHILLENDES of Mediæval times had in the pre-

paration of designs. It is remarkable, however, to find as much similarity between the nave of Winchester and Canterbury as if they were inspired by one artist or director. On this subject Professor WILLIS, in describing the Canterbury nave, writes :—

The style is a light Perpendicular, and the arrangement of the parts has a considerable resemblance to that of the nave of Winchester, although the latter is of a much bolder character. Winchester nave was going on at the same time with Canterbury nave, and a similar uncertainty exists about the exact commencement. In both, a Norman nave was to be transformed; but at Winchester the original piers were either clothed with new ashlar, or the old ashlar was wrought into new forms and mouldings where possible, while in Canterbury the piers were altogether rebuilt. Hence the piers of Winchester are much more massive. The side aisles of Canterbury are higher in proportion, the tracery of the side windows different, but those of the clerestory are almost identical in pattern, although they differ in the management of the mouldings. Both have "lierne" vaults, and in both the triforium is obtained by prolonging the clerestory windows downward and making panels of the lower lights, which panels have a plain opening cut through them, by which the triforium space communicates with the passage over the roof of the side aisles.

The nave being completed the external towers were next undertaken. But the most characteristic, called the "Central," "Bell Harry" and "Angel Tower," does not appear to have been commenced until 1472 by Prior SELLYNGE, and it was not completed until 1517, in the time of Prior GOLDSTONE II. The south-west tower was completed between 1449 and 1468. The cloisters are also fifteenth-century work, and to the same period belong the chapel of HENRY IV., Dean NEVIL'S Chapel and the chapel of the Virgin. The admired Christ Church Gate, "a goodly, strong and beautiful structure, and of excellent artifice," which forms an excellent finish for the view along Mercey Lane, and the south-western porch, date from about 1517. Examples of five centuries of building can therefore be found in Canterbury Cathedral, and as a rule what is seen is characteristic.

THE MUNICIPAL ELECTRICAL ASSOCIATION
MEETING IN MANCHESTER, 1897.

THE last week has been one of great interest to municipal engineers, as the second annual meeting of their electrical association has been held. The salient features of this association are that all directly interested in municipal electrical work are admitted to membership—electric-lighting committees, municipal electrical engineers, &c., in order that there may be complete accord and interchange of views on the subject. It must be said that the work is promising great success.

The Generation of Steam.—There are several very interesting papers on subjects of interest chiefly to central station engineers, but there are two which are of more general interest, referring to the subject of "The Generation of Steam," the authors being Mr. JOHN F. C. SNELL, Assoc.M.I.C.E., &c., (borough electrical engineer, Sunderland), and Mr. J. J. STEINITZ (borough electrical engineer, West Ham).

Taking Mr. SNELE's paper first, "The object of this paper is to bring before you the types of boilers in use and details connected with them."

Mr. SNELL gives several very interesting figures as to capital cost of the various types of boilers. These may be of interest.

Type.	Capital Cost Erected per 1,000 lbs. Max. Evap. per Hour.	Floor Space.
I. Lancashire { Without economiser	L76	69 square feet
" " With "	99	69 "
II. Water-tube	96	34'4 "
III. Dryback marine or "Economic"	94	34'4 "
IV. Marine	100	25 "

From these figures it would appear that the Lancashire boiler is the most expensive (with an economiser) and occupies the greatest space, and that with the rest the expense is greater, as the floor-space occupied is less.

The author states that the Lancashire boiler is very hard to beat, and the cost of upkeep is very low, while it can be

used with comparatively bad water. The defects of the boiler are admitted to be the length of time required to get a cold boiler under steam, the waste of water while warming up, and the collapse of flues due to want of care in cleaning and the effect of oil in the feed-water.

Mr. SNELL passes on to the water-tube boiler, and he says that the chief disadvantages are small steam space, wetness of steam, and cost of repairs and cleaning.

The life is given as being rather short (16 years), but the figures are qualified by the statement that "it only applies to the tubes, as the drum and headers should be as long lived as any Lancashire or other type of boiler."

We may say here that the wetness of steam is not a necessity with water-tube boilers. Any boiler is liable to give wet steam if forced too much, and the better types of water-tube boiler are very little worse than the Lancashire. The great advantage of these boilers, which is not sufficiently insisted upon in the paper, is their greater safety with higher pressures, and the fact that they need not be banked when not required. The cost of lighting up and getting steam again is less than the cost of coal and labour for banking a Lancashire boiler, if the time of waiting is anything like 24 hours. This quality is, we should think, very desirable with stations leaving low Sunday and Thursday loads, when several boilers have to wait 40 hours or more.

The "Economic" boiler is next mentioned, and is very properly described as combining the large steam room of a Lancashire boiler with the quick-steaming qualities of the water-tube. The repairs and necessity for good water are as great as with the water-tube boiler. The boiler has a great reputation for high efficiency, and is being largely used for electrical work. The life of this boiler is not given, but it would not be very high we should think.

The marine boiler is not spoken of very highly, and Mr. SNELL'S remarks may be compared with those of Mr. STEINITZ. "The author does not consider it so efficient as the 'Economic,' on account of the setting and arrangement of the flues. . . . The average life may be taken at eighteen years." Mr. STEINITZ says:—"The marine boiler has proved an unqualified success wherever it has been adopted. The average life would be rather less than the Lancashire boiler. . . . Many engineers hold that it is as important that the products of combustion in their course to the shaft should be brought into contact with all the heating surface as that there should be the good circulation of water. Should this be so, no boiler he is acquainted with fulfils the conditions better than one of the ordinary marine type." Mr. SNELL says with regard to circulation of water that this is insufficient in the Lancashire, "Economic" and marine

There is a slight mistake when Mr. SNELL says that "the cheapest and most useful battery of boilers will be found in the discreet combination of both types, as inaugurated by Mr. GAY at Islington." It is true that the combination was inaugurated by Mr. GAY, but it was not at Islington, but at the West Brompton station (House-to-House Company) some years before that he first arranged Lancashire and Babcock boilers side by side.

With Mr. SNELL'S remarks on feed-pumps, we cannot agree fully, and we think his comparison of the steam and electric pump is not fair to the former. The reasoning is not good. He says:—"It is well known that, at the average ratio of steam to drive the pumps to the feed-water pumped is some 3 per cent.," and then goes on to calculate on assumed figures the percentage of power to feed the boiler with electric pumps, and finds it 1 per cent. much more

It may be of interest here to give an extract from a paper read by Mr. W. FENNELL, A.I.E.E., before the students of the Institution of Electrical Engineers:—

Steam pump.—Uses, say 90 lbs. of steam per actual H.P. hour. Electric pump.—Steam in engine requiring 20 lbs. steam per E.H.P. hour, is converted into electricity with 75 per cent. efficiency, *i.e.* 26 lbs. of steam per E.H.P. hour (a lower figure than Mr. Snell's, which is 31 to 32); efficiency of motor, 75 per cent., *i.e.* 34 lbs. per H.P. hour, and as a motor is a fast-moving machine, and we *must* gear down very much, and the gearing is not efficient, say 60 per cent. efficiency between motor and water. Then we have nearly 60 lbs. of steam per actual H.P. hour with electric pump, as against 90 lbs. with a Worthington.

If Mr. SNELL'S figure of 31 lbs. of steam per E.H.P. hour is taken, the pumps are very equal. There must, however, be

a stand-by pump worked by steam, and the electric pumps are not so cheap as steam pumps, and more liable to break down.

Some actual figures would be very welcome on the actual results obtained from either kind of pump.

Mr. SNELL's remarks as to water-softening plant, and the fact that water should be softened before entering the boiler are to the point, and can be studied with good effect by all using boilers.

The good effects of heating feed-water, in preventing the sulphates of lime and magnesia from entering the boiler, being deposited in the heater and economiser tubes, are rather dubious, as they are as difficult to clean as a boiler. Surely, if Mr. SNELL can separate the oil from water in a condensing plant, as he says, he could do the same in a "mixture heater," *i.e.* one in which the exhaust-steam meets the cold feed and both are condensed; the greater portions of the salts are deposited immediately when water is heated suddenly, and the deposit acts as lagging to the heater and increases the efficiency.

We feel inclined to agree with Mr. SNELL on the question of mechanical stokers, which is that they are very good with small coal. It is questionable if small coal can be used with advantage in London apart from the smoke nuisance. As the carriage on the coal is a large proportion of the cost, and the carriage does not increase with the quality, it should pay to buy the good coal rather than slack, if dealing with the collieries almost direct, as must be done with large quantities. Of course, very cheap slack, the siftings and yard sweepings, may be obtained from coal merchants, but it is doubtful if this is worth burning in London at any price, owing to smoke troubles.

Near collieries, however, the small coal can be burnt with great advantage, and then mechanical stokers come in.

The author recommends section coverings for steam valves and the pipe flanges, and also recommends sluice valves, *i.e.* what are otherwise called slide valves, opening to the full bore of the pipe. An important point is mentioned in connection with long lengths of pipes, *viz.* the use of by-passes for warming-up and in the prevention of water-hammer. A table of tests on the various types of boilers are given, but the origin of the tests are not stated.

Turning to Mr. STEINITZ's paper, we are struck with the uncertain tone of the author. He writes, as it were, dubiously, and evidently has not made up his mind on many points. The types of boilers are not described, but a few of their peculiarities are discussed. For instance, he mentions that a well-known firm advised him not to have cross tubes fitted in the flues of Lancashire boilers. Bad circulation in these boilers is admitted, and the necessity of forced circulation is urged. A curious point is the maximum pressure at which a Lancashire boiler should be made. He says that a firm making a specialty of these boilers recommends tubular boilers for more than 120 lbs. per square inch.

Mr. STEINITZ thinks that the efficiency of the water-tube boiler is the highest ever obtained, but there is no doubt that many will disagree with him here. He agrees with our remarks on the question of banking, and answers Mr. SNELL on this point. The opinion of the author on the marine boiler has already been given.

Mr. SNELL and Mr. STEINITZ agree on the subject of suitable fuel, *viz.* that the best Welsh coal and ordinary hand-firing is best when far from a coal-field.

On the subject of boiler compositions the author says:—"Boiler compositions may be good; they may also do more damage to the boilers than good to the water, but whatever is done to the water, the author's point is that it should be done outside the boiler." In this matter again we agree with him to a great extent, but there are cases where a little good boiler composition is a help. For instance, when the greater part of the carbonates, &c., are deposited in the heater there is always a certain amount of deposit in the boiler, and this must be got rid of.

With regard to oil in feed-water, the author gives a very practical suggestion in this connection, and one which may be of special use to engineers working with condensing plant. He says, "A coke filter used intelligently will be found to be all that is required," referring to the means of keeping the cylinder oil from the boiler-feed.

The use of mechanical stokers is next entered into very fully and ably, but as the subject is of interest to few but

electrical engineers, it will be advisable to do little more than mention them.

The author's experience is that a mechanical stoker which sprinkles the coal on the grate is to be preferred for central stations, because the boilers can be forced more easily than with a coking stoker (one which pushes the coal on at the front and feeds it back).

The remaining point of general interest is the use of economisers. The author says that he thinks there is one installed in almost every central station in the kingdom. This surely is hardly correct, because he says later that where the temperature of the flue gases is below 400 deg. Fahr. they are useless. This lower temperature is very usual with a good water-tube boiler.

The liability to corrosion of the tubes is touched upon, and the remedy of heating the feed slightly before it goes to the economisers is, of course, suggested. The use of forced draught, either by steam jets or fans, is mentioned as saving capital outlay by reducing the number of boilers in cases where the maximum load is on for a short time only, as the boilers can be forced very greatly, and also for burning poor qualities of fuel.

We think that the plan of closing the stokehole and of forcing air into it, the only outlets being through the furnaces, which system is used at sea, and which the author suggests for land purposes, will hardly be adopted. The inconveniences of such an arrangement would be too apparent.

In conclusion, these papers raise many interesting points, which should bring out an interesting discussion.

PRODUCTION OF STATUARY.

THE first thing to settle in a statue or group is the general design. For this purpose the artist, having chosen his subject, makes one or more sketches on paper, representing his conception of the treatment appropriate to it; these he will vary as improvements on the original idea suggest themselves, or as new notions spring up. Having to a certain extent satisfied himself with one or other of them, as expressing fully what he wishes, and as being at the same time harmonious in its arrangement, he then proceeds to make from it a small sketch or model in clay, in order to ascertain its probable effect in other views than the one represented on the paper. For it must be recollected that sculpture is widely different from its sister art, painting; the former has many views to consider, the latter has but one; and though in a piece of sculpture there will of course be principal views more effective than others, still they must all be agreeable, and to a certain extent suggestive or expressive of the main idea; and for this reason the sculptor has frequently to sacrifice or modify that which, were only one view to be considered, would aid him forcibly in his intentions. It is scarcely necessary to say, therefore, that alterations occur again in these clay sketches, and more than one is frequently made before the final decision on the question of design takes place. This done, the full size model is commenced in clay, the same material as the sketch, and for this the artist has to supply supports, as it rarely happens, except in recumbent figures, that the clay will hold itself together in the required position without their aid; no difficulty exists, however, in providing these, the roughest hedge-carpentering answering the purpose better than the finest workmanship. All that has to be done is to build up upon the stool a rough woodwork of sufficient strength to bear the weight of the clay and prevent it sinking, and to so arrange it that it shall be contained within the surface of the proposed model. Upon this the clay is kneaded by the hand into the requisite form, unassisted by anything but a few very simple wooden tools that help to cut, scrape or press, as may be required. The clay itself is that prepared by the potters for the common white stoneware, and is in no way expensive. Young inexperienced artists often show an over-strong predilection for the use of these wooden spatulas, or modelling tools, as by their assistance they find they can more easily obtain a smooth surface to their work; but experience afterwards teaches them that an imitation of the pulpy surface of the flesh can only be obtained from the touch of flesh itself, or, in other words, from the pressure of the finger and thumb, and that the wooden tools must be used sparingly, merely as assistants to the hand, otherwise a hard mechanical style is apt to creep in. There is in truth in a real artist, when working on his clay, the same species of feeling as in a fine pianoforte player, who draws expression from the instrument, not barely from correctness of note, but from a mental absorption in the music which imparts itself to his touch, and this affinity between head and hand is interrupted in the sculptor when the modelling tool intervenes between the surface of his work and the delicate sensation with which his hands are endowed.

With persons unacquainted with sculpture there is a general impression that the cutting of the marble is the most difficult part; but those who are intimate with the art know that the designing and modelling are the primary portions, and that the other, though of course requiring some knowledge as well as taste, is, in comparison, scarcely more than a clever manual dexterity. The artist, in fact, employs his own hand almost entirely on the designs and modelling, for in these stages he has to originate almost all the beauties of his work, and he knows if his model be in any way defective, inaccurate in its proportions or wanting in beauty or expression, that there is no hope that such defects will be remedied in the marble. The latter portion is indeed, in a measure, a mechanical process of copying, restricted, by the very means it employs, from departing to any great extent from the model. Before the model is finished nature must be referred to, and that frequently, to give an air of truth to the figure, which never was and never will be gained except by reference to her. We will, however, suppose that the sculptor has by dint of time and labour thoroughly studied his model, compared it with and corrected it from nature, arranged his draperies and subordinate parts in proper order, brought all the surfaces up to a necessary degree of smoothness, in fact, given to the best of his talent and power actual embodiment of that which his mind has conceived. It is still in the soft clay, which will not bear moving, nor be durable for long, as it is liable to shrinking, and, if not constantly supplied with moisture would eventually crack, owing to the supports within not allowing every part to diminish in an equal degree. It has for this reason to be moulded and cast into plaster, a process we shall briefly describe. Plaster of Paris is a strong, fine, white lime, made from gypsum or alabaster ground to powder and baked; and, so prepared, has the property of crystallising rapidly when mixed with water, or, in other words, of condensing itself into a hard body. A certain quantity is mixed with water, sufficient to form a liquid of about the consistency of good cream, and thrown over a portion of the model, walls of soft clay having been built round that portion in order to prevent it from running on the other parts. The object of thus covering a part only at a time will be seen presently, and the proper division of such parts must be learnt by experience, as it depends entirely upon the peculiarities of the model. This liquid plaster of Paris will, under the hands of an experienced workman, take an exact impression of the surface, and in the course of a few minutes become hard, as we have before explained. More must be added, however, in order to render it of the thickness necessary to sustain itself, which thickness will depend on the size of the object to be moulded. The clay walls are then removed, when we have one-half or more of the model covered with a hard shell, the edges of which stand up clean and square from the clay. These edges are then soiled with clay water, and the same process goes on with the other half; or, if it be a very complicated work, there may perhaps be three, four, or even five pieces of mould, all made in this way in succession.

The whole having been covered, after this manner, with a coating, the inner surface of which has taken a delicate impression of every marking on the model, the next step is to open this shell or mould, in order to take out the clay. If the joints between the pieces have been well washed with clay water, these will separate easily by the driving in, at judicious distances, a few wooden wedges. At any rate, one piece will come away by this means, and from the opening thus made we can pick out the clay, just as it will best come, only taking care not to injure the surface of the mould, as any damage done to that will show itself in the cast. The interior of the mould is now washed with a soft brush and water, and the pieces again put together and bound round with ropes to keep them to their places. The whole is well saturated with water, and fresh plaster of Paris of a finer quality poured into it through the mouth formed by the underneath side of the base. This also, becoming in a few minutes hard, forms a facsimile in plaster of the clay model, to be afterwards extracted from the outer casing or mould. Between the surfaces of the two, however, there is but little adhesion, as the saturating the first with water previous to filling it with the second prevents it. The removing the outer coating is accomplished by chipping it off in small pieces by means of a mallet and blunt chisel. This part of the work requires considerable practice as well as caution to prevent injuring the cast; but if everything has been well managed the pieces will splinter off before the edge of the chisel reaches it. To remedy at last any little faults or inaccuracies that may have occurred, rasps, glass-paper, fish-skin and for small work Dutch-rush are used.

The working of the marble now begins which, if it require not the highest talent, takes at least the longest time and the greatest labour. The model and marble are fastened in relative positions on two square blocks of stone, having each, along the edge in front, a scale of parts marked out, similar to those on a carpenter's rule. The "pointing instrument," as it is called, is then applied, which consists generally of an upright pole, with a cross-piece attached, that travels along the edge so

marked, just as a T-square travels along the edge of a drawing-board. (This pointing-instrument may indeed be well conceived by fancying a large T-square, the long part round instead of flat, and perpendicular instead of horizontal.) To this is attached a circular metal bar, and at the end of that again a needle, with ball and socket joints between both. By the aid of these joints the workman can fix the point of the needle to any part of his model, and having by means of the screws tightened the joints, can transfer the instrument from the stone on which the model rests to the other, when of course the relative position of that part in the marble will be indicated if the instrument itself be fixed to the corresponding number on the scale. It is, in fact, nothing more than a system of finding a third point from two already given. Various improvements have from time to time been made on this instrument in order to gain facility of motion, but the principle in all is the same. The best one is, perhaps, that invented by Behnes, for which the Society of Arts awarded its gold medal. It possesses greater variety of movement than any other, and, as such, is more convenient to the workman, but has one drawback—a too great liability to get out of repair. Indeed it will be easily understood that in an operation where dust and small pieces of marble are constantly flying about, it is not advisable to have to do with machinery of too delicate a construction. By this simple method the block is hewn out roughly, but correctly, into shape, and a great number of points or perforations are made in it, the bottom of which represent the surface of the model, and correspond in distance from each other with small pencil dots, marked at the time of taking them upon the model. These marks on marble and model form so many guides for the carver who now takes the work in hand, so that his mind is entirely relieved from the apprehension of any error in the main proportions or position of parts, these being definitely fixed by the points themselves. He has merely to copy what he sees correctly, by the aid of those points, and to bring the whole to a good fine surface; his ingenuity is displayed in clearing out with his chisel and hand-drill the deep cuttings—often a very difficult task, attended not only with a great deal of labour, but requiring considerable skill as well as practice. The marble comes at last again into the artist's studio, from whence the model emanated; and his delight is then in giving those final touches which remove from it any hardness or immobility it may have acquired under the hands of a copier, and impart to it the spirit and character of nature. The whole is ultimately rubbed over with sand and water by the aid of small pieces of wood and linen rags, to remove the dry, dusty appearance derived from the chisel or rasp, and to bring up the lucid beauty of the material.

When the multiplying of casts is required, as is frequently the case, a mould is again made upon the finished marble, much after the fashion previously described with the clay, but composed of an immense number of pieces, fitting one within the other, so as to admit of each one coming away separately from the marble, and, again, from the casts, without injury to either. This is professionally termed "safe moulding," on account of the outer coating being preserved; in opposition to the other, which is called "waste moulding," from the shell or mould being destroyed in the process. Any reasonable number of casts may be taken from the safe-moulds.

Bronze casting is another distinct process, little understood by artists themselves, and requiring, moreover, considerable accommodation in the way of premises, furnaces, apparatus, &c. For these reasons it is frequently entrusted to regular trade founders, who understand well enough the moulding and melting of metals, but who cannot be expected to comprehend the niceties required in a good work of art. The consequence is, in this country at least, that considerable deterioration often takes place, the bronze casting representing but imperfectly the form of the original model. The practice in these ordinary foundries is to mould the parts of a statue in sand and loam, after the manner of common metal castings, and without doubt much expense is thereby saved; but the result is never quite satisfactory, as these materials are not fine enough to take a sharp impression, nor stable enough to retain it uninjured during the operation of building the core and pouring the metal, owing to which many parts of the mould have to be repaired by the workman, and accuracy to the model is lost. In engineer's work castings are all afterwards made true by planing, turning, filing, &c.; so that, provided they be sound, it is not positively necessary that they should be in every respect accurate. Not so with fine art bronzes. Chasing—in fact, all tool-work on the metal—tends to destroy freedom of manipulation, and to produce in its stead a stiff, mechanical style, the reverse of all semblance to flexibility. It is desirable, therefore, that a bronze statue should be cast from the mould as perfect as can be, and that it be subject as little as possible to the operation of the chaser's chisels and punches, though of course these must be brought into use, to a certain extent, as matters of necessity rather than choice.

Moulding for bronze requires frequently that the plaster model should be cut into parts; it rarely happens in fact that a

statue or group can be cast in one piece, owing to difficulties that arise, first from the moulding itself, and secondly from the running of the metal into that mould. It will not be requisite to describe the moulding of these pieces, as the process is similar to that previously performed on the clay, with some modifications necessary to suit the nature of metals. There are, however, two or three points which require especial care and attention, and which regulate many of the contrivances adopted in it, and by alluding to these we shall at once enable the reader, aided by what has already been said, to understand the whole business. One of them is the necessity for fully providing for the free entrance of the liquid metal into the mould, as well as for the easy and perfect escape of the air out of it, as it becomes displaced by the metal; for without proper arrangement for this there is not the slightest chance of the cast being sound, and explosions may take place, destructive not only of the work, but even of life itself. For this reason channels have to be made in the joints of the mould down which the metal is first made to run, whence, entering the vacancy left to form the cast at the lowest point, it rises upwards through all the parts and the air can thus easily escape through other channels cut for that purpose. It should be here mentioned for the benefit of those unacquainted with the nature of metal casting, that there must always be provided an inner mould, or as it is termed, a core, to regulate the thickness of the metal. This is managed by laying on the surface of the outer mould clay of the required thickness, and then filling up the interior with the same material as the mould itself, after which the outer mould is removed and the clay taken away, leaving the necessary vacancy for the metal between the two when they are again put together. The material to form the mould and core must be of a consistency to retain the impression given to it from the model, of a nature to resist the action of the hot metal and sufficiently porous to allow the escape of gas, without which the liquid fire will not settle quietly and soundly down on its surface. Sand moulds act well as far as the last two are concerned, but are too fragile for the complicated forms of statue moulding, and experience has taught us that a mixture in equal proportions of plaster of Paris and brickdust serves best all purposes, the former giving it consistency and the latter answering all desiderata with regard to the metal. These brickdust and plaster moulds are of course tender, and must therefore be duly supported with irons embedded within them, as well as built upon iron basements, to enable them to be lifted about without injury by means of cranes. When complete they are bound round by iron hoops, and put into an oven to dry for five or six weeks, according to their size. Care in this particular is highly important, as the least damp will cause a bubbling or disturbance of the metal as it runs in. At the end of this time, when the casting takes place, the mould is lowered into a pit prepared for the purpose, and tightly embedded in sand; weights are put upon the top to prevent the uprising of any part as the metal enters; every precaution, in fact, taken against expansion. Channels are then made of sand from the orifice of the furnace to the mouth of the mould; the furnace is tapped, and the liquid flame rushes out through the roads so formed for it. This is the anxious moment upon which the result of many weeks' work depends. If the metal run quietly down the mould, and appear again up the passages formed for the escape of the air, it is but reasonable to infer that it has travelled through every part, and that a good cast will be the result; but if by chance a beautiful *jet-de-feu* takes place, reaching almost to the foundry roof, it may be as well to retire to a respectful distance, notwithstanding that the dispersion of so much valuable metal may create a desire to see where it falls. The moulder, too, may recommence his work immediately, for waiting until to-morrow, when the mould and cast are to be dug out of the pit, will be scarcely worth while. No bronze-mould can serve for more than once, and the cast will be found to have a strong resemblance to a honeycomb, very curious, no doubt, but not exactly suited to display clear definition of form. Such noisy and expensive fireworks do not, however, take place in a well-managed affair, where there is everything proper for use and every care taken; but the mention of them may serve to caution those who have not the means at hand to do what is right, or who meddle with the process without the necessary knowledge or experience to guide them. Some variety of opinion exists on the question of what this metal called bronze should be composed; but the late Mr. Maudsley, no mean authority, declared ninety-one of copper to nine of tin to be the best mixture for figure-casting, and his opinion has certainly been found correct. An addition of about one and a half of zinc, put in when the copper is melted, makes it flow more freely; but a greater quantity than this is scarcely justifiable, as zinc is liable to be acted upon by acids, and, if used too freely, may endanger the durability of the statue. The mould comes off from the cast in dry dust, as does also the core from the inside. The parts called runners, formed on the cast by the metal filling up the passages through which it has flowed, and the projecting lines, caused by the seams or

joints, have then to be cut off, and any little defects remedied by the chasing-tools. The whole should then be scrubbed with emery and water to remove a green scurf attached to it, the presence of which is, however, a sure indication of a good surface beneath. The last proceeding is to join the various parts so cast. This is done by first fastening them together by bolts, and then pouring hot metal from a crucible over the joint; 6 or 7 inches at a time, when embedded in sand so as to expose nothing but the edges required to be united. When cool, this leaves a piece of metal standing up, to be afterwards cut away. A repetition of this operation, all along the joint, will be found to unite the parts as solidly as if cast at one time, and will not be at all visible in the finished work. The statue is then complete. Attempts, it is true, are sometimes made to give an artificial colour to the metal, by means of acids, before it leaves the foundry; but time does that better than anything else.

THE AUGUSTINE CELEBRATION.

ON Friday last the bishops attending the Lambeth Conference visited Ebbs Fleet and Richborough. In 1884 Lord Granville erected a copy of the Sandbach Cross to mark the spot where the Roman missionary is supposed to have landed. Richborough Castle was afterwards visited, when the following address was delivered by Canon Routledge:—

In welcoming you to Richborough, on behalf of the trustees, I cannot forget that it is mainly owing to the devotion and liberality of two persons that this historic castle and grounds have been preserved for ever to the Church of England and the nation. One of them has passed to his rest, to our unfeigned sorrow; but we shall never forget the keen interest which Archbishop Benson (antiquarian, scholar, ecclesiastic) showed on all occasions in the acquisition and maintenance of Richborough, nor the wise judgment and extensive knowledge with which he organised so many details of the solemn functions that we celebrate in this Augustinian pilgrimage. The other is still with us this afternoon, and what we owe to the princely munificence and unremitting zeal of Lord Ashcombe is well known to the trustees, and is only not known to the world because of his unostentatious character. None the less do we thank him, and regret that for private reasons he has felt himself compelled to resign his office as trustee.

Now the interest attaching to Richborough Castle is twofold. In the first place, it is one of the grandest monuments existing in England of the Roman occupation. As a fortress and a harbour Rutupiae finds frequent mention in Roman writers—Lucan, Juvenal, Ptolemy, Antoninus, and others—and down to the beginning of the fifth century was the headquarters of a Roman legion. Probably the last Roman soldiers that were ever stationed in Britain embarked here at the close of their occupation, and it was only a few years ago that a beautiful gold coin of the Emperor Honorius was discovered not far from the spot where we are now standing.

The second interest—the one perhaps that most appeals to this distinguished assembly—is ecclesiastical. That learned book lately compiled and written by Canon Mason, "The Mission of St. Augustine," claims for Richborough more perhaps than all antiquarians are disposed to concede, viz. that it was the landing-place of Augustine and his companions, to the disestablishment and disendowment of Ebbs Fleet. And this belief is supported by testimony that reaches back for five or six centuries in the narrative of Thorn, a monk of St. Augustine's Monastery at Canterbury. It is certain, too, that up to the time of the Reformation there was a chapel here, where of old was perceived a stone that was said to retain the print of St. Augustine's foot as he left the ship. And this chapel is mentioned in the will of Prebendary Saunderson, vicar of Ash. What amount of truth is to be attached to this ancient tradition, or to another stating that St. Augustine was received under these walls by Ethelbert, King of Kent, it is not my purpose to discuss on the present occasion. But on one point we are all agreed; even if St. Augustine did not actually land at Richborough, but disembarked near Ebbs Fleet, it is almost certain that he would have crossed over from Thanet to the island of Richborough, and thence started on his pilgrimage by the western Roman road, through Ash and Wingham, to Canterbury.

Looking at the present formation of the ground, with the coast line more than two miles from the eastern side of the fortress, it seems almost drawing on your credulity to assert that it was once washed by the open sea. But so it was, guarding the southern entrance of the Wantsum Strait, while the northern entrance was commanded by Regulbium or Reculver. This strait was the most direct way into the estuary of the Thames for vessels sailing (as St. Augustine's did) from Gessoriacum, or Boulogne.

Just below the south-eastern side of the fortress was a narrow stretch of sandy shore, where (on the construction of the Ramsgate and Deal Railway in 1846) were discovered the foundations of a Roman house, and at no great distance many

refuse-pits were found filled with portions of stags' horns, animal bones and pottery—a sure sign of dwellings in the vicinity.

A detailed account of the fortress may be found in the descriptions of Mr. Boys (1792), Mr. Roach Smith (1850), Mr. G. Dowker (1871), Mr. G. E. Fox (1896), and of other writers, so that it is only necessary for me to enumerate a few of the more important particulars.

The camp is a regular parallelogram, with the greatest length from east to west, containing within its walls an area of between 5 and 6 acres. The walls (of which you noticed a splendid specimen in your procession from the railway crossing) are built of a core of concrete, cemented with sea-shore mortar, the external facings being of regular courses of squared grit and Portland stone, with binding courses of Roman tiles. In some places the walls are nearly 30 feet high and 10 feet 8 inches wide. These walls are now visible only on the north, south and west, but it is more than probable that there was also an eastern wall at the foot of yonder slope. At each corner of the camp was a large circular bastion, while two square rectangular tower-bastions projected from each wall, of which traces are still evident in the west and north. These afforded platforms on which military engines could be placed. The only remaining gate is the postern by which we entered, but from foundations laid bare in 1792 we conclude that the "Porta Decumana" existed in the west wall, now the ordinary entrance to the castle grounds.

The great subterranean structure over which we are now standing measures 124 feet by 80 feet below the surface; and 144 feet by 104 feet on the ground level. It has been partially explored over and over again, and was long considered to have enclosed a large chamber or storehouse for the Roman soldiers. But, beyond all reasonable question, it is a solid mass, probably of earlier date than the external walls of the camp, intended as a foundation for some large and important superstructure.

On the centre of this platform, just within these hurdles and of a later Roman period than the solid mass beneath, is the cross of masonry (commonly called St. Augustine's Cross), measuring from north to south 87 feet by 7 feet 6 inches, and from east to west 22 feet by 47 feet. It was a happy thought of that eminent and genial archaeologist, Mr. T. Godfrey-Faussett, that this cross was the foundation of a solid stone wall that formed a kind of internal support to a timber Pharos built around it, being at once a lighthouse to guide ships into the haven and a signal tower to communicate to Reculver (at the other end of the strait) the tidings of the approach of an enemy.

And so (in conclusion) we once more bid you welcome to this classic spot, famous for its antiquarian and ecclesiastical interest, a mine of treasures and relics in the past—and destined in the future (through, I hope, the liberality of some who hear me) to be a mine of archaeological discoveries.

When many of the bishops return to their distant homes in the colonies and the United States of America, they will (let us trust) keep one corner of their hearts for the memory of Richborough Castle, associated with Ebbs Fleet, and St. Martin's Church, and the ruins of St. Pancras, and the great and crowning glory of Canterbury Cathedral.

NON-FLAMMABLE WOOD.

A PAPER on non-flammable wood was read by Mr. C. E. Ellis at the International Congress of Naval Architects on Tuesday. He said that as long ago as 1625 a patent was granted by the English Patent Office to one Beale for "a dressing for shippes and other vessels as their mastes, deckes, tackles, sayles and other furnitures, that they maie be preserved in fight at sea from burning or consuming by wildefeyer or gunpowder." From that period forward countless efforts had been made to obtain the desired result, but no plan seemed to have been devised for securing what was absolutely essential, namely, that the fire-resisting treatment should permeate the heart of the wood so as to render it internally as well as externally fireproof. It was obvious that the main difficulty of getting rid of the combustible elements and substituting others lay in providing means for treating the cells without rupturing their delicate structure, and so deteriorating the value of the timber. It was claimed for the new non-flammable wood that this difficulty had been successfully overcome. By this process the timber was placed in a cylinder and a vacuum formed. Steam was then admitted, causing the moisture in the wood to vaporise, the products of the vapour being drawn off. A vacuum was again formed, and the saturating liquid, containing certain salts, was forced in fine spray mixed with steam into the cylinder until the wood was thoroughly impregnated. The wood was then dried and ready for use. The salts which were thus forced into the wood by the process of saturation retarded the rapid

carbonisation of the wood under high heat, and particularly the generation of combustible gases, which were the cause of flame. That wood so treated was incapable of supporting or conveying flame was conclusively proved at special experiments. Two buildings were erected similar in design, one being built of ordinary and the other of treated wood. They were about 11 feet square, with the floors about 4 feet from the ground, the lower portions of the walls below the floor being formed of open trelliswork, so as to allow for circulation of air and flame. The height of the buildings was about 30 feet from the ground to the top of the wooden chimney. The framework and walls were constructed of pine internally fitted with linings of ash, oak, birch and mahogany. Equal quantities of dry wood saturated with petroleum were piled to windward of each building and simultaneously ignited. The untreated building was ablaze in a few minutes, and in half an hour was completely destroyed. The treated building, on the other hand, showed no signs of burning, except where the trelliswork and walls were charred by actual contact with the flames from the burning firewood. On entering the building at this stage it was found to be quite cool inside, both on its walls and floor. A further test was then made of the treated building by igniting a large heap of shavings and firewood inside the structure. By means of open doors and windows and the high open chimney-shaft, a strong draught was created. The flames from the burning wood rushed up through the chimney, melting the glass in the windows, the fire burning furiously for about twenty minutes. On entering the building it was found that it had been charred, as in the previous experiment, but that structurally it was quite uninjured. A box made of treated wood which had been inside the house during the fire was also found externally charred, but its contents remained in perfect condition. The success of the experiment upon the wood was apparent to all who witnessed it. Similar trials had been made in the United States, but the details did not differ from the London experiment.

BERKS ARCHÆOLOGICAL SOCIETY.

AN afternoon meeting of this Society was held in the Abbey Gate, Reading, on the 1st inst., under the chairmanship of Mr. Charles Smith, vice-president, and was attended by the Rev. J. M. Guilding (hon. treasurer), the Rev. P. H. Ditchfield (hon. secretary), the Revs. Alan Cheales, T. Flook and J. J. Goadby, Mrs. C. Smith and Miss Smith, Miss Pigott, the Misses Jackson, Mrs. Suffield, Miss Dowsett, Miss Righton, Miss Bird, Miss Strong, Miss Williams, Mr. W. M. Childs, Miss Pollard, Mrs. Ryan, Mr. Ernest Wright (assistant secretary), &c. Formal business having been transacted, the Chairman said that, the Queen being their patron, it was thought desirable that the Society should send an address to Her Majesty, and called on Mr. Ditchfield to read the draft which he had prepared, inviting criticism.

The Rev. P. H. Ditchfield read the address, and moved a resolution to the effect that it be suitably engrossed, signed by the President, and forwarded to the Queen.

The Rev. A. Cheales seconded the resolution, which, after a few words from the Chairman in support, was carried unanimously.

STAINED-GLASS WINDOWS.

THE choice of subject for the windows of a church must always depend on the nature of the design, and the nature of the design that ought to be adopted will be found to vary much with circumstances. In some buildings a window, from its distant situation, would be more effectively filled with a mere pattern than adorned with a picture in glass. The great object to be borne in mind is the general effect sought to be produced. Every window ought to contribute to the effect of the whole building, and therefore ought to be designed with reference to its situation. If a picture glass painting, it ought to tell its story distinctly at that distance from which a spectator would view it, as forming part of one general design. Nothing, as it seems, is more erroneous than to extol an Early English medallion window because, when seen from a distance, it resembles a mere pattern window in effect; for, seen from this point, the more elaborate workmanship of the figures in it, as well as the greater cost of the work, are thrown away, and in effect it is inferior to a pattern window, because a more exact balance and arrangement of colour can be preserved in a mosaic consisting of a stiff formal pattern than in one composed in great part of figures and draperies.

M. Falguière has set up in the Panthéon, Paris, his colossal group *The Revolution*, which recalls a figure of Joan of Arc with another woman dragging her back by the gown.

NOTES AND COMMENTS.

THE parliamentary committee on the Science and Art Department have already presented a memorial to the Treasury describing the dangerous condition of the South Kensington Museum. The decision on the subject has to be announced, but meanwhile additional evidence is being given. On Monday Sir JOHN TAYLOR, the chief surveyor of the Office of Works, described some of the structures at South Kensington as being of an extremely inflammable character. There were also, he said, old and dilapidated buildings used for residences and offices. Sir JOHN TAYLOR considered that the whole of the temporary buildings should be removed as rapidly as possible. It was impossible, he said, to make them safe. The wisest course would be to pull them down and to erect suitable buildings. Sir JOHN TAYLOR recommended the rebuilding of the museum as a whole, which could be accomplished in about five years, and during the rebuilding a part of the treasures could be placed in the Tait Gallery at Millbank. Sir JOHN explained that the designs for the new buildings had been selected five years ago and some of the working drawings were ready, all that was needed was money. It is not often a surveyor of the Office of Works is found to be so emphatic in his condemnation of buildings which belong to the Government, but without plain speaking it is to be feared the parliamentary session will be closed and the rebuilding indefinitely postponed.

ALTHOUGH Paris possesses institutions which are known as cercles or clubs, where pictures can be exhibited and social functions be gone through, the artists do not possess a club in the English sense of the word. The cafés and restaurants on the boulevards have served as substitutes, but their number is declining, and those which were select are being closed. In 1900, when so many foreign artists are likely to visit Paris, it will appear inhospitable if they cannot be entertained occasionally in some building which French artists can claim as their own. It is therefore proposed to found a club which can be used as a place of reunion, and where foreign artists could have a footing as honorary members. M. BONNAT, the portrait painter, has taken up the project, and already he has secured the co-operation of several painters as well as of architects and sculptors. He is sure to attain further success, for the club will be formed, and it will be additional evidence of the desire by Frenchmen to possess English institutions, or imitations of them, at any cost.

THE demolition of the Palais de l'Industrie in the Champs Elysées has caused a novel revelation of Salon exhibitions. It will hardly be credited that every year there are paintings and models of statuary which the creators do not care to claim after the close of the season. From year to year they have been accumulating, and at present there are about 150 pictures and 50 examples of sculpture, besides works of art in other forms, among the castaways. The secretary of the Société des Beaux Arts has appealed to the artists to remove their property, but very few of them have responded. The majority are indifferent to the fate of the works of their hands. But as the building had to be cleared, it was at last decided by the committee to remove the pictures and plasters to one of the big pantechnicons of Paris, where they will be sheltered for a time. It is difficult to discover all the reasons which have inspired so much neglect. It is understood, however, that in most cases there are liens on the works. A picture or bust is not a sacred object to a bailiff, and he is not afraid to affix a seal in the principal division of the Salon. But when the law has asserted its jurisdiction the artist does not care to give facilities for the disposal of his productions by the Court, and through divided interests they at last become a burden to the authorities of the Salon.

THE Morris columns in Paris were inspired by a happy thought, for by means of them, advertisements and bill-sticking are brought under some control. Theatre-goers

find them a convenience, for the announcements are brought together within a limited space. But M. MORRIS is not allowed to enjoy his invention gratuitously. Every term he has to pay a higher sum for the concession. This year the increase has gone beyond anticipation. The rent for the period just expired was 14,000 francs. After long negotiations M. MORRIS has had to agree that he will pay no less than 80,000 francs annually for a renewed term of nine years, and to that arrangement the Municipal Council agreed a few days ago. The lessee will have the advantage of the exhibition year, but it is unlikely that at the end of nine years there will be a reduction. The Municipal Council, like the hotelkeepers and the restaurateurs, have surprising tenacity for prices which are supposed to be adapted to occasional circumstances.

MR. JOHN BURNET is one of the seniors of the architectural profession in Scotland. His experience has been most varied, and in Glasgow and the western district of Scotland there are many buildings which are memorials of his skill in meeting ecclesiastical, domestic and commercial requirements. Of late years Mr. BURNET has been ably aided by his partners, viz. his son, Mr. J. J. BURNET, and Mr. CAMPBELL, and he is able to retire from the more active duties of his position with the consciousness that the business will continue to be worthily conducted. On Monday several of Mr. BURNET's friends presented him with his portrait as a memorial of their esteem. It was painted by Mr. JAMES GUTHRIE. Mr. W. GILFILLAN, in offering the gift, said that at the end of 1895 Mr. BURNET celebrated his golden wedding, and that period happened also to coincide with his jubilee as an architect. Many of his friends thought that such an occasion should not be allowed to pass without something being done to mark so unique a combination of circumstances. The feelings of his professional friends were as warm for him in his retirement as they had been in the heyday of his career. Mr. BURNET, in the course of his reply, gave some interesting reminiscences of his early days as an architect, and referred to the influences that had given shape to his professional work. He thought that some training in one of the trades with which architecture had to deal was of great value to the architect. Doubtless architecture might be more quickly taught in a technical college, but the knowledge so gained was apt to be superficial. He was proud of their handsome gift, and he was especially grateful for it, because of the kind feelings that had prompted it. Everyone who has met Mr. BURNET will share in the feeling that he may long enjoy those desirable accompaniments of such an age as he has attained, viz. "honour, love, obedience, troops of friends."

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: CLOISTERS, LOOKING SOUTH-EAST, AND PART OF TOWER.

THE illustration shows the lower part of the central tower which imparts so much dignity to the cathedral. The large window belongs to the chapter-house and the transept window to the "Martyrdom." Although there is less variety in the cloister openings than is seen in some other examples, the arrangement is excellent.

CANTERBURY CATHEDRAL.—NORTH CHOIR AISLE, LOOK'NG WEST.

ONE of the most picturesque aspects of the interior of Canterbury Cathedral is presented from the spot shown. The more ancient tomb is Archbishop CHICHELE's and the design was evidently arranged by that prelate, who wished to suggest that he knew he was not exempt from the fate of ordinary mortals and was doomed to arrive at the condition of the lower reclining figure.

The second tomb is Archbishop HOWLEY'S. His name was often to the fore during the Jubilee celebration, for he officiated at the coronation and marriage of Her Majesty the QUEEN.

SHEFFIELD MUNICIPAL BUILDINGS.—GRAND STAIRCASE, 1 & 2.

The Architect, July 9th 1897

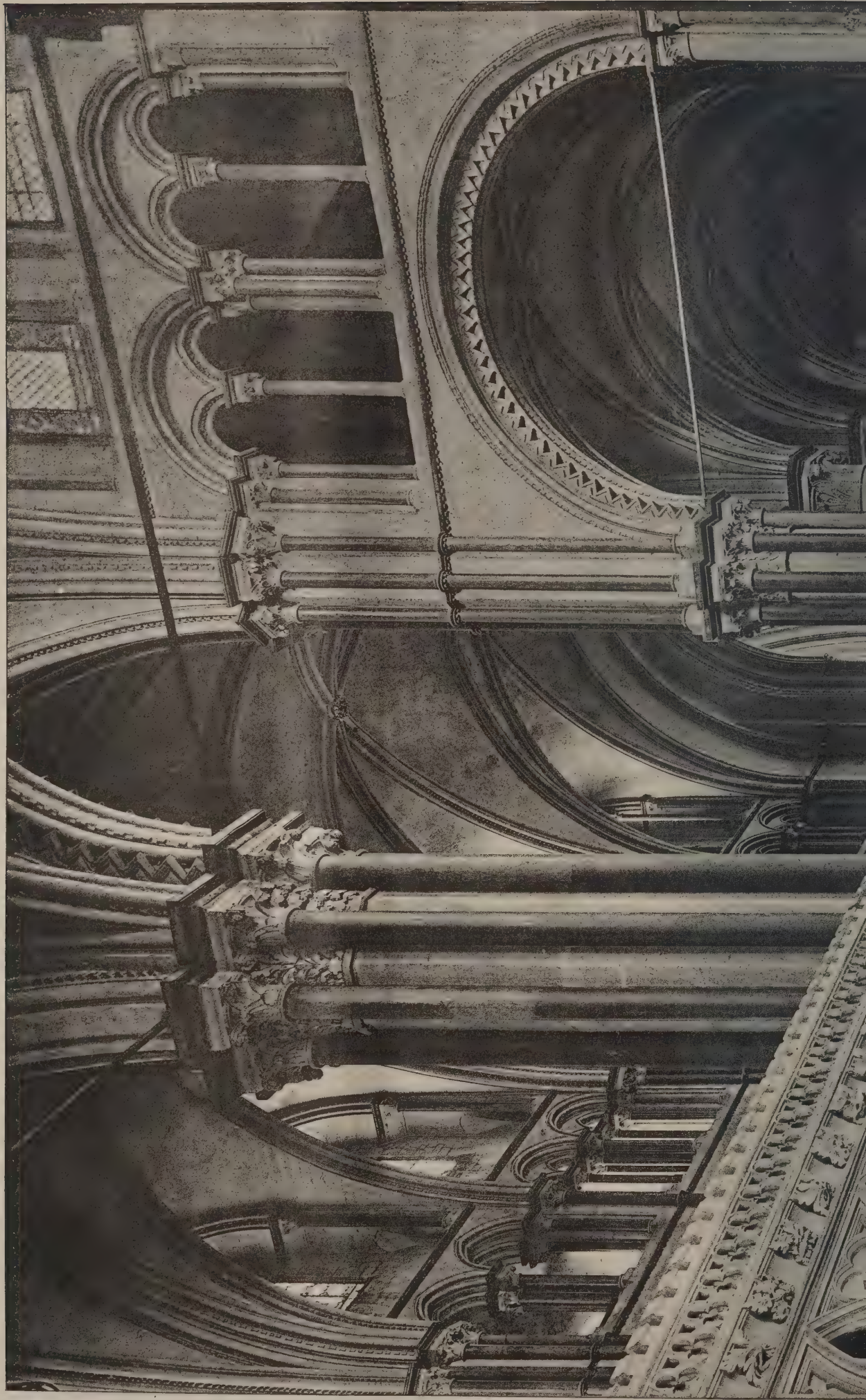


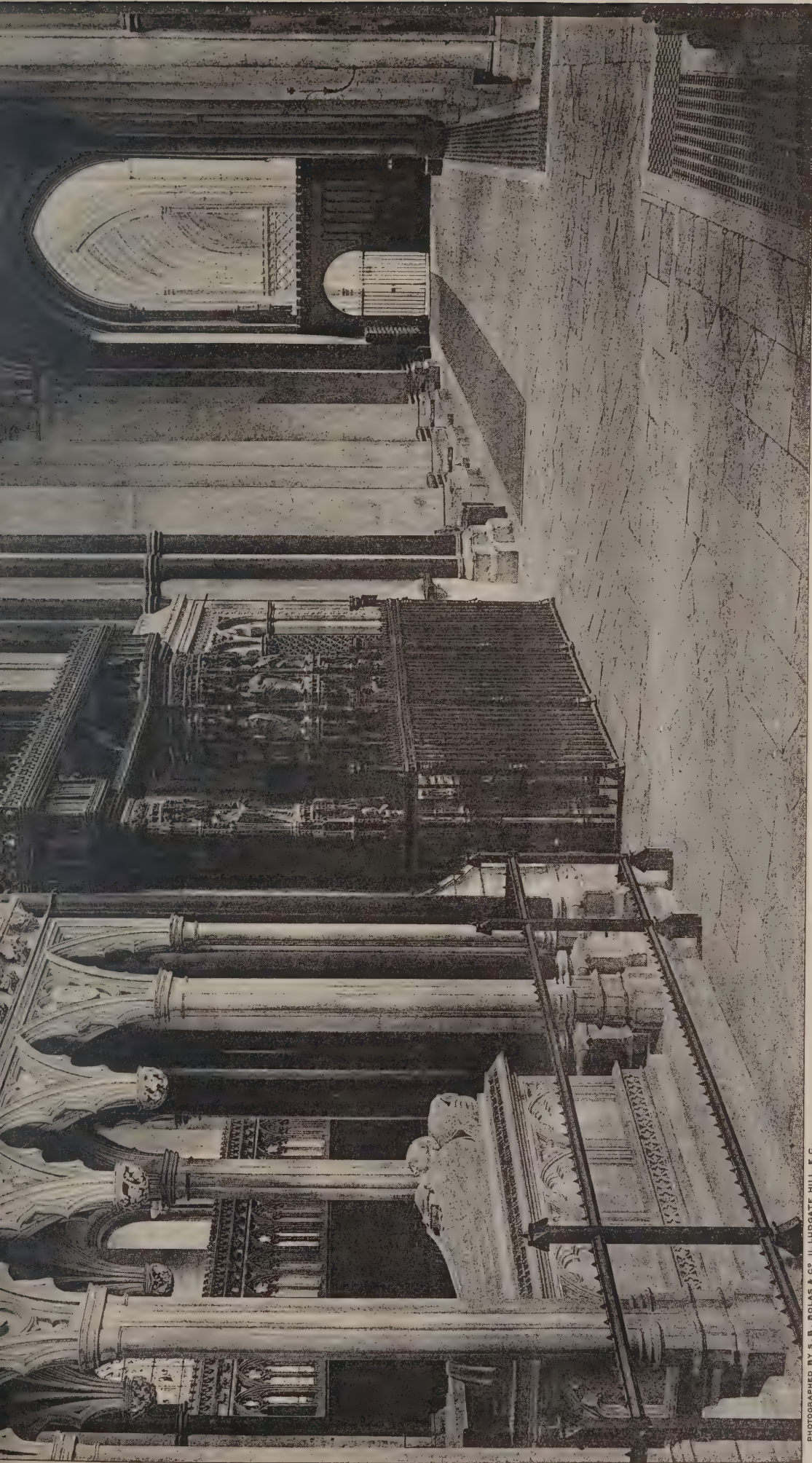


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CATHEDRAL SERIES, No. 54.—CANTERBURY: CLOISTERS, LOOKING SOUTH-EAST.
SHOWING PART OF TOWER.





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CATHEDRAL SERIES, No. 55.—CANTERBURY: NORTH CHOIR AISLE, LOOKING WEST.

The Architect, July 9th 1897





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SHEFFIELD MUNICIPAL BUILDINGS: GRAND STAIRCASE.
E. W. MOUNTFORD, Architect.



PHOTOGRAPHED BY BEDFORD LEMERE & CO

9th 1897



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SS: GRAND STAIRCASE.
Architect.

THE ARUNDEL TOWER, CANTERBURY.

THE general view of Canterbury Cathedral which we published last week, comprised, among other features, the two western towers. They appear alike. If compared with any of the views which appeared in the first quarter of the present century a great difference will be observed. In the older views the north-west tower does not rise to the same height as its companion, and it might be imagined that some rule prevailed in Mediæval times like that which was observed at a much later period in the church of St. Sulpice, Paris, which prohibited uniformity. Whatever was the cause which made Lanfranc's or the Arundel Tower at Canterbury inferior to its companion cannot now be determined, for the structure succumbed nearly seventy years ago. The lower storey formed a complex vault which attracted the attention of Professor Willis, and when the stones were deposited in the nave of the cathedral he found the surfaces of the spandrel stones covered by lines and profiles of mouldings similar to those discovered at St. Saviour's, Southwark, thus proving that the same method of laying out work continued in use from the period of its first introduction.

An elaborate description of the Arundel Tower was published by John Carter, the architect, in 1833, and is now worth reprinting:—

The north-west tower of Canterbury Cathedral, lately destroyed, was known as Lanfranc's Tower, but was not built till upwards of seventy years after the death of that prelate. This magnificent relic of Norman architecture had seven conignations between the ground and the summit, and as many stages, and was 119 feet 9 inches high. The platform or base on which it stood was of enormous bulk and strength, and originally measured full 36 feet on every side. The area of the tower was a trapezium. The east and the west sides were parallel, and measured respectively 18'4 and 19'2 feet. It should be remarked that a line was drawn through the centre, and the excess in the length of the west wall was ascertained to have been disposed equally on both sides. This irregularity in the Norman plan had been obviated within the church by the addition of large clusters of pillars towards the east and south; but above, where the Norman architecture remained in all its original simplicity, the difference was perceptible. Four storeys corresponded in design, the next below was plain, and so was the lower storey, with the exception of the doorway on the west side; but the intermediate space was enriched with a Norman window on the west, and doubtless with another on the north side. The walls were battered all the way up, some divisions more than others; their bulk was thinned on the outside by the diminution of every stage, and their gravity reduced on the inside by a series of semicircular arches on each floor. On the angles were pilaster buttresses of several thicknesses; that to the north-west enclosed the staircase. The design may be remarked as possessing two distinguishing and very interesting features: one, that the original arches throughout the design enclosed other arches; the second, that Norman and Pointed arches of coeval date were associated in the uppermost range. The Pointed arches enclosed the Norman; both had mouldings, columns, capitals and bases alike. A single torus moulding of the same size as the column from which it sprung constituted at once the figure and the ornament of the arches. An indented line on some of the capitals and cornices is the only ornament remaining to be noticed.

The walls of this noble tower were cracked on all sides between the base and the middle line of its elevation. Time and alteration had contributed to the defects which ended in demolition. Their operations have been gradual and perhaps have not been greatly retarded by the efforts which were made half a century ago to tie the mutilated walls together. To these another cause may be added for the dilapidated state of this building, namely, the inferior quality of the mortar, which had lost its binding property in the lower half of the walls, but retained the strength of the stone above. The walls were 7 feet broad at the base and upwards of 3 feet at the summit, composed throughout of rubble and a large proportion of lime, faced on the outside and inside with squared masonry, not bonded through the wall in any part. The strength of a Norman wall is in its core; when this crumbles and falls away, as in the present instance, the fate of the building is decided. But I question the modesty and justness of any reflection upon the failure, so to name it, of a fabric which has stood full six centuries and a half. The builder must have been a skilful and a honest workman; and that his labour was duly appreciated by the architect of the fifteenth century will be admitted by those who remember the laborious and difficult alterations he effected for the sake of preserving this tower and obliterating all traces of its Norman character in the interior of the cathedral. But before I describe these alterations I will conclude my remarks on the masonry, which had been carefully squared and joined together; but the size of the courses and the line of the joints were uneven. In no instance were the blocks large enough to stretch into the second member of the jambs; the same remark applies to the buttresses; it was throughout a fine and well-

wrought but thin ashlar, in the three uppermost tiers very perfect, but betraying below the middle, where it was detached from the cement, its dangerous condition. Some of the arches were formed with keystones, others without, as accident determined; and it is evident that the smaller arches, consisting of six or eight narrow stones, were constructed without centres; none of them were semicircular, but all exceeded the semi-diameter in height. The architect who spared this magnificent tower from the ruin which lighted on the Norman nave planned and executed a skilful design for preserving the interior uniformity of the church. The original arches, however graceful in form or tastefully enriched, would have ill accorded with the light and splendid character of the Pointed architecture which Prior Chillenden adopted for the nave. It became necessary not only to change the form of arches and pillars, but also to enlarge the openings, and it is probable that with the lower part of the south and east sides of the tower, the internal angle was entirely removed to make room for the present clustered pillars. At all events, if the angle was not wholly destroyed, it was so much reduced in bulk as to be inadequate for the support of the incumbent weight without the addition of the new stonework. But it is the operation previous to the alteration, and necessary to its success, which I shall more particularly describe as evincing the ability and perseverance of our ancient architects in the execution of their labours. On three sides of the tower, the north, east and south, above the openings, Pointed arches were built into the walls, of irregular masonry and coarse construction, but sufficiently strong and compact to bear the pressure from above, while the wall below was either wholly or in part taken away. The erection of this ingenious contrivance was slow and difficult in this strong and ponderous building. After the form and size of the arch had been marked on the wall, the masonry was removed in small portions, and immediately supplied by the springer of the new arch, kept flush with the old wall. In this manner the work was advanced till the discharging arch was completed. It was interesting to examine a contrivance thus admirably and successfully executed several ages ago. The two internal arches stretched quite across the walls, and abutted against the piers, and were better shaped and more carefully built than the external one towards the north, intended to uphold only a portion of the weight which otherwise would have pressed on the arch of a lofty window. I have preserved an accurately delineated representation of this arch; and it will show how little attention was paid to the size and shape of the stones employed, so that they formed altogether a compact mass, and served the purpose for which they were intended. The broken line of one side was an accident in the original construction. Had it happened after its completion and the removal of the wall underneath, it would have proved injurious to the building, over which, however, it remained till its destruction without a flaw. If the preservation of this tower had not been an object of considerable moment, so much care would not have been taken as we have seen was resorted to for the purpose of securing it from accident during its necessary internal alteration; but after three centuries and a half the architect of the fifteenth century will surely escape reproach, though I attribute to his labours the causes in part of the subsequent weakness of the building. By means of the arches he so dexterously constructed an undue weight was forced upon the angles. The structure was three centuries old in his days, but nevertheless did not yield to time and alteration till it had numbered full twice that period. The angles towards the lower part were bulged and crippled throughout the substance of the wall, while those of the upper part retained their firmness, and exhibited no signs of decay.

Canterbury, notwithstanding its losses, is still rich in the treasures of ancient architecture. But the destruction of its noblest and most interesting specimens of the Norman style—the tower just described, and a splendid relic of the tower of St. Augustine's Monastery—has severed the chain of illustrations belonging to the records of its architectural history. Canterbury is not without specimens of Early Norman architecture, but these are scarcely regarded in the midst of a transcendent display of the same style in its richest costume, combined with the grandest dimensions and the most highly finished decoration. The Norman nave might have been as frugal of ornament as the western tower, but whatever were its features, it was entirely swept away in the fifteenth century, and its demolition must have proved a work of great labour—labour, nevertheless, surpassed by that which the ingenuity and admirable skill of the architect of Gloucester Cathedral imposed upon himself when he executed his design of spreading a screenwork of stone of a light and exquisite pattern over Norman architecture of the most plain and robust character.

M. Saladin has been appointed architect for the buildings which the Government of Tunis have resolved to erect in connection with the International Exhibition of 1900.

GROINED VAULTS.

THE stupendous vaulting of the Temple of Peace at Rome was a groined vault. In the construction of this vault the Romans showed a knowledge which would have been admired in the latter part of the Middle Ages, and the idiot Emperor Claudius a discrimination in the choice of his architect not inferior to the inspired selection of Giulio II. and Paolo III. The vaulting of the great hall at the Baths of Diocletian is of the same character, and equally deserving of respect as that of the Temple of Peace.

It was the practice of the Freemasons, to whom we are indebted for the vaults which secure our cathedrals, to reduce all the pressures in a building, whether vertical or lateral, to certain principal supports; their vaults were composed, "ex lapide et topho," of ribs and panels—the one of good freestone, the other of light sandstone or chalk; their supports were piers and columns, and a wall with them was held to be merely an enclosure. The objection to this principle, "that stone would crush when subjected to the pressure of great weights reduced to a small surface," may be answered by a reference to the columns in Gothic cathedrals.

Gauthey, in the fourth volume of "Rosier's Journal de Physique," speaks of a column in All Saints, Angers, 24 feet high, 11 inches square, which sustains 60,000 lbs. He says this is only one-seventh of what would crush it. There is a column in the morning chapel at Lincoln Cathedral equally thin in comparison to its height. This column stands insulated in the centre of the chapel, so that it sustains eight-twentieths of the whole vaulting which covers the chapel. The columns which support the roof of the galleries of the Patio de los Leones, of the Alhambra in Granada, are nearly as thin in proportion to their height. A pillar twenty-six times its diameter in height would have been to the Ephesians, as Pascal styles the Jews, a continue miracle. It would be pleasant to listen to a dialogue between the shades of the architect of the hexastyle hypæthral temple at Pæstum, and the architects of All Saints of Angers, or Lincoln Cathedral. We must say of the former "professus grandia turget."

At the revival of Roman architecture the adage "Pondus addit robur" became proverbial. The different interpretations exemplified in the buildings of different ages are amusing. In the groined vault we may perceive the origin of all the improvements which the Freemasons made in the art of vaulting.

The Romans in their bridges endeavoured to reduce the dimensions of the piers, and to render the vaults of their arches more nearly in equilibration than the line of road would generally permit, by means which, in some measure, surprise us by their clumsiness, when the more elegant mode by groined vaulting had been discovered. The practice to reduce the size of the piers was by constructing small arches in the piers themselves above that part of the pier where adequate resistance had been obtained for the lateral thrust of the arch, as may be seen in the Pont du Saint Esprit over the Rhone, in Languedoc, at the bridge of Merida, in Spain, and Ponte Fabrizio, at Rome. A similar mode was adopted at the Ponte Senatorio, now Ponte Rotto, by Pope Gregory XIII. This method had also the additional advantage of affording more waterway. Tunnels have been sometimes worked in the piers with the same view—as in Ponte Sisto, built by Pope Sixtus IV. upon the site of the ancient bridge of Janiculense, and as at the Pont de Toulouse, in France, and at the bridge of Glasgow, over the Clyde. Perronet, the French architect, not only formed tunnels in the piers, but also over the haunches. The Welsh mason Edwards, in the wonderful bridge over the Taff, in Glamorganshire, learnt from experience what Perronet's theory had taught him. Over each haunch of the arch of the Pont y Prydd there were three tunnels in the breast of the arch. The mode recommended to be adopted at Blackfriars Bridge by Dr. Stukeley, "Phil. Trans.," June 1760, and which had been adopted in consequence of the sinking of one of the piers of Westminster Bridge, is very ingenious and appears particularly applicable in many cases where circumstances require a number of small arches.

Perronet, in the bridge of St. Maxence on the river Oise, adopted another mode of reducing the size of the piers, which was by supporting his arches on columns instead of single piers; so that there are openings longitudinally through the bridge, by which the size of the supports are reduced by a mass of material equal to the intercolumniations. The parts of the arches over the intercolumniations are supported by arches something resembling the inverted concave conoidal vault of King's College Chapel, Cambridge, piercing the great arches, but the weight, nevertheless, is spread on the whole surface of what would have been the base of the pier. This method may be considered as an introduction to groined vaults in the arches of bridges, a practice which would be more securely followed by adopting the Gothic manner of "arcs doubleaux."

When considering the knowledge of vaulting possessed by the builders of the thirteenth and two following centuries Sir John Robison observes:—"An art so multifarious and so much

out of the road of ordinary thought could not but become an object of fond study to the architects most eminent for ingenuity and invention; becoming thus the dupes of their own ingenuity they were fond of displaying it where not necessary." The ingenious and promising invention of substituting ribs for the groins of a groined vault required the practice of increasing the height of the generating curve over the sides of the space to be covered. When the arch over the side of a polygon is a semicircle, the arch over the diagonal becomes elliptic, the longer axis horizontal. By making the arch over the side a semi-ellipse, the short axis horizontal, the arch over the diagonal becomes proportionally elevated. If the arch over the diagonal in an octagon plan be semicircular, that over the side will become elevated in proportion to its width, as the radius 1 to 7653, the side of an inscribed octagon. At the Baths of Diocletian the crossing vaults of the great hall are elliptic, the short axis horizontal, and of such a curvature that the groins or arches over the diagonals of the side-groined vaults are semicircles.

Gautier says that pointed arches were used in bridges, churches and other buildings, "par la faire moins de pousseé." Sir Christopher Wren makes a similar observation, adding that these arches required less centering and thinner stones.

In every arch the summering of each voussoir decreases from the springing to the vertex, and in an arch whose tangent at the vertex is horizontal, the summering necessarily vanishes at that point. The thickness which is given to an arch at the vertex has relation to what may be considered a sufficient summering. Hence the more oblique the tangent of an arch at the vertex may be, or, in other words, the more acutely pointed the arch, the less thickness of material will be required. By a parity of reasoning it may be shown that the more acute the arch may be at the vertex, the less lateral thrust will be on the abutment. These geometrical and mechanical facts must necessarily have led to the adoption of the semielliptical vault, the short axis horizontal or the pointed arch. Payne Knight, who was eminent as a scholar and a man of taste, observes that "the pointed arch is the primitive arch, of which the earliest instance known in Europe is the emissarium of the lake Albano, built during the siege of Veii (394 years before Christ), before either the Greeks or Romans knew how to turn any other kind of arch, for, as this may be constructed without any centre by advancing the stones in gradual projections over each other, and then cutting off the projecting angles, its invention was obvious and naturally preceded those constructed upon mechanical principles, of which, I believe, there are no examples anterior to the Macedonian conquest." The account of this pointed arch is manifestly copied without thought from the work of some ignorant person; an emissarium may be conceived to be an arch. The first covering of an enclosed space, whether by wood or stone (not a lintel), was and must have been in the form of a pediment; the roofs of the queen's chamber and of the passage to the tomb in the pyramid of Egypt are an unnecessary confirmation. This pyramid, we are told, was built soon after the Trojan war, about twelve centuries before the birth of Christ.

Were it admitted that this emissarium had been hollowed out in a form like that of a pointed arch, nothing could be gained from this solitary fact in answer to the questions, When were arches first known? What were the forms of these arches? Seneca, Epis. 90, denies to Democritus the invention of an arch, "ut lapidum curvaturâ paulatim inclinorum medio saxo allegaretur;" such an arch as this must have required a centre. Democritus flourished sixty years before the siege of Veii. The question to be agitated, if any inquiry upon the subject were worth the labour, is, When were the arches (composed of voussoirs) first in use? To which a satisfactory answer has not yet been given. Lintels may be hollowed out into any shape, and the stones which project over one another like steps, and covering a room, may be also cut into any shape. The stone covering over the Temple of Mylassa could not have been cut out into the form of a pointed arch, but might have been cut into an extremely flat ellipse or scheme arch. The whims and caprices of masons are not to be attended to. The vault of the Salon en Forma de Tribunal of the Patio de los Leones of the Alhambra at Granada is of the early construction by inverted offsets, and is hollowed out into fantastical shapes which could have suggested themselves only to the mind of an Arab architect. Sir Christopher Wren says that the pointed arch was derived from the Saracens. We must not apply to Granada or Cordoba for confirmation, although we may see there the trefoil and cinquefoil arch.

Sir W. Gell, in his "Itinerary of Greece," 1810, says:—"Between Krabata and the Acropolis of Mycenæ is the Treasury of Atreus; the apartment itself consists of a circular dome, in shape like a beehive, 47 feet 6 inches in diameter and about 50 feet in height. This dome is not composed of stones which form part of the radii of a circle, as in an arch, but is constructed with horizontal courses, the inside of each stone being curved in such a manner that the whole has the appearance of a regular vault. Though a stone is now wanting near

the top the roof seems to be in no danger of falling. Vaults of this construction are to be found among the ruins of the ancient cities of Sicily. About 3 miles from Noto, in the district of Falconara, is a peninsula covered with ruins of the ancient city of Macara. Here, in a place called the citadel, are buildings covered with large stones placed horizontally, and having, like that of Mycenæ, internally the appearance of a dome." He further says, "It is of little consequence whether these treasuries or magazines were erected by Atreus or his predecessors."

Horace Walpole has happily remarked that "it may as well be asked who invented pure Italian, as who invented the pointed arch"; and he might have added La Fontaine's maxim in regard to another subject of jealousy:—

Quand on l'ignore, ce n'est rien.

Quand on le sçait, c'est peu de chose.

From the time of Pericles, through the ages of Augustus, Justinian and the Normans, every succeeding five centuries to the fifteenth, like a lustral cleansing, is remarkable for the alterations in architecture, and the alterations appear to have arisen from the modes of covering the spaces enclosed for public worship. It is also remarkable that the prevention of fire has been the mother of the inventions which have characterised those times. Parsons, in his "Travels in Asia and Africa," says "that in Aleppo there is no fear of fire, their houses being of stone and the ceilings arched." Dr. Johnson, describing the palace in the Happy Valley, in "Rasselas," says "that the roofs were turned into arches of massy stone, joined by a cement that grew harder by time; and the building stood from century to century deriding the solstitial rains and equinoctial hurricanes without need of reparation." Thick stone walls will remain to mark the site of a building, but vaults alone can preserve the building itself. It is the roof which makes the house.

Previously to vaulting the naves of the cathedrals round-headed arches were general, and there were few examples either of rib or panel vaulting, pointed arches, pinnacles or buttresses. While vaults were confined to low buildings, as crypts and the aisles of cathedrals, it is obvious that the thick walls of the Saxons and Normans would be able to resist their thrusts. The numerous arches at the Alhambra in Granada, at the Mosque at Cordoba, probably built about the eighth century, are elliptical horseshoe arches.

In the vaulting of the aisles of Durham and Canterbury Cathedrals are to be observed the "arcs doubleaux," and groined ribs in roundheaded vaults. In the naves of the same buildings is the same character of vaulting, except that the arch of the vault is pointed. Some vaults of this kind are to be distinguished from others by the position of the stones of the vault between the ribs, which instead of being parallel to each side of the plan as in Roman groined vaults, take a mean direction between the groined rib and the ribs of the arches over the sides, whence they meet the vertex at an acute angle and are received by stones running along the vertex, cut in the form of a ratchet. The advantage of this method consists in requiring less centering and originates in the position of the ribs at the springing.

From these beginnings vaulting began to assume those practical advantages which the joint adoption of the pointed arch and ribs was calculated to produce.

Gray, in a letter to Mason, says:—"Gothic architecture, previous to the time of Henry III., is of a clumsy and heavy proportion, with a few rude and awkward ornaments; then all at once came in the tall and picked arches, the light clustered columns, the capitals of curling foliage, the fretted tabernacles and vaultings, and a profusion of statues, &c., that constituted the Gothic style, together with decreasing and flying buttresses and pinnacles on the outside." If the antiquary will not ascribe the ornaments characteristic of the Gothic architecture of the times of Henry III. and succeeding ages to the vaulting the naves of the cathedrals, nor the pointed arch to the necessity for its production, but only to fortuitous circumstances, it must be acknowledged that the contemporaneous production is remarkable, especially as those ornaments and that form are useful only in vaulted buildings.

The second step differed from the first, inasmuch as at the vertex of the vault a continued keystone or ridge projects below the surface of the vault and forms a feature similar to the ribs. But here it was necessary that the ridge should be a stone of great length, or having artificially that property, because its suspension by a thinner vault than itself would be unsafe unless assisted by the rib arches over the diagonals and side, a distance equal to half the width of the vault. To obviate this objection other ribs were introduced at intervals, which may be conceived to be groined ribs over various oblongs, one side continually decreasing. This practice had a further advantage, as the panels or vaults between the ribs might become proportionally thinner as the principal supports increased. It was then that the apparent magic hardness of pointed vaulting and the high embowered roof began to display itself; from slender

columns to stretch shades as broad as those of the oak's thick branches, and in the levity of the panel to the rib to imitate that of the leaf to the branch.

On comparing rib pointed vaulting with Roman vaulting, it will be invariably found that the rib itself is thinner than the uniform thickness of the Roman vault under similar circumstances, and that the panel, which is the principal part of the vault in superficial quantity, sometimes does not exceed one-ninth part of the rib in thickness. The Gothic architects, it has been expressively said, have given to stone, an apparent flexibility equal to the most ductile metals and have made it forget its nature, weaning it from its fondness to descend to the centre.

VALUE OF LAND IN ENGLAND AND SCOTLAND.

AN interesting case which suggests the difference between the principles of land valuation in England and Scotland is the subject of arbitration. The land in question, which belongs to Lord Lamington, is required for the construction of a reservoir by the Airdrie and Coatbridge Water Company. The *Glasgow Herald* has published the following notes of the arbitrator Sheriff Jameson:—

Edinburgh, June 30, 1897.—The oversman having considered the proof and whole process and heard counsel for the parties proposes to find that the sum due and payable by the respondents to the claimant as purchase-money and compensation for taking the 74½ acres mentioned in the minute of reference is 5,155£ sterling, with interest at the rate of 5 per centum per annum from July 15, 1894, until paid. Further proposes to find the claimant entitled to his expenses as the same may be taxed if required by the auditor of the Court of Session, the expenses of and incident to the proof allowed by interlocutor of April 7, 1896, to be taxed as between agent and client. Allows either party to make representation against the above findings within fourteen days from the date hereof.

(Sgd.) ANDREW JAMESON.

Text of the Note.

In this arbitration the claimant claims to be compensated on the footing that the land taken by the respondents is to be valued not as pastoral land, but as land having a special value as the site of a reservoir, and having therefore what has been termed somewhat loosely, as it appears to me, a "commercial value." Alternatively the claimant supports his claim by evidence of the value of the land viewed as part of a pastoral farm, which is its present use. A good deal has been said in the course of the proceedings about a difference of principle in valuation between the witnesses for the claimant and those for the respondent, but it appears to me that the difference between the parties is perhaps one regarding the methods rather than the principles of land valuation. I hope I may be pardoned adverting at this time of day to some elementary principles of valuation, regarding which apparently there is no difference of opinion between the parties.

In the first place, it is well settled that in valuing land under compulsory powers the arbiters or oversman are bound to take into consideration not only the present value of the land to the owner, but also any potential or prospective value that it may possess. In ascertaining what potential or prospective value any piece of land possesses, the first question is, what are the uses to which it can be adapted? And the next is, what are the probabilities or possibilities of its being wanted for these uses by the owner himself or by members of the public (including companies and corporations) other than the persons in whose favour the Legislature has granted compulsory powers? It is the first of these questions that has given rise to the term "adaptability," and "adaptability" as is laid down in the case of the Countess Mary Osselinsky v. the City of Manchester, reported in the appendix to Brown & Allen on "Compensation," is an element that ought to be taken into consideration in fixing the value of land. But it is obvious that "adaptability" of land for any purpose, though it ought to be taken into consideration, cannot justly be held to add to the marketable value of land to the owner, unless it can be shown that at the time of the land being taken there was a probability, greater or less, of the land being required for that purpose by some person other than the purchaser holding compulsory powers.

What is Marketable Value?

It is this probability that raises "adaptability" into "marketable value," and in my opinion "adaptability" for any purpose, though it may be considered, can have no value put on it unless by reason of such "adaptability" a probable demand for the land possessing the adaptability is proved. To illustrate what I mean, take the most familiar example of prospective value—namely, the prospective value of agricultural land for building purposes, it may be said that so far as intrinsic qualities are concerned, most of the land in the country is

"adaptable" for being built upon, yet unless by reason of proximity to a town or the establishment of a new industry in the neighbourhood, or some such cause, there is a probability of any particular piece of land being required for building purposes within a moderate period of time, no value will be put on the land merely because it is adaptable for being built upon; while, again, if there is a probability of its being required for building purposes, but not till after the expiry of some years, then if a building value is given it will be discounted according to the number of years which will probably elapse before the land is wanted for building. Again, taking reservoir sites, I have no doubt that throughout Scotland, and especially in the Highlands, railways have intersected and spoiled what might have been admirable sites for reservoirs, but it never entered the mind of any proprietor or his advisers to make a claim in respect of such land on the footing of its being land adaptable for reservoirs, for the obvious reason that there was no demand whatever for it as such.

What uses Land is adaptable for.

It has always been the practice in Scotland in arbitrations under the Lands Clauses Acts to consider what uses land is adaptable for. I may mention that in an arbitration in which I was oversman regarding the value of Barry Links, in which the trustees for Lord Dalhousie were the claimants and the War Office was respondent, and in which the award amounted to about 38,000*l.*, evidence was led and considered as to the prospective value of various portions of Barry Links as adaptable for use as (1) a rifle range, (2) an artillery range, (3) a rabbit warren, (4) ground for grazing sheep on, (5) small arable holdings, (6) building ground so far as it adjoined certain villages, and (7) irrigation ground for the sewage of the town of Dundee. But in no arbitration in Scotland, so far as I know, has value been given for bare "adaptability" apart from a probable demand for the land for the purpose to which it is said to be adapted, such demand being either inferred from surrounding circumstances other than the circumstance of a party coming to take under compulsory powers or proved by direct evidence. It seems that it is otherwise in England, and the valuation put on the site in question in this case by all of the claimant's English witnesses seem to be based on these two grounds—(1) That the land now in question is adaptable for being used as the site of a reservoir; (2) that 150*l.* per acre (to quote Mr. Fenwick's figures) is a value willingly given for reservoir sites in England, and represents what a reservoir site is worth between parties purchasing and selling the same. Then it seems to be assumed from the fact of the respondents having come to this site that either Lord Lamington himself would have utilised it as a reservoir or the promoters of some other similar scheme would have come to take it. It is only fair to Mr. Fenwick, whose evidence was given with the greatest frankness and clearness, to say that he apparently admits (p. 80 C of proof) that mere adaptability apart from demand would not form an element of value. But judging generally from the evidence of the claimant's English witnesses in this case, who are gentlemen of high character and of great experience in compensation cases, it would appear that a practice has grown up among arbiters in England of invariably giving high rates for reservoir sites apart from the question whether in any particular case there was any probable future demand for the site other than the demand from the parties taking it under compulsory powers.

Difference between Scotland and England.

This practice may have arisen from the circumstance that there is comparatively little ground in England at high elevations and suitable for reservoir sites in proportion to the extent of the rest of the country and the density of the population residing therein, with the result that all land in England at a certain elevation above the sea-level and adaptable for reservoir purposes is assumed to possess a recognised marketable value in respect of the qualities which it undoubtedly possesses. If this is so I can only say that a different state of circumstances exists in Scotland, where even in what are called the Lowlands there is hardly a single town or village which is not within reach of high-lying ground where reservoir sites may be readily obtained. But I venture to think that even in England the practice (if it exists) is an unfortunate one, and we have heard in the present proceedings of a case which, I think, shows the danger of determining any particular case by rules of fixed values spoken to by witnesses from their experience in other and possibly differing cases. The case I refer to is the case of the Swansea Waterworks, spoken to by Mr. Fenwick. In that case a syndicate had purchased, at public auction, a sheep farm, with hill-top pastures, on the ridge between Brecon and Swansea, for the sum of 11,500*l.* The extent of the farm was 5,000 acres. A year and a-half after the purchase the Corporation of Swansea, having obtained compulsory powers to make a reservoir on said farm, gave notice to treat, and the case went to arbitration, when a sum of 12,370*l.* was awarded for 140 acres

which was taken by the Corporation for their reservoir, plus an easement through a tunnel in a hill for their conduit. In that case the owners of the land could not point to any other community which was likely to want that reservoir site of 140 acres. As Mr. Fenwick, who advised the claimants, puts it, "We said simply it was the value of a reservoir site, and one customer at all events wanted it." This case is certainly a remarkable one. The price which the estate fetched by public auction a year and a half before the arbitration shows clearly that the land possessed no market value by reason of its adaptability as a reservoir site. It further appears that it could not be proved that there was any probable demand for it as such except by the persons to whom the Legislature had granted compulsory power to take it, and yet an arbiter awarded 12,370*l.* for 140 acres out of an estate of 5,000 acres which a year and a half before had only fetched 11,500*l.* In other words—putting aside the easement—land which had sold one year at 2*l.* 6*s.* per acre was within two years held to possess the value of 88*l.* 7*s.* per acre or thereby. In my humble opinion, and with all deference to the superior experience of valuers who support the practice, I cannot help thinking that the public of Swansea were subjected to a most extortionate charge, and that the practice which leads to such a result cannot be a sound one. It has been said by some of the claimant's witnesses in this case that the practice of giving values apparently for adaptability pure and simple is borrowed from the practice in the north of England regarding land taken for railways, and it appears, according to Mr. Storey's evidence (p. 63 C of proof), that if, by reason of land being level, a railway can be made cheaply through a part of an estate, the proprietor has the right to claim for the facilities for making a cheap line, and he further informs us that the same practice was applied to the pipe track in the Manchester water scheme. He says:—"It was admitted that the pipe track going on the contour saved them 60,000*l.* going through a deep cutting. I am speaking roughly with regard to figures, and it was proved that the landowners had a right to make a special claim for the track going on the contour, although the land down below was more valuable."

The Element of Adaptability.

I can only say that the practice of which the above are examples appears to be wholly at variance with the well-recognised rule that what is to be valued is the value of the land to the person from whom it is taken, and not the value to the person who takes it under compulsory powers. It further appears that where the element of "adaptability" enters into a valuation, it is a practice in the north of England when there is a difficulty as to what value to put upon "adaptability" in land taken under compulsory powers to calculate what the undertaking for the purposes of which the land is being taken will pay when it is once set agoing, and to fix on one-fifth or one-seventh or one-tenth, as the case may be, of the profits of the enterprise as what should be paid to the owner of the land. This practice, which is said to be a "fairly-established" one in the north of England, is spoken to by Mr. Storey (p. 55 F and 66 C of the proof), and it seems to have been applied in the case of railways as well as of reservoirs, and my friend Mr. Gow, one of the arbiters, considered that this practice ought to be applied in the present case. With all deference to the great experience and knowledge of Mr. Gow as an arbiter and land valuator, and also to the opinion of the claimant's skilled witnesses, I must say that it appears to me that this method of valuation is faulty in principle. It professes to fix the value of the land to the owner by considering how much profit the purchaser will make out of it and then giving the owner a share of that profit. I am aware that this is attempted to be justified by assuming that if the particular company or corporation taking the "adaptable" land had not done so some other company or corporation would have done so, and that there being thus a demand for the land for a particular purpose its value is represented by whatever sum the hypothetical company or corporation could afford to pay for it, and might have offered to the landowner for it, and this sum again has to be arrived at by considering what profits the hypothetical undertaking would produce. This is what has been termed "commercial value." I must say this seems to those accustomed to the Scottish practice a strange method of land valuation. It proceeds on the footing of holding adaptability proved, as it generally is, by the fact of promoters of an undertaking armed with compulsory powers applying for the land and by then assuming hypothetical purchasers as competitors. The method results in an evasion of the well-known rule already adverted to, and which I find laid down by Mr. Cripps, Q.C., in his "Law of Compensation" thus: "The basis on which all compensation for lands required or taken should be assessed is their fair value to the owner as at the date of the notice to treat, and not their value when taken to the promoters. The question is not what the persons who take the land will gain by taking it, but what the person from whom it is taken will lose by having it taken from him."

Action of the Legislature.

It was said in the course of the present proceedings that the Legislature has practically sanctioned these methods of valuation, because attempts have been made to get clauses inserted in special Acts regarding railways in England, limiting the arbiters or umpire in their valuation to the actual agricultural value of the land, and that Parliament had always refused to insert such clauses. I do not think this proves anything, because I take it that Parliament would never consent in a matter of what must be called general law to alter the provisions of Acts such as the Lands Clauses Acts by contradictory provisions in special Acts. But I am not surprised that, looking to the practices and methods I have referred to, there should, as one sees in the newspapers, be occasional remonstrances in England regarding the enormous sums given in compensation cases as compared with the actual value of the land taken, and I would not be surprised if, following the example set in the Allotments Act, some legislation were by-and-by to be introduced defining more particularly the general law on the subject of compensation for land taken for public purposes as that law is laid down in the Lands Clauses Acts. I need scarcely point out how in practice a method of valuation such as I have referred to is apt to be difficult and misleading. Few things are more problematic than the ultimate success of any commercial enterprise, be it a railway scheme or a water supply scheme, and it seems to me most hazardous to depart from ordinary methods of land valuation, and to have recourse to methods which (apart from all objections to principle) are fraught in practice with elements of uncertainty and difficulty, and with enormous possibilities of injustice. In the present reference Mr. Copland, who I have no doubt foresaw the difficulties of reconciling the practice to which he has been accustomed with the novel methods of valuation in vogue in the north of England, repudiates these methods, but takes refuge in a method which leads to practically the same result. He supposes that Lord Lamington is to become a water merchant on his own account, is to obtain compulsory powers from Parliament for taking his pipes for thirty miles along public roads, and is to supply water at profitable rates to anyone he can induce to buy from him between Coulter and Glasgow, and Mr. Copland then arrives at the value of the land to Lord Lamington by a consideration of the profits he (Lord Lamington) would make out of this novel enterprise. This is very ingenious, but the hypothesis on which it is based is so improbable that I really do not think it worth while to consider it further.

Circumstances of the Case.

To come to the present case, there is little question that the land to be taken is in some respects adaptable for the site of a reservoir. Had it not been so the respondents would not have thought of taking it for that purpose. But I may here note, though I shall revert to it hereafter, that the site had one important disqualification which it was not known to possess when the respondents procured their Act, namely, that suitable clay for forming the puddle trench and wall of the embankment was not present either in the land to be taken itself or the near neighbourhood. The next question, however, is, Was there a reasonable probability of this site being wanted for a reservoir by any persons or communities other than the respondents? Mr. Copland, the first witness for the claimant, gives on pages 21 and 22 of the proof a list of all the towns and villages which might be supposed some time or other to require a reservoir site at Cowgill, but he says on page 32, letter C, that with regard to the towns and villages on his list, all of them, except some very small villages, have got a supply of water with the possible exception of Carstairs. It is instructive to notice that while Mr. Tait, the engineer to the Wishaw Commissioners, speaks to the reservoir site in question as being of sufficient elevation to supply Wishaw and Motherwell, yet, although the Wishaw Commissioners were looking out for a site for a reservoir before the present respondents, they never thought of approaching Lord Lamington (p. 14, F.G.), because a reservoir at Cowgill would have been too expensive for them, and they accordingly intend now to go to a place called Dunsyre. It is true that Mr. Tait says (p. 116 C of proof) that Motherwell and Wishaw in combination might have been a customer for Lord Lamington's site at Cowgill, but that apparently is out of the question now, and Mr. Tait has to admit that agreements between towns such as these I have been speaking of are not very easy to make, and accordingly Wishaw has got a scheme of its own, and is to have a reservoir at Dunsyre, where a reservoir can be constructed much more cheaply than at Cowgill.

Result of the Evidence.

In short, the result of the evidence led is that the claimant has failed to show (first) that any single town or community referred to in the proof could alone afford to go to Cowgill, and (second) that the claimant has failed to show that any combination of communities would do so. It is true that a general

suggestion has been made that at some future time a combination of communities, or perhaps a district of the county of Lanark, might desire to make a reservoir at Cowgill; but in the first place this is an entirely problematical view, and against it I think it must be assumed that if any considerable combination of communities, or a large district in Lanarkshire, wished a new or additional water supply, they would almost certainly choose a site where a reservoir of much greater capacity could be formed than is possible at Cowgill. But in considering the question of probable competition for a reservoir site at so high a price as 150*l.* per acre or upwards, it is very important to observe that Cowgill is by no means the only possible site for a reservoir in the Upper Ward of Lanarkshire at an elevation capable of supplying water to the towns and villages in the lower parts of the county, because no less than five sites, apparently all of them possible sites, were mentioned in the course of the evidence—viz. Coulter, Camps, Wandel, Midloch, and the Kyne Water. Now, I think it very certain that if any possible customer had come to Lord Lamington and been told that he would have to pay 150*l.* per acre for a site at Cowgill, he would very speedily have gone down the water to Coulter or across the country to some of the other places I have mentioned, where, doubtless, he could have got a reservoir site at a very much less price. But since this case was commenced a fact has emerged, which, I think, makes it extremely improbable that any customer other than the present respondents would have been found for Cowgill reservoir site, and that is the want of clay at or near Cowgill suitable for making the puddle trenches and walls of the proposed reservoirs. The result has been that the respondents have been obliged to get clay elsewhere, which will cost them when delivered at Cowgill something like 20,000*l.* At the time when the respondents procured their Act they were under the belief, induced by insufficient investigation, that serviceable puddle clay would be found in the site of the reservoir, and from the additional evidence in the case it seems certain that if they had not entertained this belief they would never have gone to Cowgill at all. On the whole matter I am of opinion that it is not proved that at the time when the land in question was taken by the respondents there was any reasonable probability of its being wanted as a reservoir site by any other person or community. I therefore am of opinion that it possesses no prospective value as a reservoir site, and falls to be valued according to the use to which it is at present put.

Character of the Ground.

The ground taken forms a long strip of sheltered and comparatively flat land in the midst of steep, high and unsheltered hills. Having for ages received the washings off the surrounding hills, the soil partakes of an alluvial character, and the herbage, consisting of grasses, rushes and other plants, is strong and luxuriant compared with that on the adjoining hill pastures. It is situated about the centre of one of the hirsels of the farm of Baitlaws, and may well be termed the heart of the hirsle. The value attaching to it is not to be measured by the number of sheep which, if it were fenced, could feed on it all the year round. It supplies to a large number of sheep a daily and most salutary change of food in summer and a store of natural hay in winter. It serves as a shelter in times of winter storms and as a sheltered and warm spot for ewes and lambs in a cold spring, such as we have just passed through. It contains any number of excellent watering-places, which the surrounding hills are very deficient in. All these advantages the farm of Baitlaws will lose by the ground being converted into reservoirs. Further, when occupied, as it will be, by two sheets of water fenced into one block, it will form for a long distance a complete barrier against sheep crossing from one side of the valley to the other when they might wish to do so on account of the direction of the storm, and it will lead to greater difficulty and expense in herding the sheep, and probably to other inconveniences in the working of the farm. I cannot, after a careful consideration and reconsideration of the evidence, avoid the conclusion that the farm of Baitlaws will let for about 110*l.* less a year than it formerly did, owing to this piece of land being taken out of the heart of one of the hirsels.

Award as Compensation.

It is, however, right to divide the amount I propose to award as compensation into what should be put upon the land taken and what should be reckoned as severance and other damage of all kinds to the rest of the farm. As sheep farms are generally valued, not according to acreage, but according to the number of sheep they carry, I proceed to inquire how many sheep will require to be sent off this farm owing to the taking off of the 74½ acres in question. This is a question which it may reasonably be thought can best be answered by the tenant of the farm and his shepherd. The tenant puts it at 10 score and the shepherd at 10 or 12 score. But it is possible that both these excellent persons may in the circumstances take a somewhat pessimistic view of the future of the hirsle

after being deprived of a part of it on which they naturally set a high practical value. So I take the lower figure of 8 score spoken to by Mr. Glendinning, Mr. Kennedy and Mr. Archibald, all very experienced gentlemen. I am not much impressed by the respondents' witnesses on this matter. Most of them know nothing whatever about sheep-farming, and although Mr. Hamilton and Mr. McDougall are entitled to respect as skilled sheep-farmers, I think that neither their methods of inspection nor valuation in this case are entitled to the same weight as those of the claimant's witnesses. The next question is the rate per score to be taken. Now 8s. per sheep overhead is the present rent of the farm, and I am not disposed in a case of this kind to enter into speculations, more or less fanciful, as to whether rents of sheep farms will go up or down in the future. I think the present rent of the farm is the proper criterion to go by, there being no evidence that it is exorbitant. Nor do I think it worth while to go into the question of the merits (as regards profits) of a blackfaced or a Cheviot stock respectively, regarding which the evidence is conflicting. I accordingly have taken them as equally profitable for the purposes of the present valuation. The next question is as to severance and all other damage, the nature of which I have already sufficiently indicated in the commencement of my remarks on this part of the case. I put that at 72l. per annum. With regard to the damage to the shooting, Mr. Glendinning, the claimant's factor, claims nothing for permanent damage, though he claims a large sum for temporary loss. I think that 50l. a year for an extra watcher and 50l. for disturbance is ample compensation on this head. The difficulty is to know how long it will take to complete the reservoirs, and there is little evidence on this point. The respondents are allowed ten years to complete their works, and I think I may take six of these as representing the time during which there will be more or less disturbance of game. I therefore propose to give 600l. on this head. The figures, accordingly, work out thus:—I. Land taken, 74½ acres, necessitating reduction of sheep stock by eight score at 8s. per head, 64l. at forty-five years' purchase, 2,880l.; II. Damage of all kinds to the remaining lands, 72l. per annum at thirty years' purchase, 2,160l.; III. Damage to shooting during construction, six years at 100l. per annum, 600l.—5,640l.; deduct tenant's interest in damage under head II., 485l.—total, 5,155l.

(Initd.) A. J.

Wayleave for Road and Pipes.

Edinburgh, June 30, 1897.—The oversman, having considered the proof and whole process and heard counsel for the parties, proposes to find that the sum due and payable by the respondents to the claimant as purchase money and compensation for the servitude right of pipe track and the servitude right of widening and levelling the road mentioned in the minute of reference, No. 1 of process, so as to make it fit for use as an access during the construction of the respondents' works and also on all necessary occasions thereafter for superintendence, inspection and repair, is 545l. 2s., with interest at the rate of 5 per cent. per annum from July 15, 1894, until paid. Further allows either party to make representations against the above findings within fourteen days from the date hereof.

(Sgd.) ANDREW JAMESON.

NOTE.—As is shown by the evidence, there is a very great discrepancy between the sums usually awarded in Scotland and those awarded in England for wayleaves. This possibly arose from the much greater value of land in England over that in Scotland before the times of agricultural depression and the unexampled depreciation which has taken place in the value of all land fitted for growing cereal crops. This being a case of wayleaves over land in Scotland, I am of opinion that Scotch rates ought to rule, and, further, that they are such as amply to compensate the claimant. The wayleaves lie through land situated on a hill side and of little value. With regard to the road, it must be considered that to some extent it was already an *opus manufactum*, and that this fact entitled the owner to something more than if it had been mere hill land. I accordingly think that 4s. per yard is not too much to award in respect of the servitude over the road. This amounts to 279l. 12s. With regard to the pipe track, I am of opinion that 1s. per pipe per yard is a fair allowance, making, for the 1,770 yards at 3s., 265l. 10s., or in all 545l. 2s.

(Initd.) A. J.

Mr. John Rennie Cockerell, whose death, in his sixty-seventh year, occurred at his residence, 36 Westbourne Terrace, Hyde Park, on the 30th ult., was the second son of the late Charles Robert Cockerell, R.A., by his wife Anna Maria, daughter of John Rennie, the celebrated engineer. Mr. Cockerell belonged to the Madras Civil Service and retired on a pension in 1873.

TESSERÆ.

Mezzo-Rilievo.

THE ordinary style of mezzo-rilievo was used for gems, and indeed for all works in this branch of sculpture which required close inspection, and needed no conventional contrivance. A flat style of relief, which is sometimes observable in cameos, was adopted only for the sake of displaying a subject on a different coloured ground, the layers of colour in the stone employed, generally the sardonyx, being very thin. The difference of colour in the ground has, however, the effect of giving roundness to the figures relieved on it, as if, their whole effect becoming apparent, the internal markings disappeared. The figures on the Portland Vase are treated on this principle, and as it was intended to imitate a precious stone (for which indeed it was at first taken), the thinness of the outer layer of colour is also imitated. Such works, however, reduced to one colour in a cast or copy are totally wanting in effect and style. The impressions from intagli or engraved gems, which were used for seals, are never in the flat style of relief, but, however slightly raised, are on the principle of mezzo-rilievo, as above defined. The gems of Dioscorides, the finest of antiquity, are in mezzo-rilievo and often of the fullest kind, as, for instance, the heads of Demosthenes and Io, and the figures of Mercury and Perseus. The same may be observed of other celebrated gems, such as the Medusa of Solon, the Hercules of Cnæius, &c. It is supposed that the same artists who engraved on gems, and who frequently inscribed their names, also executed the dies for coins. The latter are among the finest antique works of art, but of the many thousand existing specimens, there is but one which bears the name of the artist, viz. the coin of Cydonia in Crete, the inscription on which proves it to be the work of Nevanus.

Wren on Gothic Architecture.

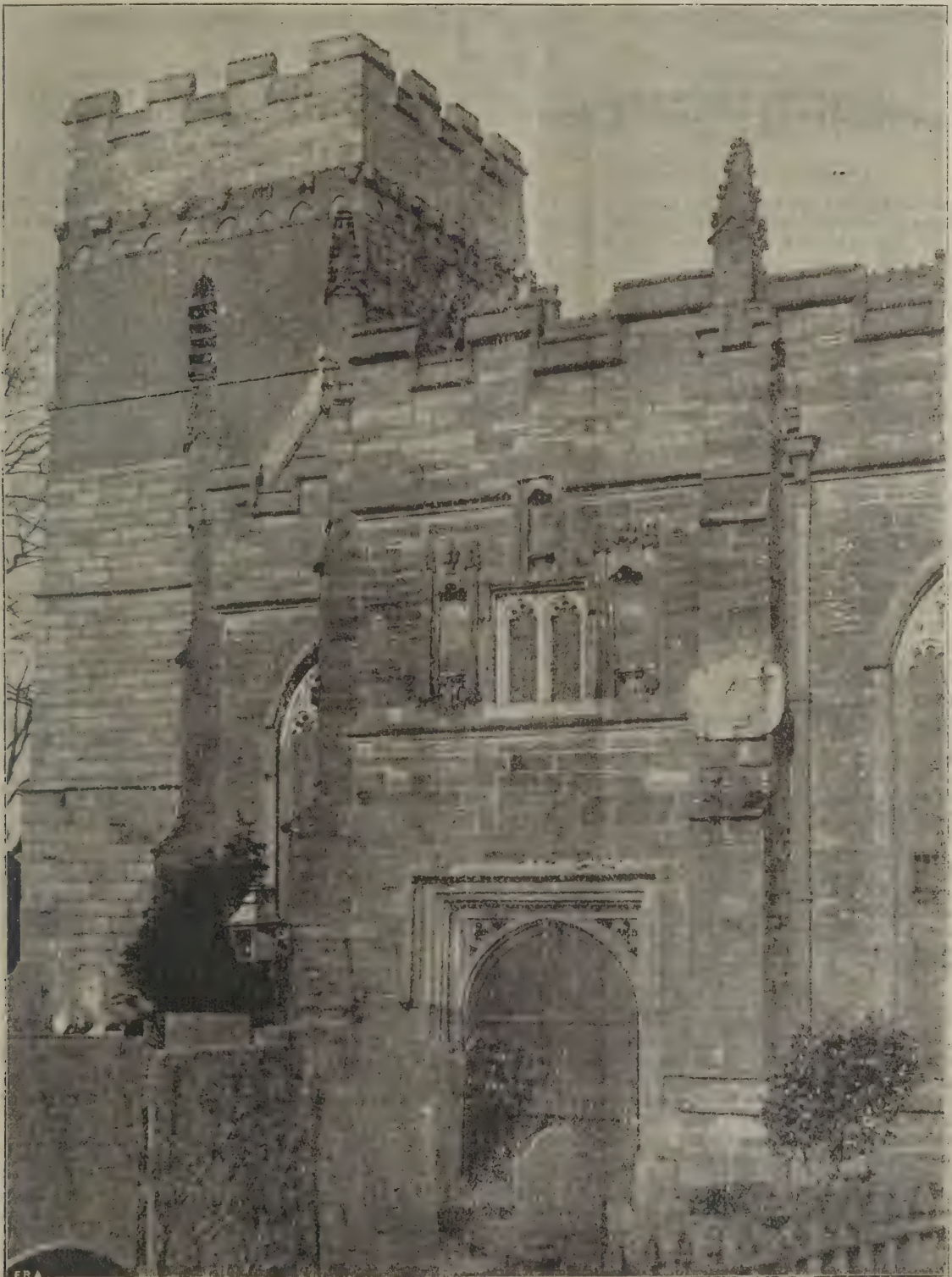
Wren made a survey of Salisbury Cathedral at the request of his friend Seth Ward, who was then the bishop; he afterwards made a similar examination of the Abbey of Westminster, and on both drew up reports exceedingly long, circumstantial and curious: "Almost all cathedrals of the Gothic form," he observes, "are weak and defective in the poise of the vault of the aisles; as for the vault of the nave, both sides are equally supported and propped up from spreading by the bows or flying buttresses, which rise from the outward walls of the aisles; but for the vaults of the aisles they are indeed supported on the outside by the buttresses, but inwardly they have no other stay, but the pillars themselves, which, as they are usually proportioned, if they stood alone without the weight above, could not resist the spreading of the aisles one minute." Having described one serious defect in the construction of the Gothic—a defect, however, which, be it observed, is only to be found in such cathedrals as Westminster, where the central nave rises too loftily for the unity which the principles of sound construction require—he proceeds to point out the mistakes of the architect; he is speaking of Salisbury Cathedral, but the sentiments are for all nations and all styles of architecture. "I must assure him," says Sir Christopher, "that building in a low and marshy soil, he did not take sufficient care of the foundation, especially under the pillars. That foundation which will bear a wall will not bear a pillar, for pillars thrust themselves into the earth and force open the solid ground if the foundation under them be not broad; and if it be not hard stone, it will be ground and crushed, as things are bruised in a mortar, if the weight be great. A second fault was not raising the floor of the church above the fear of inundations; many sufficient foundations have failed after the earth had been too much drenched with unusual floods; besides, it is unhandsome to descend into a place. The third fault is the poise of the building, generally the substructions are too slender for the weights above. Besides these defects, the bracing of the walls together with bands of iron to sustain the spire of the tower, however ingenious and neat, is contrary to the rules of good architecture, not only because iron is corruptible by rust, of unequal strength and liable to dissolve and precipitate whatever it supports into ruin, but that the very use of such a material is a proof of defect in construction and could not be required were all parts of proportionate strength and massiveness." It will be considered as singular enough that the dome of St. Paul's is secured by a massy band or hoop of iron. He had his own misgivings and sought refuge in this dangerous remedy.

The "Bucentaur."

Il Bucentaro, the State galley of the ancient republic of Venice, was 100 feet by 21 feet in extreme length and breadth; 168 rowers, four to each oar, were allotted to it from the arsenal, and were disposed in a lower deck; besides these it was manned by a crew of forty mariners. The upper deck was covered with an awning (*tiemo*) of crimson velvet, beneath which were seated the doge and his goodly company. The doge himself was enthroned near the stern, surrounded with

foreign ambassadors, and the senators and great officers of State were disposed on seats running in four rows along the length of the vessel. The date of the original *Bucentaur* is not very clearly ascertained; but, like the famous ship at Athens, although in perpetual flux, the galley of the moment, according to Howell, was ever reputed "to be the self-same vessel still, however often put upon the careen and trimmed. Yet I believe there is not a foot of that timber remaining which it had upon the first dock, having been, as they tell me, so often planked, ribbed, caulked and pieced." The reader may not care to have any elaborate account of the carving and gilding with which it was adorned; and a detail of the marine deities, the sirens, the masques, the fruit, the flowers, the shell-work, the medallions, the cornucopias, the allegorical groups, the winged lions, the birds, the zodiacs, the canopies, the virtues and the liberal arts which were profusely scattered over it on one of its latest repairs by the skill and taste of "Giovanni Adami,

Doratore Veneto." The *Bucentaur* having been conducted on the eve of the feast of Ascension from the arsenal to the piazza, received its splendid passengers. Accompanied by innumerable feluccas and gondolas it passed on to the mouth of the Lido amid the thunder of artillery. On coming in front of the chapel of the arsenal, the rowers, in maritime fashion, saluted an image of the Virgin, and in the meantime the patriarch of Santa Helena, on which island is a convent, awaiting the pomp, was entertained by the monks with a repast of chestnuts and water. As soon as the doge appeared in sight the patriarch embarked with his suite in a small gilded barge in order to meet the procession, and during his passage he blessed the remainder of the water, which was afterwards thrown into the sea. On issuing from the port of Lido, near the mouth of the harbour, the doge dropped a ring into the bosom of the Adriatic, betrothing her by these words:—"We wed thee with this ring in token of our true and perpetual sovereignty." He then re-



LISKEARD CHURCH.

turned to the church of San Nicolo di Lido, and having heard a solemn pontifical mass, re-embarked in the *Bucentaur* and entertained his cortège with a magnificent banquet in the palace. Casaubon, who has been followed by Darù, notices the Venetian custom as reminding him of an offering made to the sea by the Syracusans of an earthen vessel filled with honey, flowers and frankincense.

German Towers.

The campaniles, or belfry towers, of Germany, have quite a distinct character, which seems to be a development of the Anglo-Saxon towers of England, originally carried to Germany by the English missionaries, but never fully developed in England, because the Normans preferred their own towers, which are of a different type. The earliest belfry towers in Germany approach the nearest to the Anglo-Saxon type; long and short work is frequently used, and most of the other characteristic features of that style are found. This type of tower spreads over nearly the whole of the north of Germany and into the German part of Switzerland, where we also find at Roman-Motier a church with other parts besides the tower of Anglo-Saxon character.



Liskeard Church Tower.*

SIR,—As attention has been called to this subject through the medium of your columns, and further as Mr. Norris has written to *The Architect* asking for bona fide criticism, I sincerely hope that such criticism will be given freely. Although anything I can say will, I fear, not be considered by Mr. Norris as free from bias, yet I sincerely trust he will accept my opinion as a bona fide criticism, given solely in the interests of the art I love so well.

From previous correspondence in your columns, it may be remembered that in 1895 I was asked by the committee to report upon the tower, and for this reason, if for no other, I feel now called upon to put plain facts before your readers.

After a careful survey I found that although the tower had been allowed to fall into a deplorable state of decay, there was no reason whatever why, with careful and judicious repair, it should not stand for centuries to come, and I reported accordingly. Now, sir, this being the case—and I unhesitatingly assert that it is without fear of contradiction from any practical man—what are the reasons set forth for the destruction or retention of this tower?

1. Those who advocate its destruction assert that in 1890 a certain Miss Pedler left 1,000*l.* for the purpose of rebuilding the tower, on condition that a new tower was erected at a cost of 3,000*l.* within ten years, otherwise the sum was to be paid over for the benefit of Truro Cathedral, and so be lost for the use of the parish.

2. That because the necessary repairs to the tower would cost a considerable sum, it is better to pull it down and build a new tower.

3. That their intention is to build a tower more "worthy of the church."

I ask any unbiased man whether these reasons are sufficient for destroying one of the most ancient and interesting landmarks in Cornwall.

To deal with these reasons in order:—

1. Because a generous lady, under a mistaken impression, leaves money for a building that necessitates the destruction of an ancient monument, is it therefore to be destroyed? If so, what ancient building is safe? May we be defenced from many such legacies. What, I would ask, is the loss of 1,000*l.* to the parish, compared with the retention of an historic landmark?

2. Is the parish of Liskeard so architecturally interesting that it can afford to lose its chief point of interest, or so poor that it cannot afford to keep its church tower in decent repair?

3. "More worthy of the church." Was ever such a reason more unworthily given? What! destroy a past history reaching back over 600 years for the sake of a brand-new structure, to prevent 1,000*l.* being lost "for the use of the parish."

What, then, are the reasons for the retention of the tower? Sir, in answering the reasons set forth for its destruction, I have almost stated them. The tower is, of its kind, unique in Cornwall. In the main, it is of late Norman date, with the usual interesting additions of later date. It is historically interesting as the oldest building in Liskeard. It is architecturally and archaeologically interesting from its various and curious details. It is quite repairable without detriment to such details.

The fifteenth-century architects, when they rebuilt the nave-

aisles, did not consider it necessary to build a tower "more worthy of the church."

Surely, under the circumstances, the Chancellor has a right to refuse a faculty: if so, surely no momentary local feeling can legally coerce him to grant the same. But I hope the Chancellor will not insist on having the tower rebuilt "as at present," as it can well be repaired as before stated.

In your issue of June 19, you state that I favour the retention of the tower "on the grounds of antiquarian taste." I trust what I have written will show that to me it is much more than a mere matter of taste.

In conclusion, I can only add that my sole aim in writing this is to try and bring it home to others, that they are not only dealing with a thing of local interest. This relic of the past is far more—it is of historical value to Cornwall in particular and to the nation at large, and those who do their best to preserve these ancient landmarks (temporarily committed to their care) will earn the gratitude of all who love to retain the architectural links that bind together the past and present in our churches.—I am, yours faithfully,

GEO. H. FELLOWES PRYNNE.

6 Queen Anne's Gate, Westminster, S.W.:

July 5, 1897.

GENERAL.

The Institute of Painters in Oil-Colours on Monday elected Sir E. J. Poynter, P.R.A., Sir E. Burne-Jones, Mr. G. F. Watts, R.A., Mr. Frank Dicksee, R.A. and Mr. Frederick Sandys as honorary members. Mr. W. Llewellyn, Mr. Julius Olsson, Mr. Niels M. Lund, Mr. W. B. Wollen, R.I., Mr. Alfred Withers and Mr. Robert Noble, A.R.S.A., were elected members.

The New General Hospital, Birmingham, was opened by H.R.H. Princess Christian on Wednesday. The building was designed by Mr. W. Henman, whose aim has been "to adopt the spirit and not the letter of ancient work." Terra-cotta, by Messrs. Doulton, has been largely used. The cost is estimated at 210,000*l.*

A Congress is to be held in Brussels from July 23 to 25 on the subject of "Model Dwellings for Workmen and their Families." M. Beernaert, one of the ministers, will preside.

Mr. Everard Green, "Rouge Dragon" of the Herald's College, has been appointed Vice-President of the Society of Antiquaries.

Mr. George Coffey, whose essays on interlaced ornament have obtained notice, has obtained the appointment of Superintendent of Irish Antiquities in the Dublin Museum.

The Juries will commence their inquiries at the Brussels Exhibition to-day. There are about 800 members, the president being M. Nyssens, the Minister of Industry.

M. Bertone, Grand Prix in Architecture, has sent several able studies of the ruins of Palmyra to the exhibition of "envois" in Paris.

The Works Committee of the London County Council announce that a recent sale by auction of timber unused by the Works Department had resulted in a loss of 674*l.* The cost of the timber was 2,781*l.*, including rent.

Projects have been submitted by several French architects for dealing with the ground in the Rue Jean Goujon, Paris, which was the scene of the recent catastrophe, but as yet the Archbishop of Paris has not given any decision on the subject.

The North-West Gable of Peterborough Cathedral having been restored, the cross surmounting it was fixed in position on Friday last. In the course of the work very few new stones have had to be introduced to take the place of those which were completely ruined by the weather. There are only two new stones in the outside order of the great arch, and with the exception of two small patches the large string-course has been replaced intact. Every stone has been put back into its original position, having been carefully numbered before being taken down.

The New National British Gallery, Millbank, will be opened by H.R.H. the Prince of Wales on July 21.

Mr. Frederick Wheeler, F.R.I.B.A., has removed from 22 Chancery Lane to No. 6 Staple Inn, Holborn, W.C. His Horsham office remains as before.

The Members of the Archaeological Society of Durham and Northumberland on Friday last paid a visit to Brinkburn Priory and Framlington. Morpeth was the base of operations, and the party journeyed from there to Brinkburn by way of Longhorsley, and, through the kind permission of Mrs. Fenwick, the members were able to make a thorough inspection of the historic priory. Framlington was next visited, and here the ancient church, which possesses many features of interest to both architect and antiquary, was examined, and the party returned thence to Morpeth, arriving about six o'clock, after a most agreeable outing.

* For illustration see preceding page.

The Architect.

THE WEEK.

IN our last number we gave an extract from the British Consul's report relating to the proposed harbour at Licata, in Sicily. The British and Italian Finance Syndicate, Limited, write to us and say that the opinion formulated is unfavourable, and is the first notice of the kind that has appeared in either the English or foreign press. Several reports relating to the proposed harbour have been sent to us. One from Mr. A. E. CAREY, M.Inst.C.E., says that Licata is the centre of a large sulphur industry, but it will be "as a coaling centre, and more especially in connection with the vast trade between England and the Continent and India, China and the East that the prospects of the harbour will depend. The sale of the various concessions cannot fail to be a source of large profit." Mr. CAREY adds that the commercial prospect of such an undertaking should, on so small a capital, be extremely good, but his opinion in favour of the project is minimised when it is said that he has not yet had an opportunity to inspect the site of the intended harbour.

A DECISION in one of the Pennsylvanian law courts is interesting for those authorities who insist on certain rates of payment to workmen being defined in the conditions of contract. According to the statute law, public work in Pennsylvania should be given to whoever submitted the lowest tender. But one of the city regulations prescribed that contracts should be monopolised by those contractors who employed members of trades unions and paid union prices. Recently a lowest bidder was refused a contract because he had not a good reputation with the unions for generosity. He brought an action against the city authorities. It was decided by the judge that the Corporation regulation clashed with the law of the land, and defeated the intention of the Legislature, which was to have municipal work executed at the lowest prices. The judge further added that tendering should be free and open to all, and contracts awarded to the lowest responsible bidders without restrictions. Although apparently the decision is in favour of free contracts, the trades authorities are certain to have their will obeyed.

THE London School Board in December, 1895, accepted the tender of Messrs. TREASURE & SON, amounting to 15,186*l.*, for enlarging the Cottenham Road School, Holloway, and also for carrying out various other improvements to the school. These contractors in April last were compelled to forward the following statement of claim for delays:—"A considerable portion of the site (alongside Cottenham Road) was covered with a long row of cottages; according to contract possession was to be given to us in October 1896, but instead of this, part possession was given on or about January 4, 1897, and full possession on or about February 22, 1897. Loss was thus caused by the following, viz.:—1. In preventing any drainage to any part of the site being done, thus causing great loss and delay in completing main building, in completion of w.c.'s, covered sheds, &c., and the site has been more or less flooded with water from roofs, &c. 2. Owing to delay and want of this space for storage we have had to pay the heavy rise in price of bricks for delayed portions of buildings. 3. Owing to the near shoots being closed, we have had to pay 1*s.* 6*d.* per yard additional for removal of all spare earth since December 1. 4. Storage and loss of interest of money, &c., of ironwork, timberwork and various other materials prepared with a view of their being required four months earlier. 5. Owing to the school children being about, the temporary gangways, passages, &c., had to be erected and maintained far in excess of anything contemplated by us when pricing the estimate, and owing to this land not being handed over the space was so limited, materials could only be delivered in comparatively small quantities and causing constant moving by hand from one part of site to another. In addition to this, owing to district surveyor condemning the

usual wooden temporary staircase and compelling the erection of a stone staircase with brick walls, this prevented us taking down the old staircase block and rebuilding new one for several months; this necessitated the erection of new staircase portion as a separate and distinct building to the classrooms. So much has this delayed us that we are only now able to slate in the roof of this portion; this has caused us a very considerable loss in money. We have gone as carefully as possible into the loss to us, and consider that we are fully entitled to the sum of 650*l.*, although this will not cover our actual loss." The works committee have carefully considered the application, and are of opinion that having regard to the fact that possession of a portion of the site was not handed over to the contractors until after the time stipulated in the contract, and that the contractors were undoubtedly put to considerable expense in consequence, and also having regard to other special circumstances in connection with the contract, the payment of a sum of 400*l.* might be made to the contractors for the loss they have sustained, upon the understanding that this payment shall be charged to the cost of site and not to the school building. The claim of the contractors is most moderate, and it will not matter much to them to whose account the money is charged, and the ratepayers will probably be of the same opinion.

It is authoritatively stated that the Marquis of BUTE has decided to erect a Roman Catholic cathedral in Columnshill Street, Rothesay, on the site of the existing chapel. For many years it has been a matter of common report that Lord and Lady BUTE have been desirous of transferring the headquarters of the Roman Catholic diocese of Argyll and the Isles from Oban (where there is a corrugated iron cathedral) to Rothesay, and it may be presumed that the erection of the new building will facilitate the proposed change.

It is to be regretted that a more satisfactory site was not to be obtained for the new National Gallery than that formerly occupied by the prison at Millbank. The ground lies low, and seems unsuited for a building which, if compared with many modern examples, may be described as severely Classical. Like the old temples, the collection of galleries may be described as forming a building of one storey. There is a basement which will be utilised for offices, but the rooms which the public will visit are on the same level, and approached by steps from the outside, as they are about 12 feet above the level of the ground. The entrance leads to an octagon hall lighted by a glass dome. Recesses have been formed for sculpture, and when they are occupied it will form an excellent feature in the building. There are two main galleries measuring 59 feet by 32 feet. One will be assigned to the pictures purchased with money derived from the Chantrey Fund, a great number of them being entitled to be considered as characteristic examples of modern English art. As the gallery is well lighted, we may expect that will have an influence on the trustees, and care will be taken to purchase those pictures alone which can be considered as worthy of becoming national property. As long as there was no fixed local habitation for the pictures it was hardly possible to adopt a rigorous standard, but now that the Millbank Gallery is an accomplished fact the public has a right to expect that chance or favour will not be a factor in the selection. Another room contains the great works which Mr. WATTS has generously handed over to his countrymen. Next we come to the largest gallery, in which by right Mr. TATE's gifts are hung. There are no less than sixty-five pictures, not one of them being obtained by the donor on what would be called economical terms. In another room the pictures transferred from the National Gallery will be found. Mr. SIDNEY J. SMITH can be congratulated on the success of his work. The site was not favourable, but the general verdict of all who saw the rooms on Wednesday is that the galleries are well adapted for the display of the treasures, which can be thoroughly enjoyed by every visitor. From the arrangement it is also possible to enlarge the rooms without causing any inconvenience or closure of the new gallery.

PROPOSED NEW HOUSES OF PARLIAMENT AT SYDNEY.

(FROM OUR NEW SOUTH WALES CORRESPONDENT.)

IT is difficult to imagine a more inconvenient and in every way unsuitable building for legislative purposes than that at present occupied by the Parliament of New South Wales. Its ignoble appearance and utter absence of artistic pretension have long occasioned it to be regarded as an architectural eyesore in the Australian commercial metropolis, and successive Ministries have promised without effect that steps should be taken to remove the unsightly structure and replace it by one more worthy of the high reputation and importance of the colony. Within the last few months, however, Mr. G. H. REED, the colonial Premier, and his Ministerial colleagues decided that the erection of new Houses of Parliament should be included in the list of public works to be undertaken by them. With this object they commissioned Mr. W. L. VERNON, the colonial architect, at present in London, to prepare the necessary plans to be submitted to a parliamentary committee for consideration and approval. As might have been expected, Mr. VERNON'S designs have been subjected to a considerable amount of professional criticism, especially on the part of those desirous of an open competition, but their boldness and comprehensive character have caused them to be regarded with favour by the colonists generally, the only question at issue being that of cost. These designs were prepared by Mr. VERNON, a model on a larger scale than is customary being prepared of that of which we give an illustration, being 1-48th of the actual size of the intended building.

The edifice, which is intended to occupy the site of the present structure and some adjoining buildings, will be 528 feet in length, with a depth of 140 feet across the public lobbies, and of 234 feet from the portico to the projecting library in the centre of the structure. The façade towards the main thoroughfare is broken by the north and south wings and the central portico, all of which are pedimented and connected to each other by colonnaded waists. The portico consists of massive Corinthian columns, strengthened at the angles with piers of severe ashlar masonry, the whole finished with a pediment, the tympanum of which is richly carved with sculpture, and crowned on the apex with a group to represent Wisdom, Purity and Temperance, or some equally appropriate subject. The north and south wings have a solid ashlar appearance broken on the first floor by a recessed loggia with a slightly projecting balcony and solid piers to support the cornice above. The waists are plain in treatment, the chief embellishment being the Ionic colonnades forming the verandahs. Centrally behind the north and south wings rise the octagonal walls and domical roof forming the upper part of each chamber, the crown of each dome being glazed to give light to the legislators below. Centrally behind the portico roof rises the main dome. It is flanked at each angle with four attendant domed towers richly decorated with small columns, the whole, including the small domes, being of stone, connected with each other by a plain ashlar parapet wall. From the enclosure thus formed rises the drum of the main dome, enriched by an Ionic colonnade, which becomes solid when diagonally opposite the flanking towers in order to give the dome a satisfactorily stable appearance. Behind the balustrade of this colonnade rises a minor drum pierced with bull's-eye windows, and from this springs the dome proper, which is deeply ribbed and covered with copper. Above the dome is a gallery slightly bracketed out, and an enriched cupola, inside which it is suggested to place a great arc light, which shall be always shining while the House is sitting, and be extinguished at each adjournment. This dome is, of course, the crowning feature of the whole design, and it is hoped that, should this building be carried out, its construction will not be postponed, as is the case in so many other instances, until the Greek kalends. At each corner of the block of buildings is a square staircase tower carried up considerably above the main roof level, brought from the square to the circle by clusters of Ionic columns, and finished with a conical dome.

The northern and southern façades are kept almost in plain ashlar, with the addition of a central circular bay in

each case. The eastern, like the western, façade is broken by north and south wings and central projection. The wings have pediments supported by Corinthian columns with strong angle-piers of ashlar-work. The library projection has plain ashlar-work below with a circular bay at end, while the dining-room above is treated as solid ashlar for some distance, and the remainder is colonnaded, forming an open loggia. The connecting waists are colonnaded in two storeys, forming wide and spacious verandahs and balconies for use of members. They command an unrivalled view across the harbour, and give an admirable play of light and shade to the façade. The basement throughout will be of rusticated trachyte. As the site slopes downward towards Sydney Harbour a sunk garden is formed on the western side about 6 feet below the level of the main thoroughfare, and finished with an ornamental balustraded wall. This is not only an ornamental and highly effective treatment, but also enables the room on the basement floor to receive ample light and ventilation.

The general disposition of the plan has a right and left wing to the block of buildings to be occupied by the Council and Assembly respectively; a central block, to be occupied by accommodation common to both Houses; and two connecting blocks or waists, to be occupied by public lobbies, offices, &c. The positions of the chambers for both the Council and Assembly were emphasised in the designs, and the great hall is crowned by a dome. On entering the building at the central portico one would pass through the vestibules to the grand hall, which contains the grand staircase up to the first floor, where spacious balconies overlook the entrance floor, and the whole is crowned, as before mentioned, by the main dome. To the right and left of this hall are public lobbies about 76 feet by 35 feet, treated architecturally, and are intended to resemble the French Salles des Pas Perdus where members may meet their friends and constituents without taking them into the sacred precincts of the House. Entering off these lobbies are the post, telegraph, and telephone offices, public rooms for constituents, and staircases to the House galleries. Thus far and no farther may the ordinary average mortal penetrate. The Assembly chamber is planned as a semi-octagon, with a square base, changing above the ceiling to a true octagon or circle, and the roof carried up in this form, and treated as an important feature in the external design. The seats of the chamber are arranged in a semicircular fashion round the table of the House, at the head of which on a raised dais is the Speaker's chair. Special provision has been made for future enlarged requirements for seating without any alteration being necessary to the structural portions of the building. On the right and left of the Speaker are division lobbies for "ayes" and "noes," the division to be recorded at the connecting doorway. Around the whole chamber block is a private corridor, from which on the "aye" side is entered the Ministerial supporters' room, and on the "noes" side the Opposition room and labour members' room. Off this corridor also the Speaker has official quarters, which overlook the harbour, and on the north side are spacious rooms for Ministers.

The Legislative Council chamber is similar in plan but has no division lobbies. The President has the same relative position for his quarters as the Speaker on the Assembly side, and the general lounge and smoking-rooms for the council have a similar position to the Opposition rooms of the Assembly. On the western side rooms are provided for the Governor, and on the southern side is a large reception-room and also rooms for the Vice-president and the Minister in the Upper House. Common to both Houses in the central block is a large and spacious library, entering off which are smaller special libraries and a writing-room, and by means of a special staircase direct access is provided to a large archives library in basement. Immediately above the general library is located the members' dining-room, about 25 feet of the length being arranged as an open-air loggia, where members may dine in hot weather, and which they could use as a lounging café throughout the year. To the right and left of the dining-room are suites of committee-rooms for the use of both Houses, and the chairmen of committees have their official rooms immediately over those of the President and Speaker respectively. The north wing facing Macquarie Street is occupied by the

Premier's under-secretaries, and one includes Ministers' room, while the remainder of the accommodation on this floor is given to Parliamentary officials and to "Hansard" and the daily press. On the second floor there are extra rooms for the press and the Parliamentary officials, and also for kitchen and general service, as well as stewards' quarters.

In the basement under each chamber is ample storage for records; under the grand hall is a crypt lighted from the floor of hall; under the council public library is space for machinery for heating, ventilation and lighting; under the correspondents' assembly lobby are muniment and strong rooms; under the President's and Speaker's quarters there are official quarters for librarian and serjeant-at-arms respectively; and there are also quarters for a caretaker for each House. Situated next to the serjeant-at-arms' rooms and entered from the members' terrace overlooking the Domain (the St. James's Park of Sydney) is a tea-room where members may entertain their friends or constituents. All the rooms overlooking the main thoroughfare are devoted to offices for Parliamentary officials, as well as some additional public-rooms for constituents. There are three passenger lifts and one for service, and there is also ample staircase accommodation. The estimated cost is 500,000/. Should the New South Wales Parliament endorse the Government project the colony will possess the most magnificent public building in the southern hemisphere.

SIR HENRY RAE BURN, R.A.

THE sale of nine portraits by Sir HENRY RAE BURN at excellent prices on Saturday last by Messrs. CHRISTIE was an event in the auction market. It was, as it were, the formal admission of another artist to the favours of amateurs, for henceforth it may be assumed that RAE BURN's portraits will have their special admirers, who will be willing to pay liberally for the privilege of possessing examples. Most of the portraits were of members of the family of FRASER, who were unknown to Englishmen or to fame, and yet the prices varied from 330 to 640 guineas. The name of *A. F. Tytler, Lord Woodhouselee*, is not altogether unfamiliar, for he wrote books about history, taxation and the principles of translation. He was also a Scottish judge and lord of judicatory, but his portrait was sold for 215 guineas, whilst one of his wife was valued at 1,250 guineas. It would, therefore, appear that the quality of RAE BURN's work rather than the subjects have had influence with dealers, and on that account the future value of his portraits is not unlikely to increase.

Fortune, in her dealings with pictures, is whimsical; but it is not often so much merit as is apparent in RAE BURN's portraits characterises the productions of a new competitor in the St. James's Street rooms. That peculiar feeling of being at ease before a work of a master who never goes beyond his powers always arises on seeing the Edinburgh artist's men and women. There seems to be no laborious effort, for the heads are suggestive of a few bold strokes. But they stand out from the background as if they were reliefs. In fact, they were at one time considered to be too prominent, for some of his admirers advised RAE BURN to alter his backgrounds in order that there might be a less marked contrast with the figures. It was not understood that he wished to exhibit racial peculiarities, and neither WATSON GORDON, CHALMERS, nor any of the living portraitists has succeeded so well in the representation of the strongly marked countenances of the North. RAE BURN was compelled to pay a price for his success. He rarely was able to do justice to the features of the Scottish maiden on his canvas, and although he fancied that Sir THOMAS LAWRENCE was not altogether unselfish in advising him against a removal to London, we believe that with English subjects RAE BURN's success would be less manifest.

RAE BURN could not be a cosmopolitan painter. He was a Scotsman to the core, and nature prevailed over him in the selection of subjects and in other ways. His style was his own. There was no artist who was more of an admirer of REYNOLDS's works, and under the guidance of GAVIN HAMILTON and BYERS he endeavoured to transform himself into one of the Renaissance masters, but his endowments

were too strong to submit to outer influences. In youth and age his originality found expression. If it were not for his innate power he would never have painted portraits. He belonged to that middle class that assess utility by the amount of money gained, and therefore prefer industrial or mercantile pursuits. His father was a manufacturer at Stockbridge, which in 1756, when RAE BURN was born, was a suburb of Edinburgh. But young RAE BURN was only six when he was orphaned. He was not a brilliant boy, and the Heriot masters did not prophesy a brilliant future for him. He only showed skill when making drawings and caricatures for the amusement of his fellows, and as a rule the judicious generally grieve over displays of that sort.

The spirit of the family inspired RAE BURN when it was necessary for him to select an occupation. He became a goldsmith's apprentice. In one of the old Italian cities a choice of that kind would be taken as evidence of artistic ability. To the son of the Stockbridge manufacturer the craft was only an expeditious mode of winning gold. With a little experience of the workshop he was disillusionised. RAE BURN was no model apprentice whose worth was to be rewarded with the hand of the goldsmith's daughter. Apprentices and journeymen were glad to have among them a youth who was delighted to caricature the whole establishment for their amusement. But those hours brought no profit to the master. We imagine that RAE BURN was not more successful as a messenger. He was too fond of gazing at print shops and booksellers' windows where engraved portraits were to be seen. But somehow the thought struck him that caricatures were becoming monotonous, and as a change he tried to imitate the miniatures which were then to be seen in glass cases as baits to those who were ambitious to be immortalised. The goldsmith was kindly but shrewd. He recognised that the untaught apprentice possessed talent, but he could not be blind to the fact that the time which by indenture belonged to him was wasted over attempts at portraiture, and that it was hopeless to expect much assistance from his apprentice. The fate of the lad was also to be considered. It may not be enjoined in long or short catechisms, but in no country in the world is there a stronger sense of the duty which belongs to age to foster the young, and to it Scotland is indebted for much of her power. Accordingly, RAE BURN's master brought him and his drawings to a painter named MARTIN. He also was inspired by the belief that it was obligatory to help a tyro. MARTIN not only gave advice but encouraged RAE BURN to pursue painting. As a consequence the young miniaturist was emboldened and produced better work. Several people also gave him commissions, for the prices of his likenesses were moderate. The goldsmith, realising that he must not raise obstacles to a career that was likely to be successful, agreed to cancel the indentures on the payment of reasonable compensation.

To an artist with so much largeness of style the painting of miniatures was like imposing fetters on his hands. It is not wonderful that when he decided to give freedom to his power he should rush to the opposite extreme and endeavour to paint life-size figures. He was unacquainted with the elements of the practice of painting in oils. The preparation of the canvas, the mixing of colours, the laying-on of paints had all to be discovered by means of a succession of failures. But he was young and enthusiastic. After many trials RAE BURN succeeded. He had hardly passed his twentieth year when he was admitted to be the most popular portrait-painter in Edinburgh. Success did not spoil him. RAE BURN had a misgiving that, owing to his want of instruction, his pictures were not deserving of the praise which was awarded to him. To gain knowledge he resolved to visit REYNOLDS, who then was considered to be supreme. But the President was never disposed to part with the knowledge he had acquired about the technique of his art, although he must have perceived that as RAE BURN was without the aid of a HUDSON to guide his first steps, the simplest hints might have their use. As usual, REYNOLDS recommended a course of study in Rome and especially of the works of MICHEL ANGELO. If he was not disposed to part with any of his studio secrets at least he was willing to be generous with money, for he proffered RAE BURN whatever sum he might consider necessary for his Italian studies. But the Scotsman was not needy. He

had probably contrived to save a part of his income, and a short time before his visit to London he had married a wealthy lady.

RAEBURN next spent a couple of years in Rome. It is always difficult to estimate the growth of the intellect, and he could not see every day a multitude of noble works without an expansion of his artistic powers. But what he most valued as a result of his life in Rome was the advice he received about avoiding any copying from memory, but to insist on having everything he represented, however small, before his eyes. He attached more importance to the counsel than most painters, and the almost realistic character of his works, although free from an excess of detail, is explained by its adoption.

RAEBURN was in his thirty-first year when he returned to Edinburgh and opened a studio in George Street. He was most systematic in his art. At nine o'clock every day he was ready to receive subjects. A sitting lasted an hour and a half or two hours, and he therefore required from six to eight hours for painting a head. Three or four subjects a day he considered sufficient. He never sketched his heads with crayons, but boldly began with colours. His hand was so steady he had no need of a maulstick or other rest. It is remarkable that he kept no list of his portraits, and in consequence there is a danger that when the demand for them increases, as is now likely, works will be ascribed to him which were never touched by his fingers. Of his manner of painting the following account was given by a sitter:—"He spoke a few words to me in his usual brief and kindly way—evidently to put me into an agreeable mood; and then having placed me in a chair on a platform at the end of his painting-room in the posture required, set up his easel beside me with the canvas ready to receive the colour. When he saw all was right, he took his palette and his brush, retreated back step by step, with his face towards me, till he was nigh the other end of his room; he stood and studied for a minute more, then came up to the canvas, and without looking at me, wrought upon it with colour for some time. Having done this, he retreated in the same manner, studied my looks at that distance for about another minute, then came hastily up to the canvas and painted a few minutes more. I had sat to other artists; their way was quite different—they made an outline carefully in chalk, measured it with compasses, placed the canvas close to me, and looking me almost without ceasing in the face, proceeded to fill up the outline with colour. They succeeded best in the minute detail—RAEBURN best in the general result of the expression; they obtained by means of a multitude of little touches what he found by broader masses; they gave more of the man—he gave most of the mind."

It was the good fortune of RAEBURN to be commissioned to paint the portraits of the most eminent of his contemporaries in Scotland. He was the national painter, and the representatives of literature, law, academicism, theology can be recalled by his canvases. They form a memorable collection. The chiefs of old families, and, in fact, all who had any pretension to be considered as above the crowd, found their way to his studio. In 1815 he was elected a Royal Academician, but he avoided London, and Englishmen were not disposed to venture as far as Edinburgh in order to find a portrait-painter. As years advanced there was no decline in his skill, which seemed to correspond with his health, that was always unattacked. But a few days' illness at last was fatal to him. RAEBURN died on July 8, 1823, the day on which he was nominated to the office of King's limner and painter in Scotland, with all the fees, profits, salaries, rights, privileges and advantages thereto belonging.

CANTERBURY CATHEDRAL.—III.

THERE are no artists who are so quickly forgotten as architects. A picture or statue in one of their buildings may bring fame to the creator, but about the designer of the building which it helps to adorn and who probably inspired it, few care to inquire. With so many examples of the modern neglect of architects, we need not be surprised nor angered when we find the names of the designers of Mediaeval cathedrals and churches are not to

be traced. In fact, modern ingenuity has devised a theory to excuse the indifference to men who by their buildings have conferred honour on many cities and towns. The architects are supposed to have been so modest and self-sacrificing they considered it sinful to have their names associated with an ecclesiastical building. Exalted virtue of that kind seems to be ill adapted to mortals, and especially to artists. It is probable they were under the delusion that somehow their names would be remembered among the people who rejoiced in their buildings, but the compilers of records and chronicles preferred to inscribe the names of other men in their manuscripts. Canterbury is an exception to the almost universal indifference. We are enabled to recall two at least among the numerous architects who helped to create the cathedral. For that favour to the art we are indebted to Brother GERVASE, who was one of the monks that were scared almost to death by the murder of BECKET. He was a witness of the conflagration of the cathedral two years afterwards, which he attributed to "the just but occult judgment of God," and he was among those who considered themselves as exiles because there was no choir left in which they could recite their offices, and they were compelled to pray and chant for five years in the nave, "separated from the people only by a low wall." The object of his narrative was, of course, to excite the sympathy of the Christ Church monks in future ages about the sufferings of GERVASE and his companions, who were compelled to mix with the laity through the destruction of their "paradise of pleasures." But to attain his purpose he considered it was necessary to be more precise in details than is usual with monastic annalists when describing things made of wood or stone. His whole tract "On the Burning and Repair of the Church of Canterbury" deserves to be included in every description of the cathedral, but our readers will be likely to consider that the part relating to the rebuilding of the choir, which is the subject of one of our illustrations, will be sufficient for the present:—

The brotherhood sought counsel as to how and in what manner the burnt church might be repaired, but without success; for the columns of the church, commonly termed the pillars, were exceedingly weakened by the heat of the fire, and were scaling in pieces and hardly able to stand, so that they frightened even the wisest out of their wits. French and English artificers were therefore summoned, but even these differed in opinion. On the one hand, some undertook to repair the aforesaid columns without mischief to the walls above. On the other hand, there were some who asserted that the whole church must be pulled down if the monks wished to exist in safety. This opinion, true as it was, excruciated the monks with grief, and no wonder, for how could they hope that so great a work should be completed in their days by any human ingenuity?

However, amongst the other workmen there had come a certain William of Sens, a man astute and ready, and as a workman most skilful both in wood and stone. Him, therefore, they retained on account of his lively genius and good reputation, and dismissed the others. And to him and to the providence of God was the execution of the work committed. And he, residing many days with the monks and carefully surveying the burnt walls in their upper and lower parts, within and without, did yet for some time conceal what he found necessary to be done, lest the truth should kill them in their present state of pusillanimity.

But he went on preparing all things that were needful for the work, either of himself or by the agency of others. And when he found that the monks began to be somewhat comforted he ventured to confess that the pillars rent with the fire, and all that they supported, must be destroyed if the monks wished to have a safe and excellent building. At length they agreed, being convinced by reason, and wishing to have the work as good as he promised, and, above all things, to live in security. Thus they consented patiently, if not willingly, to the destruction of the choir.

And now he addressed himself to the procuring of stone from beyond sea. He constructed ingenious machines for loading and unloading ships, and for drawing cement and stones. He delivered moulds for shaping the stones to the sculptors who were assembled, and diligently prepared other things of the same kind. The choir, thus condemned to destruction, was pulled down, and nothing else was done in this year. In the following year, that is, after the feast of St. Bertin (September 5, 1175), before the winter, he erected four pillars, that is, two on each side, and after the winter two more were placed, so that on each side were three in order, upon which and upon the exterior wall of the aisles he framed seemly

arches and a vault, that is, three *claves* on each side. I put *clavis* for the whole *ciborium*, because the *clavis* placed in the middle locks up and binds together the parts which converge to it from every side. With these works the second year was occupied.

In the third year he placed two pillars on each side, the two extreme ones of which he decorated with marble columns placed around them, and because at that place the choir and crosses were to meet, he constituted these principal pillars. To which, having added the keystones and vault, he intermingled the lower triforium from the great tower to the aforesaid pillars—that is, as far as the cross—with many marble columns. Over which he adjusted another triforium of other materials, and also the upper windows. And in the next place, three *claves* of the great vault from the tower, namely, as far as the crosses. All which things appeared to us and to all who saw them, incomparable and most worthy of praise. And at so glorious a beginning we rejoiced and conceived good hopes of the end, and provided for the acceleration of the work with diligence and spirit. Thus was the third year occupied and the beginning of the fourth.

In the summer of which (the fourth year), commencing with the cross, he erected ten pillars, that is, on each side five. Of which the two first were ornamented with marble columns to correspond with the other two principal ones. Upon these ten he placed the arches and vaults. And having, in the next place, completed on both sides the triforia and upper windows, he was, at the beginning of the fifth year, in the act of preparing with machines for the turning of the great vault, when suddenly the beams broke under his feet and he fell to the ground, stones and timbers accompanying his fall from the height of the capitals of the upper vault, that is to say, of 50 feet. Thus sorely bruised by the blows from the beams and stones, he was rendered helpless alike to himself and for the work, but no other person than himself was in the least injured. Against the master only was this vengeance of God or spite of the devil directed.

The master, thus hurt, remained in his bed for some time under medical care in expectation of recovering, but was deceived in this hope, for his health amended not. Nevertheless, as the winter approached, and it was necessary to finish the upper vault, he gave charge of the work to a certain ingenious and industrious monk, who was the overseer of the masons—an appointment whence much envy and malice arose, because it made this young man appear more skilful than richer and more powerful ones. But the master, reclining in bed, commanded all things that should be done in order. And thus was completed the ciborium between the four principal pillars. In the keystone of this ciborium the choir and crosses seem, as it were, to meet. Two ciboria on each side were formed before the winter, when heavy rains beginning stopped the work. In these operations the fourth year was occupied, and the beginning of the fifth. But on the eighth day from the said fourth year, on the idus of September, there happened an eclipse of the sun at about the sixth hour, and before the master's accident.

And the master, perceiving that he derived no benefit from the physicians, gave up the work, and, crossing the sea, returned to his home in France. And another succeeded him in the charge of the works—William by name, English by nation, small in body, but in workmanship of many kinds acute and honest. He in the summer of the fifth year finished the cross on each side, that is, the south and the north, and turned the ciborium which is above the great altar, which the rains of the previous year had hindered, although all was prepared. Moreover, he laid the foundation for the enlargement of the church at the eastern part, because a chapel of St. Thomas was to be built there.

For this was the place assigned to him, namely, the chapel of the Holy Trinity, where he celebrated his first mass, where he was wont to prostrate himself with tears and prayers, under whose crypt for so many years he was buried, where God for his merits had performed so many miracles, where poor and rich, kings and princes, had worshipped him, and whence the sound of his praises had gone forth into all lands.

The master William began, on account of these foundations, to dig in the cemetery of the monks, from whence he was compelled to disturb the bones of many holy monks. These were carefully collected and deposited in a large trench, in that corner which is between the chapel and the south side of the infirmary house. Having, therefore, formed a most substantial foundation for the exterior wall with stone and cement, he erected the wall of the crypt as high as the bases of the windows. Thus was the fifth year employed and the beginning of the sixth.

In the beginning of the sixth year from the fire and at the time when the works were resumed, the monks were seized with a violent longing to prepare the choir so that they might enter it at the coming Easter. And the master perceiving their desires set himself manfully to work to satisfy the wishes of the convent. He constructed with all diligence the wall which encloses the choir and presbytery. He erected the three altars

of the presbytery. He carefully prepared a resting-place for St. Dunstan and St. Elfege. A wooden wall to keep out the weather was set up transversely between the penultimate pillars at the eastern part, and had three glass windows in it. The choir, thus hardly completed even with the greatest labour and diligence, the monks were resolved to enter on Easter Eve with the new fire. As all that was required could not be fully performed on the Saturday because of the solemnities of that sacred day, it became necessary that our holy fathers and patrons, St. Dunstan and St. Elfege, the co-exiles of the monks, should be transferred to the new choir beforehand. Prior Alan, therefore, taking with him nine of the brethren of the church in whom he could trust, went by night to the tombs of the saints that he might not be incommoded by a crowd, and having locked the doors of the church, he commanded the stonework that enclosed them to be taken down. On the morrow, however, when this translation became known to the whole convent, they were exceedingly astonished and indignant that it should have been done without their consent, for they had intended that the translation of the fathers should have been performed with great and devout solemnity.

By the intervention of Archbishop RICHARD and other authorities peace was restored among the monks. It was one of the most serious duties to transfer relics, and CARLYLE has described in "Past and Present" the remorse of Abbot SAMSON for having acted like the Canterbury prior. As was arranged, the community were able to enter the choir on Easter Sunday in the year 1180, after an absence of five years, seven months and thirteen days. The Archbishop began the Te Deum, and amidst the ringing of bells "the convent took up the song with great joy, and shedding sweet tears, they praised God with voice and heart for all His benefits."

The narrative of GERVASE, it will be seen, relates to a period when laymen were recognised as architects. Evidently WILLIAM OF SENS was one. If he were a monk he could not keep his own counsel about the extensive demolition which was contemplated by him. In those days English quarries were not properly worked, and WILLIAM OF SENS was obliged to have stones brought over from Caen. The transit of materials was also a difficulty, and hence he was compelled to construct machines for loading and unloading, as well as carts that would withstand the shocks received in passing along irregular tracks. The masons could not be trusted to shape the stones without moulds. An architect's office in the eleventh century plainly could not be filled by an amateur. It is not easy to give a correct notion of vaulting without the aid of diagrams, and GERVASE was puzzled in describing the parts, and some of the terms he employs no longer retain the same signification. We suppose he dare not approach WILLIAM OF SENS for explanations. The architect evidently directed all the important operations on the spot, and his accident suggests that he took up a position of danger from which his assistants recoiled. WILLIAM must have possessed models or drawings, otherwise he could hardly have directed operations and explained procedure whilst lying in bed. It is also evident that he could appoint a deputy. At Canterbury the overseer of the masons was selected; he was a monk, and his appointment excited the envy of his brethren. Whether he was the English WILLIAM who was to be the successor of WILLIAM OF SENS cannot be determined, but a man who was able to undertake the superintendence at a critical period would apparently be competent to carry on the works which were required for the completion of the scheme, the principal being those of the Trinity Chapel and corona.

STREET LIGHTING BY ELECTRICITY.

THREE papers were read on this subject at the recent annual meeting of the Municipal Electrical Association, by Mr. H. L. P. BOOT, borough electrical engineer, Tunbridge Wells; Mr. C. D. TAITE, borough electrical engineer, Southport, and Mr. S. E. FEDDEN, electricity mains superintendent, Edinburgh, each dealing more particularly with a special point.

Mr. BOOT goes into the capital cost of the various systems of lighting, Mr. TAITE the use of "rectifiers" for obtaining continuous currents from high-tension alternating mains: in fact, Mr. BOOT and Mr. TAITE confine themselves to the

case of a central station working by means of alternating currents.

The points in these papers which will be of interest to borough surveyors, such as the candle-power and arrangement of lamps, will be dealt with more fully than those of interest to central station engineers.

Dealing first with Mr. Boor's paper. He speaks of the difficulties confronting the municipal electrical engineer in connection with the supply of electrical energy in towns where considerable opposition is experienced from local interests. He says that people are not satisfied by being given the same amount of light in another form, although it may put money into their own pockets instead of into a rival company's. He further says that "it is exceedingly difficult to convince councillors, and the public generally, that, by lighting their streets in a manner which is worthy of the nineteenth century, they are decreasing crime, assisting in maintaining law and order, and educating the people one step further in civilisation. . . . There is, however, the cry of the so-called 'economist,' whose main object seems to be to keep down the rates at the expense of efficiency." This paragraph should be taken to heart by all municipal engineers and town councillors, as we are sure that in these matters cost is too often considered first and efficiency afterwards. The author's aim is to endeavour to light the streets with electricity in preference to gas, at the same cost, and he says this can be done if the public are satisfied with the same amount of light.

The author is quite right when he emphasises the importance of carrying out a liberal scheme of public lighting from the very commencement of supply, as it acts as the best of advertisements, and also it costs less to lay the cables with the others than to extend afterwards. This point is of great importance, and it will be noted on examining the results of central station working, especially in provincial towns, that a good system of public lighting usually accompanies a successful undertaking.

The portion dealing with arc lamps, &c., is not as clear or correct as it might be. The author discusses the distances apart of arc lamps and actually goes so far as to give a table of towns and extract an average distance. The distance (100 yards as a max.) which he says should never be exceeded is, of course, perfectly useless, except as an extremely rough figure. The author says that "from the table it will be seen that few towns seem to be of the same opinion as to the correct distance." This is easily understood, because there is no fixed correct distance. The distance apart and height of arc lamps, or any lamps, depends upon the kind of street (whether crooked or straight, wide or narrow), the candle-power of each lamp, the illumination required and several other points. Then with regard to arc *v.* incandescent lighting the author goes wrong, or at least does not answer his question, "When and where should arc lamps be used?" This subject must be studied scientifically for every case, and until this is done there will be great differences in practice and often failures, owing to arcs being used when incandescent lamps would be better, and *vice versa*. Account must be taken of the maximum and minimum illuminations required, and of the smallest arc lamp which will work satisfactorily, together with cost of trimming and capital expenditure. Note must be taken of the different distribution of light from the two sources, and the subject is one which cannot be lightly dismissed. The most important factor is the limitation in power of arc lamps. The small arc lamps will replace the larger incandescent, as their steadiness and time of burning without attention increases. To attempt to fix the distance between the posts irrespective of the circumstances is absurd. The author goes further, and fixes the best power of an arc lamp. He says:—"The author's experience is that the best effect for the money can be obtained by using rectified arc lamps of 500 watts, or alternating arc lamps taking 270 watts." The author does not state why he thinks arc lamps of a particular size best; surely circumstances will determine the best power.

The author then goes on to describe the different systems of arc-lighting when supplied from an alternating current central station. As these systems chiefly concern electrical engineers a short summary only will be given:—

A. By separate plant, *i.e.* by putting down a separate engine and dynamo.

B. By a motor generator, *i.e.* an alternating current motor driving a continuous current dynamo.

C. By rectifiers, machines which cut up the alternating current, reversing one-half of the cycle and give an unsteady continuous current.

D. Using the same plant for public and private lighting, and probably the same mains.

The capital outlay with "C" the author reckons out at 1,570*l.* 11*s.* with 25 lamps, and the annual cost as 47*l.* 17*s.* 1*d.* per annum. With "D" the capital outlay is 898*l.* 7*s.*, and the cost of upkeep 457*l.* 10*s.* per annum. There are no figures given for the other methods. Mr. Boor's preference for the rectified arc is not borne out by the figures given, as they cost more to run and more to erect in the first instance. While on the subject of rectified arcs it may be of interest to collect the opinions of the three authors on the matter.

Mr. Boor gives the advantages of "C" as efficiency of arc lamp; the small attention required by the lamps (owing to the vibration); the capital outlay is not so heavy as with a separate plant or motor generator, and the repairs to the rectifier are very small; the current is kept perfectly constant by the constant current transformer; they run off the ordinary plant and keep it loaded, and very little attention is required. The only disadvantage mentioned is that when the motor is new, and when the load is coming on rapidly, the rectifying commutator is liable to flash over (*i.e.* short circuit, putting the lights out) because the synchronous motors get out of step.

Mr. TAITE says that the efficiency, small upkeep and minimum of floor-space are the causes that have led to its adoption. The efficiency is over 93 per cent. at full load and 87.4 per cent. at half load. The upkeep is low, and attendance very small. The disadvantages are that considerable care is required with the commutators, and that there must be no irregularity in the running of the engines.

Mr. FEDDEN says that the "Edinburgh experience of rectifiers is that they are very tricky, because when one goes wrong or a fuse blows, the others which are running are liable to follow suit, run out of phase, flash over, causing the lamps to pump, and eventually stop. It is then necessary either to switch all the lamps out or to run alternating currents through them, with the result that either the town is in darkness or that the lamps are damaged." Mr. FEDDEN says that it is impossible to run the rectifiers and incandescent lamps from the same circuit owing to the unsteadiness. He thus bears out Mr. TAITE's statement that extremely steady running of the engines is necessary.

Returning to Mr. Boor's paper, a point which is worth consideration is the turning on and off of the public lamps. At Tunbridge Wells the policemen have been provided with special keys, with which they turn the lamps on and off at the proper time as they pass them on their beat. This is the means of saving the expense of lamplighters.

In Mr. FEDDEN's paper there are several interesting points, and the placing of arc lamps is again discussed. The author's opinion is that the effect is best when all lamps are suspended at the same height from the ground; but he mentions the continental practice of putting lamps at various heights, and asks for the views of the meeting on these points. We should think that where the streets are level, where lamps of the same size are used, and where the same illuminations are required the lamps should be at a fixed height and distance apart; but that where the illuminations vary, owing to varying importance of the streets, and where the size of lamp is fixed, as it usually is, then the height and distances apart should be greater, as less illumination will suffice.

Mention is made of the splendid lighting of Prince's Street, Edinburgh, to Calton Hill.

The running of lamps in series across the low-tension mains is very sensibly recommended as being far superior to rectifiers, &c. The author mentions running 40 or 50 alternating arc lamps direct from a 2,000 or 3,000 volt alternator, and says that the only remaining point is to get a good alternating arc lamp.

A point in connection with the use of tower ladders for trimming the lamps is that they are very unmanageable in windy weather, as many as five or six men being often required to hold them up. The ladders are also a great

source of expense and trouble, owing to their falling to pieces rapidly through the jolting on the granite setts.

The benefits of arc lighting enumerated by Mr. FEDDEN are that :—(1) The load factor of the central station is considerably increased owing to the long hours of burning. (2) It gives a good load between, say, 12 P.M. and 6 A.M., when otherwise none would be on at all. (3) It has most decidedly reduced crime in the densely populated districts where it has been specially used. (4) It acts as the best advertisement. (5) It reduces station costs in every direction. The author exhibits curves showing the improvements in load and load factors due to the arc lighting. In conclusion, it must be said that Mr. FEDDEN's paper stands out as combining correctness with very useful information, and a record of experience in one of the most successful and largest of our central stations in connection with arc lighting.

The Old Church of St. Pierre on Montmartre, by the efforts of the archæologists, has been saved from demolition. It is to be repaired at the joint expense of the city of Paris and the State.

STATUARY FOR THE NEW MARKETS AT SYDNEY.

SEVERAL months ago the Sydney Municipal Council offered a series of prizes for a group of statuary for the main entrance to the new markets now approaching completion in Sydney. There were three competitors, each of whom submitted a model in clay, together with the prices required for the reproduction of the same in marble, bronze, or freestone. Ultimately a group designed by Mr. William P. McIntosh, of Sydney, was accepted, the sculptor undertaking to make two replicas in marble for the sum of 3,150/., one for each principal entrance to the markets. The successful design represents a group of three figures. Standing upon a raised pedestal in the centre is a lightly-draped female figure representing the controlling power or guardian genius of the city, with a sword and scales of "Justice" in one hand and a scroll of "Wisdom" in the other. On her head is a civic cross and waratah wreath, and at her feet a shield bearing the city crest. On her right hand is seated a semi-nude muscular male figure representing "Labour," with the approved symbols grouped around him, viz. the wheat, ram, fruit and beehive. On the other side a corresponding male figure representing "Commerce" and "Exchange," with a ship by his side in full sail. His left hand holds a bag of money, while his right rests upon a ledger-book.



NOTES AND COMMENTS.

ACCORDING to the arrangements of the Government the Tate Gallery will to some extent correspond with the Luxembourg Gallery. In the latter the majority of the works are by living artists, whilst in the Tate Gallery the general principle of selection adopted by the trustees and director has been to accept all works by British painters born after 1790. Accordingly, no less than ninety-seven pictures have been transferred from Trafalgar Square to Milbank; but certain exceptions have been made to this rule. Almost all the pictures by Sir EDWIN LANDSEER have been retained in the National Gallery, and, on the other hand, a few small paintings by CONSTABLE (born 1776) and a few examples of WILKIE (born 1785) have been removed to the Tate Gallery. All pictures of the earlier British school, including the works of HOGARTH, WILSON, REYNOLDS, GAINSBOROUGH, MORLAND, COPLEY, ROMNEY, STOTHARD, OPIE, CROME, LAWRENCE, TURNER and others, will remain in the National Gallery and have been hung in the western wing of the building. The Tate Gallery will also contain not only Mr. TATE's own gift of modern British pictures, but also the modern British pictures and sculptures bought by the Chantrey trustees out of their trust fund and at present housed at South Kensington. After a time it is not unlikely the advantage of restricting the wall space to the exhibition of works by living painters will be recognised, and then pictures which were produced by artists who were born in the last century will have to be returned to the National Gallery.

PARIS has somehow contrived to preserve some examples of Mediæval architecture, and there is no doubt they increase the charm of the street views, but the requirements of modern business seem to be a merciless power which will not spare the most venerable object if it is supposed to be an obstacle. To it the thirteenth-century house at the angle of the Rue des Prêcheurs and the Rue Saint Denis is about to be sacrificed. One of the features of the building was an immense beam of oak, on which a tree of JESSE was carved. It was unlike the ordinary Mediæval examples, for the patriarchs were represented by Dominicans. It is to be hoped that a piece of woodwork which has stood so long will be secured for one of the archæological museums.

THERE are a great many memorials of the dead which could be removed with advantage from great churches, but an exception should be made in favour of those which were commissioned by the State out of gratitude. They correspond with peerages and baronetcies. If that view were recognised by the Dean and Chapter of St. Paul's, there would have been no need to excite commotion by a proposal to remove the Burges monument. It was erected by order of Parliament as a recognition of the heroic effort of RICHARD RUNDLE BURGESS to break through the Dutch fleet at Camperdown in 1797. The space was to be utilised for the monument of Lord LEIGHTON, but would the late president have approved of the eviction? Lord CHARLES BERESFORD, in a letter on the subject, wrote:—"Lord LEIGHTON was a personal friend of my own, but I have yet to learn that he was the sort of man who would have wished to usurp the place of anyone, or that he would have even admitted that an artist, however distinguished, takes precedence in the nation's memory of those heroes to whom the existence of our Empire is due. I rather think from what I knew of Lord LEIGHTON's character, that had such an hypothesis been presented to him in his lifetime his answer would have been much like that of Her Gracious Majesty the QUEEN, who, it is reported, when it was suggested to her that Queen ANNE's statue should be moved to make room for one of herself, replied, 'Certainly not; why, you would be proposing to move mine next.'" The Burges monument may not be in the highest style of art, but if critical rules are applied, very few statues would be allowed to remain in St. Paul's. It is difficult to interfere with the determination of an English dean, but, owing it is said to the mediation of the Prince of WALES, the Burges monument is to be allowed to remain in the position it has occupied for nearly a century.

THE prejudice against South Kensington officials is so general the select committee could hardly be free from its influence, and it was, moreover, not likely to be diminished by the evidence which was given. It inspired the voting, which has led to the resignation of Sir JOHN GORST as chairman. To obtain a copy of a paper which was offered as evidence without the formal approval of the chairman is an irregularity according to Parliamentary procedure, but if the deed were done by other officials it would not be an unpardonable sin. South Kensington must be suspected to commit more than oversights. Sir JOHN GORST is a man of honour who would not tolerate the least deviation from the prescribed rules, and it was absurd to make a scapegoat of him. His resignation of the office is likely to delay the decisions of the committee and to deprive the conclusions of much of their value.

ILLUSTRATIONS.

THE CHOIR, CANTERBURY CATHEDRAL.

ON another page an account is given of the erection of the new choir after the destruction of CONRAD's choir. It is difficult to discriminate between the parts erected by the two WILLIAMS. Professor WILLIS observes:—"In a new building the lower part is necessarily erected first, and the works proceed regularly upwards, but in a case of this kind there can be little doubt that the essential part, namely, the raising of the clerestory walls and the erection of the vault, would be first done, and then the decoration of the lower part, which consisted merely of a new lining to the old walls, would be proceeded with. But as GERVASE has distinctly recorded the vaults of these transepts as the last works of the Frenchman, and the finishings of the transepts as the first works of the Englishman, a very probable case is made out in favour of the introduction of the round abacus by him, inasmuch as this is a new feature in the work, and as such, very likely to have been introduced by a new architect; everywhere else, however, he has adhered to the square abacus of his predecessor, excepting, as before said, in the crypt, where he had none of the previous work to guide him. However, it must be very difficult to judge of the unfettered style even of WILLIAM OF SENS, because in every part of his work the retention of the old Norman portions evidently cramps and governs his composition." An account is also given elsewhere of the introduction of new stalls in the choir as substitutes for those which were set up at the beginning of the eighteenth century.

ST. MICHAEL'S, OR WARRIORS' CHAPEL, CANTERBURY.

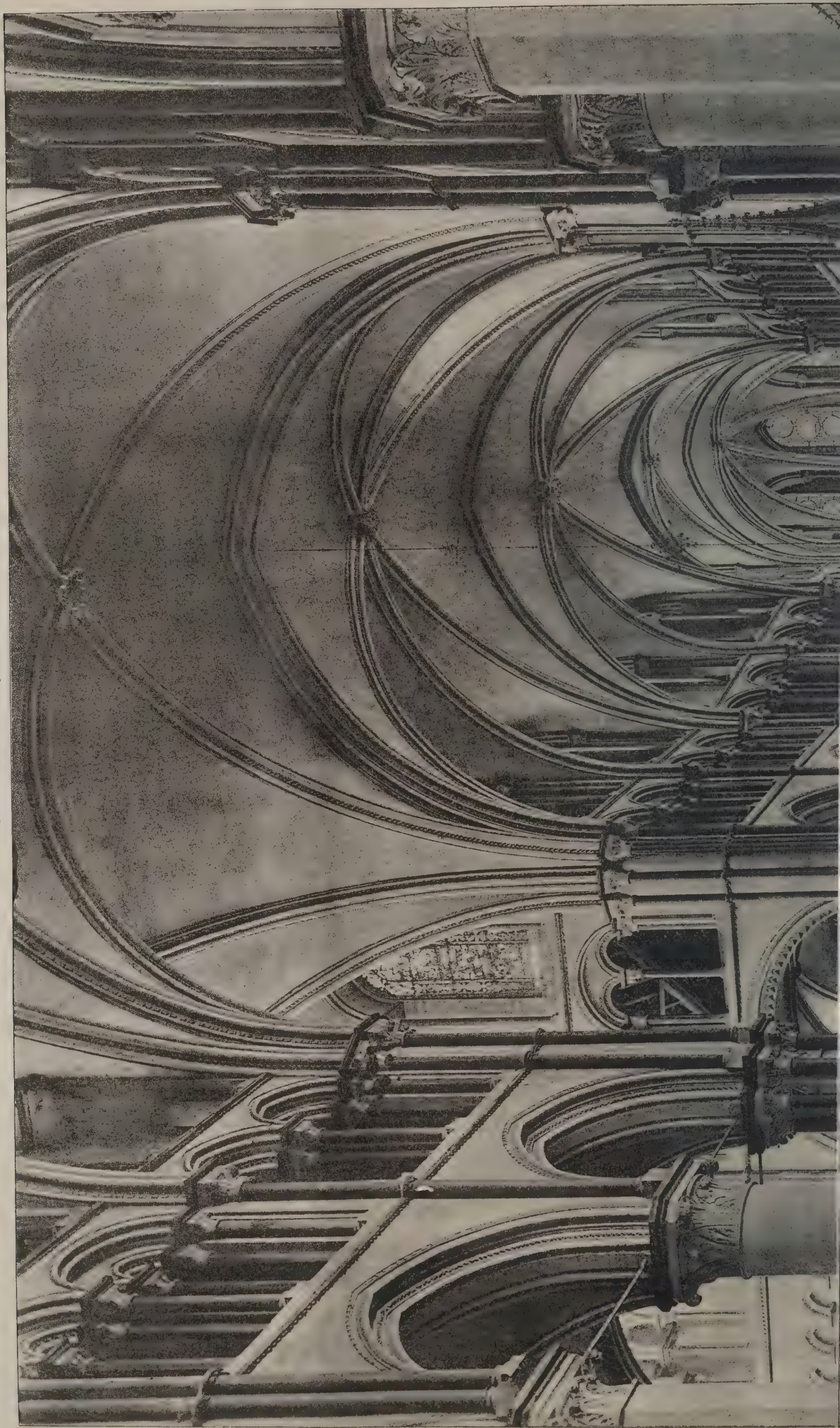
THE old chapel of St. Michael, in the south transept of Canterbury Cathedral, was replaced in the fourteenth or fifteenth century by another, which we illustrate, and which almost corresponds in position with the lady chapel adjoining the Martyrdom on the northern side. To whom the credit for so beautiful an example of Perpendicular should be given is not recorded. Professor WILLIS describes the roof as "a complex lierne vault of an unusual pattern, but resembling that of the north transept of Gloucester Cathedral, which dates from 1367 to 1372." In the middle of the chapel is a monument erected by MARGARET HOLLAND to the memory of her two husbands, viz. the Earl of SOMERSET, who died in 1410, and the Duke of CLARENCE, who died in 1420. As she died in 1437, the monument was erected between 1420 and 1437. The chapel was, therefore, in existence at that time.

Over the chapel is a vaulted room, on the keystones of which are inscriptions, which may be taken as suggesting that the chapel was erected prior to 1411 by THOMAS CHILLENDE, the Prior.

SYDNEY HOUSE OF REPRESENTATIVES.

AN illustration is given of the principal front of the proposed Parliament House in Sydney, and another of the interior of the Chamber, as designed by the Government architect, Mr. W. L. VERNON.

The Architect, July 16th 1897



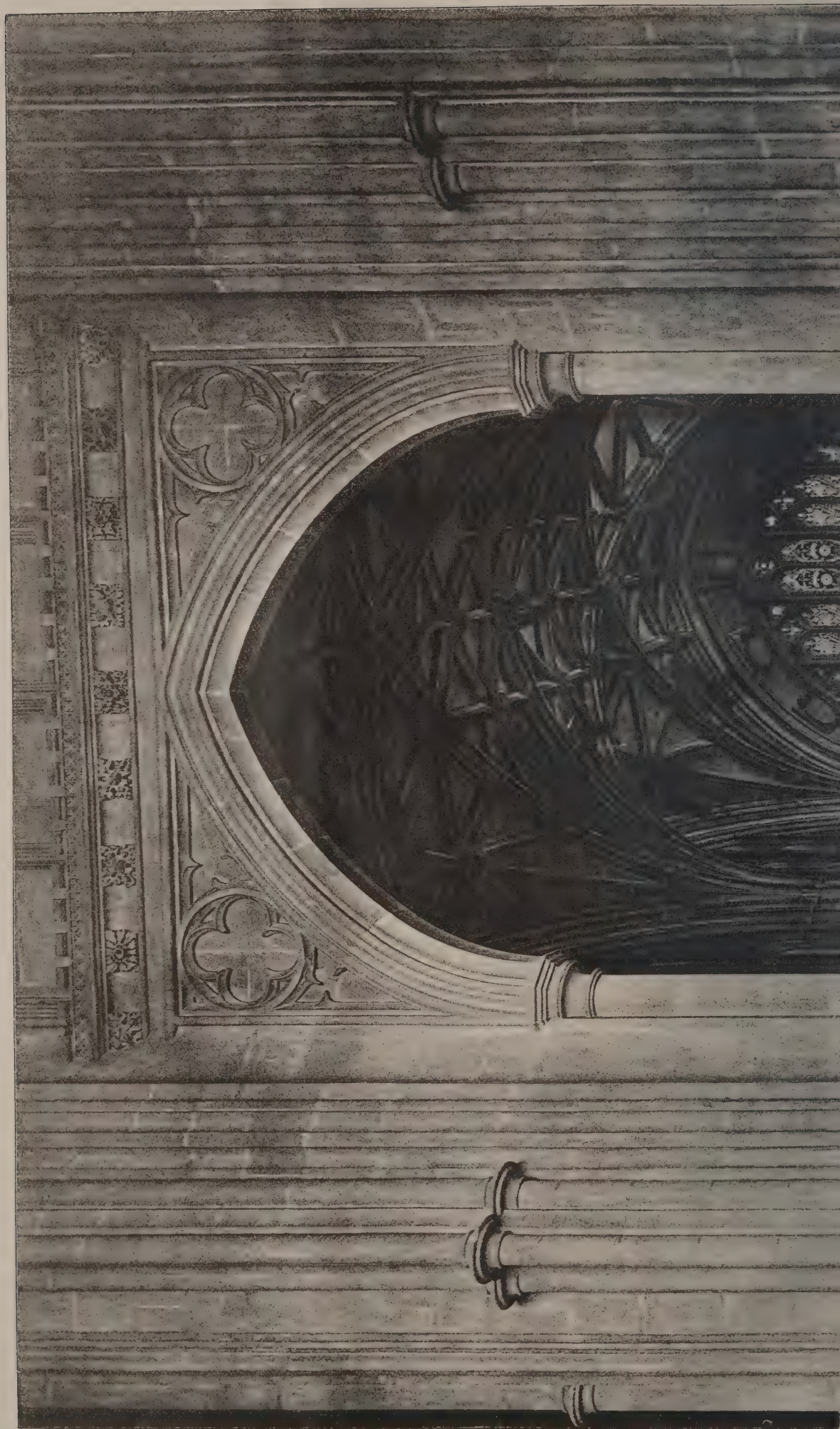


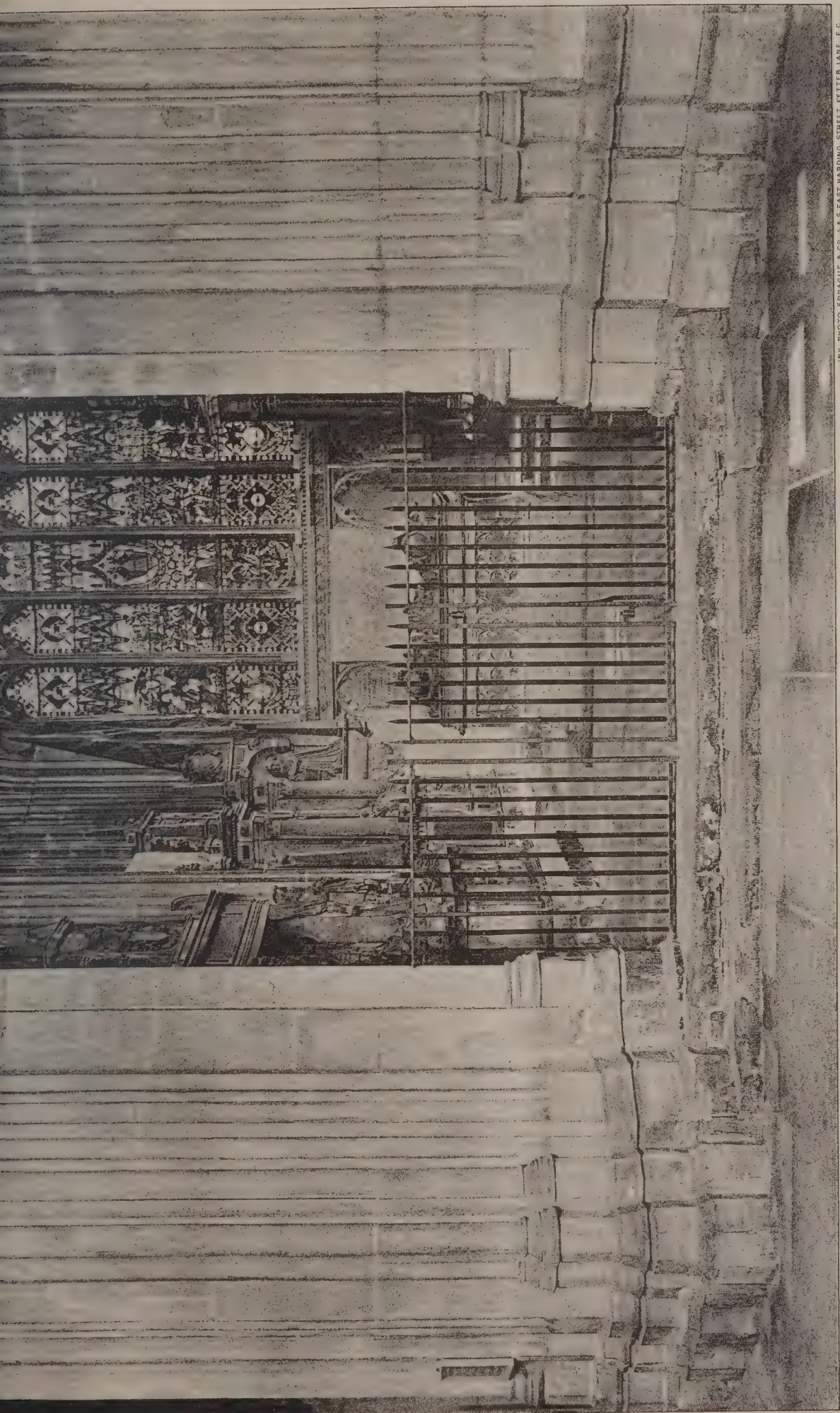
PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

CATHEDRAL SERIES, No. 56.—CANTERBURY: THE CHOIR.

INK-⁴PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

Die Architect, July 16th 1897





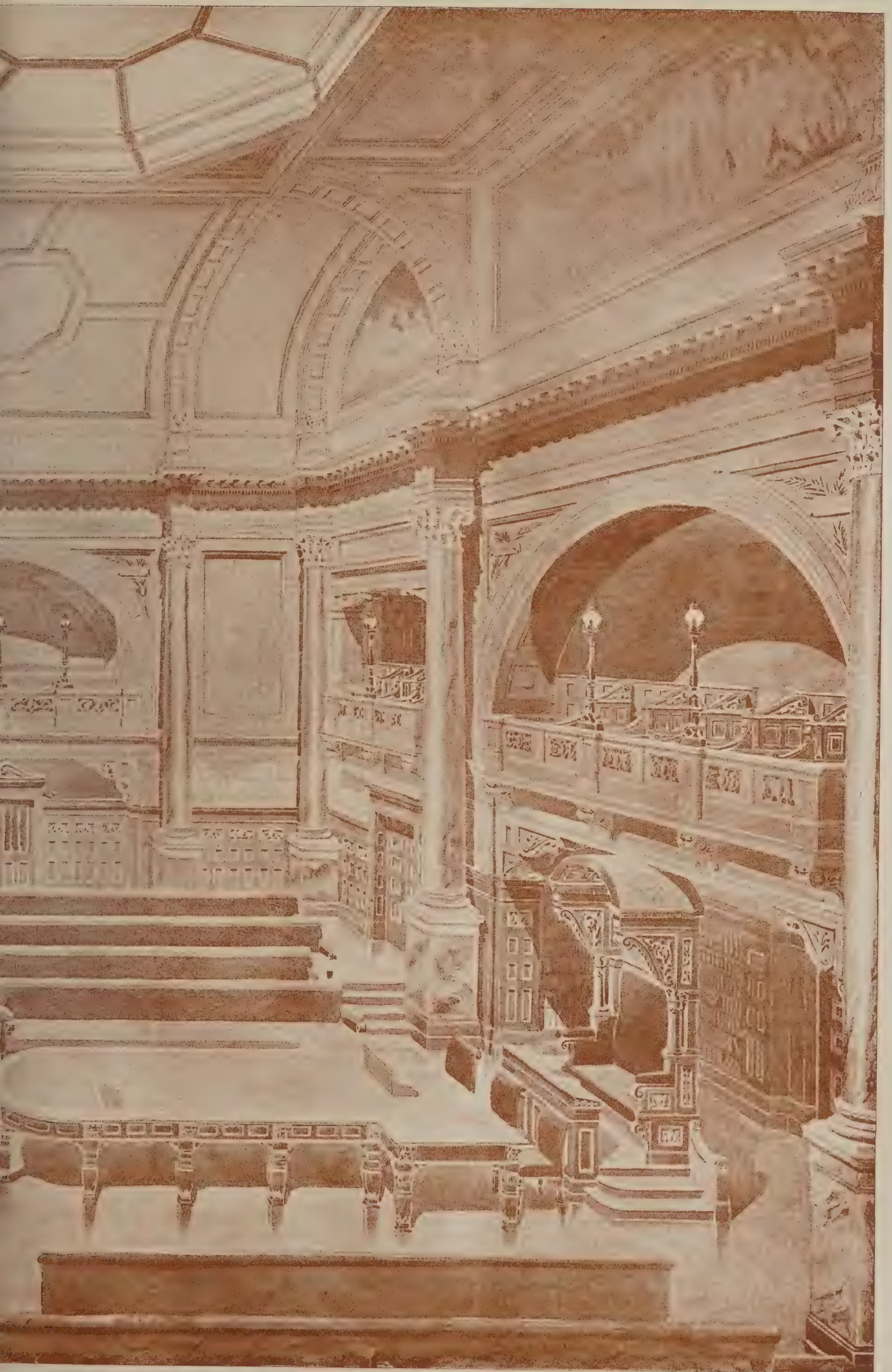
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CATHEDRAL SERIES, No. 57.—CANTERBURY: ST. MICHAEL'S OR WARRIORS' CHAPEL.



July 16th 1897



SYDNEY, NEW SOUTH WALES.

INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET FETTER LANE, E.C.



NEW PARLIAMENTARY BUILDING
FRONT TO M
W. L. VERNON

July 16th 1897



INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

SYDNEY, NEW SOUTH WALES.
MARIE STREET.
J.B.A., Architect.

THE CHOIR STALLS, CANTERBURY CATHEDRAL.

ALL the visitors to Canterbury Cathedral during the late celebration could hardly have been aware that the choir stalls are not more than twenty years old. On May 5, 1876, a meeting was held in the library of Lambeth Palace for the purpose of considering a project for refitting the choir of Canterbury Cathedral and restoring the stalls to the state in which they were placed by HENRI D'ESTRIA in 1305. The cathedral was for a long period in charge of the AUSTIN family as architects, but for so important a work as the transformation of the choir the aid of Sir GILBERT SCOTT was invoked. The following report on the subject was prepared by him :—

As a preliminary to the consideration of the treatment most suitable to be adopted in the restitution of this magnificent choir to a condition consistent at once with its architectural dignity, its present uses and requirements, and with ecclesiastical propriety, it would seem desirable, as far as possible, to ascertain what was its former state; and, as that has been necessarily subject to changes during the three and a half centuries intervening between its reconstruction by William of Sens and his successor about 1180, and the suppression of the monastery with the foundation of the college of secular canons in 1541, it may be well to aim at ascertaining, as far as may be, its state at about the last-named period, which may be said to close the Mediæval history of the cathedral.

We have little information as to the internal arrangements and fittings of the choir at the period of its reconstruction in the twelfth century; indeed, from the haste with which it was re-entered by the monks in 1180, it would seem impossible that its furniture could not have been other than temporary; and it is not improbable that the fittings generally were, at a much later time, considered hardly worthy of the structure, and that they were in great measure replaced by Prior Henry d'Estria early in the fourteenth century.

The only feature in the choir (beyond its mere structure) which appears to be of earlier age is the lower part of the walls which back the stalls; these are, from their character, clearly of the time of the two Williams; and are, indeed, distinctly recorded by Gervase to have been erected in 1180 by the English master.

The Patriarchal Chair may also be said, notwithstanding its repeated wanderings, to belong to the portion of the church under consideration. It is of early date, though its precise age is difficult to determine. It seems, however, reasonable to attribute it to the period of reconstruction, from its being of Purbeck marble, which does not appear to have been used in the church before this time, and from the improbability of the more ancient throne escaping the conflagration.

The high altar then occupied a position quite distinct from that in which its successor is now placed, having been, according to Professor Willis, nearly two bays to the westward, and less than half-way up the great flights of steps leading towards the Trinity Chapel. The Patriarchal Chair stood, as it is suggested that it ought still to be, at the head of those steps; whence it was moved, probably in Charles II.'s time, into Becket's Crown, and more recently into the south-eastern transept.

Beyond those above mentioned, it is probable that no feature of the choir, as seen at the period of the foundation of the collegiate body (excepting only its glorious structure itself), dated earlier than the time of Prior Henry d'Estria.

The most obvious of the remaining works of that period are the beautiful screens which divide the choir from its aisles, standing as they do on the base of the English William's walls. This prior is recorded to have "decorated the choir of the church with most beautiful stonework delicately carved;" and, in another document, his works are described as "The reparation of the whole choir, with three new doors, a new screen or rood-loft, and the reparation of the chapter-house," &c.; and, as the latter document is dated 1304-5, we know what was about the date of the work.

These side screens remain entire, except where interfered with by subsequent monuments. Those which formed the backs to the stall-work are placed about in a line with the inner face of the pillars; but those towards the east, at about the line of their centres. They are close walls to about a yard above the level for the elbows of the stalls, and above that line develop into beautiful pierced screen-work, crowned by a rich and exquisitely designed cornice, frieze and battlement; while portions which are entangled among the later monuments retain fragments of a beautiful decorative colour and gold, indicative of the original treatment of the entire screen-work.

Now this bears witness to a mode of treatment almost unique among English cathedrals; that is to say, that the stalls were without canopies, and backed by pierced screen-work. There is a sort of parallelism with this in what has been discovered to have been the arrangement at Rochester, where

also there were no canopies; but as in that case there are no pillars and arches, but closed walls, the stalls were backed by the wall itself, which was richly decorated in colour and gold. At Exeter also the screens which back the stalls are crowned by a cornice and parapet very similar to those of d'Estria; but as the screens themselves had been replaced in the sixteenth century by brick walls, we do not know what was their design.

These screens at Canterbury were, early in the last century, concealed from the choir by the introduction of wainscoting, which, however, has been for some forty years removed.

Towards the west, the choir is still concealed by canopy-work, erected in the time of Charles II. This canopy-work is of beautiful design and execution, but behind it remains d'Estria's rood-screen, which, though particularly seen on some previous occasions, especially by the late Mr. Austin, has been now again brought to light, and more minutely examined than before, and careful drawings have been made from it. It consists in the main of a continuation (with some variations) of the same beautiful design with the side screens, subject also to this difference, that the whole of the coloured decoration remains. This, however, does not apply to the entire width, being intercepted in the centre, not only by the doorway, but by the first or official stalls on either side, which, unlike all the others, have had overhanging canopies of stone, now cut away, as is also the case with most of the details of the doorway.

The screen-work, as it exists at this western end, does not actually meet that of the sides, being severed from the Norman piers, which project in the internal angles. The painted decoration was, however, continuous, the intervening spaces being occupied by a painted representation of the screen-work (or rather of its colouring), which is also continued over the stone canopies which flank the entrance.

The space between the level of the elbows of the stalls and the sills of the pierced screen-work is boarded (probably for greater comfort), and is painted and spangled with gold rosettes, with a rich border on the upper edge which continues across the Norman piers.

There can be no doubt that these remains of original decoration are indicative of that of the entire screen-work of d'Estria's choir.

Returning, for a moment, to the eastern screen, it may be mentioned that the design of the central doorway is left somewhat doubtful through the mutilation it has suffered; but there are proofs of there having been a figure, or a group of figures above it, the canopy over which was renewed, on an altered design, when the western side of the screen was reconstructed, a century later; the precise designs of the two canopies of the official stalls are also open to conjecture, though d'Estria's splendid canopy in the chapter-house may offer some suggestions.

Whether the stalls themselves were of d'Estria's time has not yet been absolutely proved; but the expression "Reparation of the whole choir," united with the fact of the screen which backs the choir being of that age, seem to render it probable.

A portion of the horizontal elbows of the stalls has been found to exist among the timbers of the floor of the seats, and this, so far as it can be examined, is not inconsistent with d'Estria's date, while the width, from centre to centre, of the stalls, as shown by that fragment, agrees accurately with that of the compartments of the side screens. Possibly more of the work of the old stalls may be found beneath the floor, as they existed till 1704, when the present seats were substituted, and it is not unlikely that they were in part used as materials for the new floors.

Assuming, then, that the renewed stalls should agree in character with the screens by which they are backed, they should be designed in conformity with such ancient stalls as we possess of about the same period, among which may be mentioned those at Wells and Ely. The desk-ends and fronts, with the stalls or seats in front, must also be designed in conformity with those of the same period, which in this country happen to be extremely rare. The old stalls are described by Somner as being in "two rows on each side, an upper and a lower;" but whether both were actually divided into stalls is uncertain, though probable.

The double rows of stalls would be extremely handsome, and add much to the dignity of the effect; but would accommodate a smaller number of persons than undivided seats.

In the above remarks, the stall-work is supposed to be wholly renewed as nearly as may be imagined to its old design; the two stone canopies and the central doorway between them, with the niche-work over it, restored; and the screen-work, so long concealed, at the west end, exposed to view, its beautiful decorations being carefully made good where injured. One may here add that, as this would displace the canopies of Charles II.'s time, some worthy place should be found for them elsewhere.

The decoration should then be continued along the side screens, the space between the stall-backs and the sills of open work being filled in with boarding and decorated like that dis-

covered at the west end. This boarding was probably, as before suggested, introduced for the sake of greater comfort. It might be desirable to have tapestry hangings for this space, if only for occasional use. We find that there were formerly hangings against all these screens, "for extraordinary occasions." These were provided by Prior Godstone in the fifteenth century. The hooks for these (which remain on the western screen and at intervals throughout) show that they hung from the cornice, and consequently concealed the open screen-work; and we learn that those on one side were wrought with "The history of our Saviour's actions," and those on the other side with "The life and death of the Blessed Virgin."

In arranging the stalls a space must, of course, be left as at present for the organist.

It is impossible to form four ranges of fixed seats with fronts, as at present, on either side; but one regular seat in addition to the two ranges of stalls may be formed, and movable seats may be placed in advance of them.

The rest of the accommodation should be obtained, as far as possible, by means of chairs; and it will be worth consideration whether, by removing the plate-glass which now fills up the open screen-work, the aisles of the choir, and even partially the eastern transept, may not be made available as a place for the overflow of the congregation. Persons so placed could probably hear even though they might see but little; and this might be facilitated by an altered position of the pulpit. The uses of plate-glass have been in a great degree obviated by the warming of the cathedral.

The next consideration is the position of the altar table.

Its removal, as at present, from its ancient place to the very top of the flights of steps, seems a very marked exaggeration of the idea of a "high altar." Its height is, indeed, so excessive as to sever it almost wholly from the region of the choir and the congregation; while the beautiful ancient arrangement—a relic of those of the Basilica of Augustine—by which the Patriarchal Chair was placed at the extreme east, was, by this position of the altar, rendered impracticable.

It is worthy of consideration whether an approach, at least, to this most interesting ancient arrangement may not be recovered; placing the venerable Patriarchal Chair behind the altar table, as in primitive churches, and among them in this, which from the time of Gregory the Great has been the Metropolitan and Patriarchal Cathedral of England.

The other arrangements of the interior need but little remark. The brass lectern would retain the position marked out for it in the old pavement; the litany desk would be placed in a suitable position; a reredos seems not to be wanted, as it would be an obstruction between the archbishop's chair and the altar table; an open screen, perhaps of metal, would occupy the position of the present reredos. Some description of sedilia, probably of wood, would be necessary, as well as such other minor accessories as might be thought needful.

There was much opposition to the proposal on the part of the Society for the Protection of Ancient Buildings. It was stated that the woodwork was remarkable for its intrinsic beauty, and was a noble example of the art of its period, while it in no way interfered with the architectural effect of the building. As the remains of Prior D'ESTRIA'S fittings were in a very fragmentary condition, the restoration of them must be conjectural as to design and modern as to workmanship. The Society was convinced that, however lamentable former destruction of ancient fittings may have been, the restoration of them was impossible and could only lead to a condition of things still more grievous to all lovers of art, and still more destructive of the history and dignity of the cathedral.

The cathedral authorities and their friends, however, gained the upper hand. The proposals of Sir GILBERT SCOTT were realised, and we imagine that few people who are competent to judge will be found to regret the removal of the eighteenth-century woodwork.

ROYAL ARCHITECTURAL MUSEUM.

THE annual meeting of the Royal Architectural Museum and Westminster School of Art was held at the Museum, Tufton Street, Dean's Yard, on Friday afternoon, the Duke of Westminster (president of the Society) in the chair. On the motion of Dr. Garnett, seconded by Mr. Sidney Lee, the Duke of Westminster was reappointed president and the vice-presidents were re-elected.

Mr. Maurice B. Adams proposed the adoption of the report, which stated that the council had acquired the premises adjacent to the museum for the purpose of building additional classrooms. The new building was now in course of erection at an estimated cost of 2,630*l.*, exclusive of architect's charges,

and was to be completed by Christmas next. The total income for 1896 amounted to 1,912*l.*, of which the School of Art in fees and grants contributed 1,821*l.* The expenditure reached 1,330*l.* The adoption of the report was seconded by Mr. W. Pain and carried.

In replying to a vote of thanks, the Chairman said that there could be no doubt of the immense advantage which it would be to the school to have the additional premises now being added to the Institution. He called attention to the fact that a substantial amount of the funds necessary to carry out these alterations remained to be found and that, as on most occasions of this sort, they had to appeal to a generous public to supplement with their contributions the efforts of the Society.

The Secretary announced that he had just received the results of the examinations held in May last in connection with South Kensington. Out of fifty-three candidates entered for drawing from the antique thirty-six succeeded; in drawing from life sixty-one candidates were sent up, of whom fifty-nine succeeded, eight obtaining "excellent"—the highest award; and in anatomy eighteen candidates entered, of whom thirteen succeeded.

THE STATE AND TECHNICAL EDUCATION.*

WHILE as early as 1833 the State had begun to foster primary or elementary education and to assist it with grants from the public funds, it was not until many years later that the claims of secondary or intermediate education entered the sphere of practical politics. It is true that, owing to the appointment of the select committee of the House of Commons in 1835, the art education of this country was aided from 1836 onwards by annual Parliamentary grants, which, beginning in the latter year with a sum of 1,500*l.*, amounts at the present time to a total of little short of 320,000*l.* per annum, by far the largest part of which, however, is allotted to the teaching of drawing in elementary schools. General science teaching was first rewarded by Government grants in 1859, and the sum set apart for the science education of the country for the present year amounts to nearly 200,000*l.*, disregarding for the time being the large sums received for this purpose under the local Taxation and Excise Act of 1890.

In the admirable "Historical Sketch" prefixed to the recent report of the Royal Commission on Secondary Education, it is stated that it was not until 1861, when the Royal Commission was appointed to inquire into the condition of nine among the chief endowed schools of the country, that what is now called secondary or intermediate education began to engage serious attention. This Commission, presided over by Lord Clarendon, reported in 1864, while a second Commission appointed in December of that same year, the so-called Schools Inquiry Commission, presented its report three years later, in December 1867. The outcome of the first of these Commissions was the Public Schools Act of 1868, while the issue of the second Commission was the Endowed Schools Act of 1869. Among other provisions of this latter Act was the appointment of a permanent body termed the Endowed Schools Commission, entrusted with large powers for the better government and management of schools of this character. In 1874 this body was by a subsequent Act of Parliament merged in the Board of Charity Commissioners for England and Wales. Under these public bodies schemes for upwards of 900 schools have been framed and approved out of a total of 1,448 endowments in this country known to be subject to the Acts, but a considerable number of endowments founded less than fifty years before the passing of the Act of 1869 have until now been exempt from its provisions.

The Elementary Education Act of 1870 had undoubtedly the most far-reaching effects in establishing the primary education of the country upon a sound and systematic basis, and when it becomes necessary to study the question of more advanced instruction, the recent tendency of certain of the public bodies, created under that Act, to provide education for children beyond the limits for which the primary schools were originally designed, must receive careful attention. Schools of the type known as "higher grade," "higher standard," or "seventh standard schools," have been established in certain of the large towns with the avowed intention of taking up the work of education to a point beyond that at which the elementary school leaves off. As is well said in the report of the Secondary Education Commission, "these schools, though they have received the name of 'higher grade elementary,' are really secondary in their character, so far at least as regards their higher classes, in which instruction beyond the standards is given." As these schools can only share to a very limited extent in the grant distributed by the Education Department, they are supported partly by the fees of scholars, but mainly by the grants of the Science and Art Department.

This brings me to the consideration of the principal Govern-

* A paper by Mr. Gilbert R. Redgrave, read before the International Congress on Technical Education.

ment agency for the promotion of secondary and technical education in this country, namely, the operations of the Science and Art Department, and in this connection I desire to speak more particularly of the work of the Organised Science Schools called into existence under that Department. The State first took a part in diffusing a knowledge of the arts and principles of design among the people (especially the manufacturing population) of the country by the establishment in London in June 1837 of the Normal School of Design. In 1840 the Government decided to extend their assistance to the manufacturing districts, and authorised a grant of 10,000*l.* towards the formation and equipment of schools of design in certain of the larger provincial towns. Ten years later, in 1850, when considerable changes had been from time to time introduced into the management of the school in London, there were sixteen provincial schools of design in Great Britain and Ireland, with about 3,000 pupils under instruction, and in 1852 a so-called Department of Practical Art was called into existence under the Board of Trade to administer these schools and to promote and foster the general art education of this country. A year later the new Department was much enlarged in its scope, and became from thenceforth known as the Department of Science and Art.

This state of things continued until February, 1857, when the Education Department was constituted to include (a) the Education Department of the Privy Council Office and (b) the Department of Science and Art, and these two departments were placed under the Lord President of the Council, assisted by a Vice-President of the Committee of Council on Education. It will thus be seen that the Department, originally organised to deal with the art work of the country, was subsequently entrusted with administrative machinery by which grants are distributed in aid both of science and art. Its annual grants began, as we have seen, to be made as far back as 1837, and though these grants were not originally made to schools except such as those in which art alone, or later those in which science in conjunction with art was taught, yet, as pointed out in the report of the Secondary Education Commission, the tendency of more recent "legislative and general changes in education has been to render them grants to scholars in schools."

The work of the Science and Art Department and the syllabuses of its examinations originated with the requirements of the art school, the art class, or the evening science class, and the examinations have from time to time been modified to make them more generally applicable to the needs of scholars in schools, rather than to those preparing for an art designer's career, or to those attending the night classes at mechanics' institutions and schools of a similar type for whom they were, as already stated, in the first instance chiefly intended. It is, indeed, largely owing to the new type of students taking advantage of its grants in the higher grade schools in provincial towns, to which reference has already been made, as also in endowed schools or grammar schools, that certain recent developments in the work of the Department, culminating in the establishment of the so-called organised science schools, have been introduced, and it is to this aspect of its operations as bearing on a State system of secondary education that I desire to chiefly dwell upon the present occasion.

At the very inception of the scheme of State grants in aid of science teaching in 1861, there were ready to hand, besides the isolated classes in architectural and engineering drawing, physics and chemistry in some of the chief mechanics' institutes, a certain number of schools scattered through the country in the nature of engineering schools, navigation schools, or trade schools in which a considerable amount of time was devoted to science teaching, some of these schools being due to the early action of the Department, from 1853 onwards, and these were prompt to avail themselves of the examinations and grants offered to them by the Science and Art Department. In the course of time, as teachers became trained, classes in the various subjects of science were multiplied, being very largely in the nature of evening classes, and one of the reproaches levelled against the work in connection with South Kensington was the sporadic character of many of these classes and the want of continuity and completeness in the course of study pursued by those who were trained in them.

The chief attempt to remove these objections was the institution of the Organised Science Schools, or secondary schools, in which a definite course of science work was enjoined, and in which the curriculum laid down was such as to insure a due sequence in the subjects studied and in the correlation of one branch of work with another.

The name adopted for the schools of this type, though it is sufficiently explanatory of its object, is not free from objection, being no doubt cumbersome and in some of its applications misleading, but as the appellation in question is about to disappear we need not now discuss it further.

Various advantages in simplified registration and in capita- tion grants were held out to induce school authorities to avail themselves of these special schemes, and the organised science schools under the Department have steadily increased both in

number and in importance. Very early in their history it became manifest that these schools would embrace institutions which were originally of widely differing types, for while, on the one hand, the scheme was adopted by many of the higher grade schools, to which attention has already been drawn, frequented almost entirely by ex-standard scholars of the public elementary school, the course was shown to be readily applicable to the modern side of the grammar school, and, with slight modifications, to the day technical school of still more recent growth. The tendency in the grammar school was to press for a reduction of the time devoted to the science and art teaching, and in the technical school the literary teaching was in some cases brought down to the vanishing point. It soon became evident that schools of this character, conducted upon the lines laid down by the Department, were admirably adapted for the education needed by the middle classes of our large manufacturing towns, and that by the introduction into the prescribed courses of certain modifications, such schools might become the State secondary schools of the future, carrying on to its necessary conclusion the excellent education afforded by the best Board schools, and serving to provide such a ground-work in science as would furnish the soundest possible preparation for the technical high school or science university. My intention is now to indicate how these various aims are provided for in the amended curriculum of the State science school.

The Secondary School Commissioners in their recent report have well defined secondary education, which is inclusive of technical education, as "education conducted in view of the special life that has to be lived, with the express purpose of forming a person fit to live it." A good type of a school providing this education is stated to be "less literary than the grammar school, less theoretical than the science school, and distinguished from both by its functions being mainly industrial." The modern science school, as I understand it, draws its population from the lower middle classes, almost entirely from the children of parents who cannot afford to keep them at school beyond the age of eighteen. In the case of a very small number of its students provided with bursaries and scholarships, or the children of more well-to-do parents, it may be possible to proceed to the technical college, but the large majority of the students will end their education here and will quit the school to earn their own living. This fact must limit the course in most cases to three years, but it becomes possible, by the provision of a fourth year's course, to meet the requirements of those who will matriculate for the university or who will complete their education at the technical college.

The work of the so-called elementary course of the science school is designed to extend over two years, during which a thorough progressive course of education in science, combined with literary and commercial instruction, must be given. It is an important feature in this part of the scheme that students whom the inspector reports to be unfitted for the work will be excluded. The elementary course, as laid down in the directory of the Science and Art Department, comprises five obligatory subjects of instruction, namely, mathematics, elementary physics, including the fundamental principles of mechanics (theoretical and practical), elementary chemistry (theoretical and practical), freehand drawing and elementary practical geometry. It is stipulated that, while the course may extend over two years, all the subjects must be taught in each year, the instruction in the second year being more advanced than that of the first year. It is intended that the teaching should be such as to form the basis of future studies in science, and the students, during this part of their education, are not submitted to examination, but their work is tested by the inspectors of the Department in the course of frequent visits. Not less than thirteen hours per week must be allotted to the instruction in the above obligatory subjects of science and art, eight hours of which must be devoted to the teaching of subjects other than mathematics, and not less than ten hours per week must be set apart for the literary subjects, which may include two hours given up to manual instruction, or, in the case of women students, to cookery and needlework. It will thus be seen that twenty-three hours per week must be devoted to subjects of the time-table, over which the Department exercises direct control, and further regulations apply to the length of the lessons, the number of students under each teacher, the marking of the registers, and to other matters of detail which need not here be specified.

On the completion of the elementary course, the intention is that the work of the students should be specialised in one or other of a series of advanced courses, several specimens of which have been drawn up suitable to the needs of students who may desire to devote their attention either to physics, mechanics or biology. It is pointed out that other special advanced courses, such as for mining and agriculture, may be sanctioned, but it is necessary that they should be previously submitted to the Department for approval. In all these courses a considerable amount of latitude is allowed to the teacher, provided the instruction is sound, satisfactory in

amount and combined with proper practical work. In the case of the advanced courses, certain obligatory and optional subjects are laid down, and, as in the elementary stage, sanction is given to extend the work over two years, but the second year's curriculum must be submitted to the Department for approval. During this second year the time devoted to literary subjects and manual instruction may be curtailed to six hours per week.

The education of women students is specially considered, and in their case instruction in certain subjects of biology may be substituted for physics in the elementary course, and where this is done a special advanced course has been drawn up for their use. In many of the existing schools both sexes are being taught together with excellent results.

A liberal scale of payments has been devised for these schools, based partly upon capitation grants upon individual attendance, partly in the form of a variable grant dependent upon the result of inspection, and partly as a grant for practical work done in suitable laboratories. In the case of students in the advanced course, payments are made upon the results of examinations conducted by the Department in the ordinary subjects of science and art, and payments may also be claimed on account of manual instruction or for the needlework and cookery of the women students.

It has been found that in a well-equipped science school, properly staffed, and attended by students of suitable age, who have been carefully trained in accordance with the prescribed syllabus, that grants averaging from 4*l.* to 6*l.* per head can readily be earned, and it is estimated that schools coming under the scheme can in certain cases obtain in grants more than three-fourths of the total expenditure per scholar. Of course it is not intended that the State should pay the entire cost of this education, but it has been publicly stated that in certain of the higher grade schools the grants from the Science and Art Department are sufficient to cover all expenses except the rent.

From this brief outline of the regulations for these schools it will, I think, be evident that we have here all the conditions needful for the suitable training of the large majority of the young people of both sexes in the country, who would in the natural course of events enter the secondary school. In the case of a relatively small proportion of the children of the upper middle classes, who may look forward to entering the university, there is the classical training of the grammar school and the public school, existing upon lines which have been pursued from time immemorial, and concerning which I have no desire to speak at the present time, but the curriculum of the grammar school is ill-fitted for modern requirements and for the training of the vast majority of the children of the middle classes who have to look forward to an industrial or a commercial career. Something of the nature of the German Real-Schule, but with a far larger proportion of practical science work and manual training should, I am convinced, serve in the future as our model for the secondary school in this country, and I believe that it is quite possible to expand the scheme of the State science school, such as I have described it, so as to embrace all those branches of a modern education, whether literary, scientific or commercial, which can possibly be required by young people between the ages of fourteen and eighteen. I look forward to the time when each large manufacturing town and every county town of importance will possess its State-aided and State-inspected modern school, and I am convinced that in the organised school which I have attempted to describe we have all the necessary elements of the institution in question. Each of these schools will, of course, be adapted in its details to the special needs of the locality in which it is situated.

I have purposely avoided all mention of the details in the work needed for different types of schools, but it would be easy to show that in the case, for instance, of a commercial or an agricultural school certain readily introduced modifications in the curriculum would convert this or that section of the school in the one case into an agricultural division, in the other into a commercial school. For schools of the latter type we have excellent models in Antwerp, Vienna and certain other continental cities, where the youth is trained to be a clerk almost as if he were in the counting house of a merchant's office. He sends and obtains samples, analyses them in the school laboratory, tests their relative values, fixes the prices, sends invoices and corresponds with imaginary agents, manufacturers and travellers in several languages, and he sees in the school museum fine collections of commercial produce from every part of the world. We have really no example in this country of a commercial school established on modern lines. Agricultural schools already exist in England and will furnish useful types of the class of changes which will have to be introduced in the syllabus in order to render the State-aided school suitable for a specialised training in agriculture.

There are many other directions in which the school or sections of the school may have to be modified, since it is quite

evident that no narrow or rigid curriculum would suit every case, and to my mind the great value of the syllabus consists in the obligatory nature of a fixed amount, both of literary and scientific instruction, with the power to take up other voluntary subjects capable of giving a special direction to the work of the school.

I wish it to be clearly understood that I have purposely here omitted all reference to the other directions in which the State intervenes in order to aid the science and art work of the country, namely, in the system of evening classes and in the fully equipped school of art or in the simple art class. The art work may be disregarded, as it forms but one small branch of technical education. The science work, however, stands in a wholly different position, and the training in practical science and in manual work, which has been largely stimulated by State grants, must, I think, be regarded as among the most important and valuable of the results of State intervention in secondary technical education.

THE GREEK ROSE.

THE rose, as described in the Anacreontic odes and as familiarly known in modern times, is acknowledged to be the product of cultivation; the original plant, from which all our varieties have proceeded, being the common wild-briar. Such is the rose which Theophrastus describes in his "History of Plants" as alone commonly known in Greece, and although the process by which the simple blossom of the wild-briar is converted into the fine double rose does not appear to have been altogether unknown to that naturalist, yet the language he uses in speaking of the artificial production implies that he had never had an opportunity of seeing it. This testimony is confirmed by the accounts which have come down to us of the state of horticulture among the Greeks, that people having been wholly unacquainted with gardens in the modern sense of the term before the time of Epicurus. Further evidence to the same purpose is derived from the fact that the garlands used by the Greeks upon festive occasions were composed of such ordinary plants and herbs as myrtle, coriander, feverfew (*Pyrethrum Parthenium*), parsley, &c.; the custom of interweaving them with flowers was not introduced before the 100th olympiad. Such likewise was the composition of the crowns celebrated by the early lyrists, including the genuine remains of Anacreon preserved by Athenæus. The period when Theophrastus published his work, in which he gives the above account of the rose as known to the Greeks, at which period the horticultural art was in a state quite incapable of producing flowers corresponding in beauty and fragrance with those celebrated in the odes, was the 116th olympiad; while the period when Anacreon flourished cannot be brought lower than the sixty-fifth, being a difference of more than two centuries. While, however, the cultivated rose appears not to have existed in Greece in the age of Anacreon, the term *rodon* afterwards applied to this flower was in use not only at that period, but even in the times of Homer. The word *rodon* is of oriental derivation; its elements are employed by the Hebrew writers and by Homer to express not specifically the rose, but generally any flower used in dyeing; in this sense it was applied to the lily, the plant madder, the privet, &c. On assuming that the rose was the first flower to which it was applied, and the type from which all others so termed derived their appellation, it is inconceivable that these plants should have been at all termed roses, and inexplicable that they should have been called, as was the case, the dog rose, the red rose and the white rose; but on the supposition that the term signified a dye-flower, no name so appropriate could be applied to them as the dog dye-flower, the red dye-flower and the white dye-flower, they having all been employed in the art of dyeing. The flower which assumed to itself the name of the dye-flower *rodon* was the blossom of the pomegranate, or balaustium. The dye extracted from this flower was red, and hence the word appears to have been applied to all flowers of a red colour. We learn from the scholiast on Pindar that it was from its being celebrated for its dyes, which were obtained from the pomegranate, that the island of Rhodes received its name. Should, however, any reasonable doubt be entertained respecting the signification ascribed to the term under consideration, it is certain that the plant, whatever it was, to which it was assigned, obtained but a moderate share of admiration—if we except the suspected odes, in which a flower so-called corresponding to our modern rose is celebrated with an excessive and unexampled partiality. The balaustium having been superseded in its application to the art of dyeing by the brighter colour drawn from the murex, gradually sank into oblivion; while the rose, obtaining increased attention, fixed the general admiration and finally appropriated the name which it at first received by adoption. Shortly after the publication of Theophrastus's "History of Plants," at which time it was comparatively little known, its cultivation was extensively spread and the partiality for it fully established. From Greece the "garden queen" found its way into the Italian soil, and through

France was spread over all the west; while its reception into every European garden was accompanied by the adoption of its name into all the European languages.

LOUTH AND ITS ARCHÆOLOGY.

THE members of the Architectural and Archæological Society of the counties of Lincoln and Nottingham made a visit to Louth on the 6th inst. The attendance was large. Leaving Louth shortly after 10 o'clock the party proceeded on an excursion in the marshes, in which there are numerous objects of particular interest to an archæologist. On the outward journey Grimoldby, South Cockerington, South Somercotes, Skidbrook and Saltfleet were visited, and the churches of these places, with their many objects of interest, were inspected and much admired. At Saltfleet the party were particularly interested in the history of the old-time seaport town, which was partly destroyed, together with the church, by the incursions of the sea, and which in 1359 furnished two ships of war and 49 men to the navy of Edward III. for the invasion of Brittany. Having had lunch, the party commenced their return journey, halting at Saltfleetby St. Clement's and All Saints Theddlethorpe, All Saints, Great Carlton, and Legbourne. At Legbourne the party's attention was drawn to the priory of Cistercian nuns, founded by Gilbert de Lekeburn before the reign of King John. The church of All Saints was also inspected. It is chiefly built of chalk. The dinner at night was followed by a public meeting, at which the mayor of Louth (Ald. H. D. Simpson) presented an address on behalf of the Corporation and burgesses. The address expressed a cordial welcome to the Society; referred to its foundation at Louth in 1844; to the occasion of the Society's last visit some twenty-two years ago, and to the loss the town and the Society had sustained by the death of Ald. Fowler. The address also assured the visitors that the inhabitants of Louth recognised the advantage of the periodical visits of the Society to the churches in the diocese, and they trusted that their efforts would prove conducive to the preservation in their original beauty of the many sacred edifices which the piety of our forefathers had erected in nearly every parish in the diocese. An interesting paper, entitled "A Description of the Fabric of the Louth Church, with a Glance at its History," was given by Mr. J. J. Gresswell, A.R.I.B.A., and Mr. R. W. Goulding gave a capital paper, entitled "The Lords of the Manor of Burwell." An exhibition on a small scale was given in illustration of the papers.

THE PRESERVATION OF HISTORICAL PLACES.

AT the annual meeting of the National Trust for Places of Historic Interest or Natural Beauty, held in Burlington House on the 9th inst., the Duke of Westminster presided.

In moving the adoption of the report and statement of accounts the Chairman said they were now celebrating the third year of their Society's existence, and though it could not be expected they could do much at once, yet their progress could be reported as satisfactory. They had been able to secure Barras Head—that very noble headland near Tintagel—and they had also been able to report the completion of the offer of Mrs. Talbot to purchase from Lord Harlech and present to the Trust a further portion of Barmouth Cliff. Other interesting places had either been secured or were about to be secured, and they hoped to do more work in that direction as time went on.

The Secretary (Mr. A. M. Poynter) read a letter from Sir W. B. Richmond, R.A., who, in wishing the Society every success, urged them to go on in the manner they had commenced. He did not think the Legislature would take up such a matter at present. Private enterprise with a whole heart did so much in England. The thing was to get public opinion excited and to reach the Legislature that way. While he confessed to wishing the Government was ideal and highly æsthetic, as well as practical, he held that as matters were at present faddists were more likely to stir public opinion than any body of legislators. When they found the public on their side, by becoming at times pleasant and disagreeable, then would be the time to try the Government.

Mr. Fred. Harrison also wrote deprecating the arrangement which allowed private families to reside in the Tower, and hoping that active steps would be taken to prevent the building and its walls from being in any way desecrated.

Professor Geddes proposed, Sir H. Howorth seconded, and it was unanimously resolved, "That it is desirable that further facilities be given by legislation to private owners to place historic monuments and places of striking natural beauty beyond reach of destruction or injury."

THE PANTHEON OF POMPEII.

THE College of the Augustales, which is called on the spot the Pantheon, for no other reason than that twelve pedestals were found in its centre, is one of which the use is the least evident of any at Pompeii. The plan is, as nearly as possible, similar to that of the building misnamed the Temple of Serapis at Pozzuoli, but which is proved to contain the baths or thermæ of Puteoli, with their appropriate medicinal spring, now cleared and applied to its original use. In each of these edifices we find an open court, with its colonnades and little chambers, and in each we have a circular or polygonal tholos in the centre, corresponding with that which Pausanias describes at Epidaurus as the place where patients waited till they could enter the bath. In each we find, exactly in the same relative situation, a temple or building evidently more sacred than the porticoes; but these coincidences only serve to prove that the convenience of such a disposition of the apartments of public buildings was the motive for its frequent adoption in places serving for the union of any great concourse of people. Signor Carlo Bonucci, in his work printed at Naples in the year 1826, has called a part of the Pompeian edifice the Temple of Augustus, and considers the remainder as the scene of the sacred banquet of the Augustales; and there seems no reason to doubt this theory, except the difficulty of finding so large a piece of ground, in the centre of a city already built, for the erection of such a fabric, and for such a purpose, at so late a period. Yet Vitruvius, cited by Signor Bonucci, gives such a situation for the Temple of Augustus. The Augustales were highly honoured, as we are informed by Vegetius, being chosen by Augustus, the founder of the order, to lead the troops in battle, and they seem to have presided at the feasts and games called Augustalia, in honour of that deified emperor. Tacitus has given some accounts of the institution, and Lipsius has added almost everything else that was known of the Augustales, till the numerous inscriptions at Pompeii proved that they were of great consequence in that city, though neither their office nor their antiquity is likely to conciliate the respect of the moderns or give any interest to their history. They seem by one inscription to have been six in number at Pompeii. It appears, however, that the Augustales were possessed of funds which supplied them with the means of feasting and inviting their fellow-citizens to partake in the banquet, for which purpose the building now called the Pantheon was so well calculated that, whether belonging to a particular order or the common property of all the inhabitants of Pompeii, it may be safely considered as a place of feasting or carousal under the protection of some deity, who from his more elevated sacellum was supposed to overlook and patronise the banquet. That such was the destination of this edifice, and that it differed but little in its uses from that which the Greeks called Lesche, and the modern Italians a trattoria and coffee-house, seems to be rendered more probable by many of its internal decorations, while its proximity to the Forum, the chief resort of the inhabitants of the city, would point out this situation as the most eligible for a place of conversation and refreshment. Pausanias, in his account of Delphi, describes a building called Lesche, which, he says, was a place of meeting and conversation common in many of the more ancient cities of Greece, where, says Harpocration, citing Cleanthes, the Lesche was sacred to Apollo. In that was a temple, as in this at Pompeii, and the walls were covered with paintings, some of which represented the very personages repeated on the walls of the Pantheon of Pompeii. The Lesche of Lacedæmon was even called Poikilos, or painted, and as most of the smaller temples had little light these pictures must, like those of Pompeii, have been disposed on the walls of the portico or peribolus. The Lesche of Delphi, among other historical paintings had many Homeric subjects. Ulysses, Ariadne, Theseus, Penelope, Phædra, Bacchus and Æthra were among the personages represented there, and we find many of these on the walls of the Pompeian edifice, with other scenes taken from Italian history. It must be confessed that this coincidence of ornament proves little more than that the plans and decorations of many public buildings were not very dissimilar; as a portico surrounding a court with a more sacred portion at one extremity would be the characteristic of the greater number of them. That feasting, however, was the principal motive for assembling in the porticoes of Pompeii may be presumed from the subjects of many of the smaller paintings. The street which runs along the north side of the Pantheon from the Temple of Jupiter has been called that of dried fruits, from the number of figs, raisins, chestnuts and plums, fruits in glass vases, lentils, hempseed and other objects of the same kind found in the shops. Bread, scales, money and moulds for pastry were among the discoveries; and a bronze statue of Fame, of small size and fine work, with golden armlets. We find at the northern entrance—which has on a pilaster the name CELSUM, and near which was found a box containing an engraved stone set in a gold ring, with 41 silver medals and 1,036 brass coins—cupids employed in making bread or driving the ass, crowned with a wreath, that brought the flour. On the opposite side they are employed in making garlands for the guests. On

the wall at the southern entrance is painted a hatchet for cutting the meat; while hams, boars' heads, fish and other viands compose the picture. In other places we find geese, turkeys, vases full of eggs, fowls and game ready plucked for roasting, oxen and sheep, dishes of fruit and a cornucopia poured out, with a variety of amphoræ for holding wine and every sort of accessory for the banquet. To the evidence of the pictures may be added that of a drain or sink near the tholos or dodecagon in the centre of the court, which was found obstructed with bones of fish, and other indications of the remains of articles of food.

TESSERÆ.

The Towers of Bologna.

BOLOGNA is one of the most remarkable cities in Italy, and one at which any student in history should make a halt to examine it. Nowhere else can we see arcades and colonnades of three miles long; and the celebrated leaning towers are quite unique. The fact of their leaning over so much out of the perpendicular without falling is a proof of the strength with which they are built and the excellent mortar that was used; they also serve to illustrate an interesting chapter of Mediæval architecture and customs. There was once a tower to every house of importance in Italy; it was one of the marks of rank, but they were also important means of defence. The artillery of those days consisted of paving stones, and whoever could throw them from the greatest height had the most powerful castle. The bottom, or ground-floor, of these towers is frequently solid to make a secure foundation and to resist the battering-ram. The entrance was frequently on the first floor, and the steps drawn up (as in Irish round towers), and each succeeding storey could be defended in the same manner. When they had attained sufficient height, an arrangement was made to throw out on all sides a wooden scaffold or balcony, called a *hourd*, on which the defenders could stand and from which they could throw down large stones on the heads of assailants, and on which they could also probably fix catapults to throw them to a distance. Holes through a wall on the level of the floor, to pass the poles through, remain, so that a *hourd* could be thrown out at any time even now. Such scaffolds, resting on poles placed horizontally and passing through the wall, with sloping brackets under them to strengthen them, are in common use in Rome by the builders at the present time; a scaffold is seldom brought down by vertical poles to the ground after the first floor is built. These leaning towers are a tremendous height, each succeeding generation having carried them a storey higher in constant rivalry one with the other; he whose tower was the highest had the command of the others. The two that lean in different directions are higher than the others and near together, but were separated by a street and belonged to two different families. There are remains of many others of these towers in Bologna, and they are common in all parts of Italy.

The Aristion Relief, Athens.

In the Theseum stands the celebrated monument of Aristion. It is certainly as old as the Persian wars, if not older. But who was Aristion? We have no information of any kind about him; he is represented in the usual armour of a hoplite; he was an ordinary Athenian citizen. How completely, then, must he have already penetrated all the pores of Attic life, when a monument, ranking among the most perfect works of art, was erected to this simple man, neither eminent in point of rank nor distinguished by any memorable deed. It is in very low relief; all the older works disdain the slightest approach to statuesque rounding. The pillar, of Pentelic marble, is high and narrow, and the form, in conformity with the confined space, of slender but firm and vigorous make. The worthy hoplite strides onwards with slow and measured steps, his head bent a little forward, his mouth drawn into that good-natured smile which invariably appears in all the more ancient works of art. In his left hand he holds the lance, one end of which rests on the ground; his right hangs close by his side. The simple worth and manliness of the old Marathonian speak from every feature. The anatomic forms and proportions are so rightly understood, the muscles so vigorously thrown into prominence, the transitions and outlines so sharply and yet so finely given, and the cuirass and greaves which protect breast and shinbone handled with such a masterly feeling of their character as thin, flexible metal, yielding to every impression of the body, that the effect of this work is only the more powerful, the more clearly we see from the long, lean figure, the forced smile, and the methodically combed and curled hair of head and beard, that we have here to do with a production of an early and imperfect period.

Optical Delusions.

To make a building appear much smaller than it really is may be a proof of skill in the architect; but the English architects aimed at the opposite effect—to make it appear as large

and especially as long as they could, and the large number of small narrow arches produces a wonderful effect of perspective, and gives apparently endless length to many of the English cathedrals. This appears to give them a much finer effect to the eye, and to produce a more religious impression on the mind than the opposite extreme. In some of the Italian churches, as in Sta Maria Novella in Florence, the arches of the east end towards the altar are smaller and narrower than the others, the effect of which is still more to shorten the church to the eye. Perhaps one object of this is to fix the attention more exclusively on the high altar with its fine screen.

Stained-Glass at Winchester.

The earliest specimens of English glass at Winchester are the two fragments probably of a border worked in with other glass in the west window of the nave of St. Cross, and two other fragments of a border over the door leading into the refectory. All this glass is of precisely the same character, and to be referred to the beginning of the thirteenth century. A few small fragments of later Early English are at present contained in the cloister of the college. Two circles of early decorated glass are over the door of the refectory of St. Cross, and two or three more in the west window of the cathedral. They are composed of plain pieces of coloured glass, disposed in a geometrical pattern, and prove how much of the effect of early glass is owing to the texture of the material. It appears to have been the practice formerly to glaze the windows according to the progress of the work. Thus at York the Decorated glass in the aisles is earlier than that in the west window of the nave, and the Perpendicular glass in the aisles of the choir is earlier than that in the great east window. All the glass in the side windows of the College Chapel, Winchester, is modern, as well as that in the east, with the trifling exception of two small figures, the head of an angel, and four other little bits of glass in the tracery of the window. Considering the time when the glass in the east window was executed, it must be admitted to be a very good copy of the old. The art of making coloured glass was not so well understood then as now. Had the glass been copied now, it would only have been one degree better than it is. Its effect would still have been that of painted glass, exhibiting the drawing of the early part of the fifteenth century and the colouring of the nineteenth instead of that of the sixteenth. The texture of all modern manufactured glass, uncoloured as well as coloured, is identical only with that of the sixteenth century, and is totally different from the texture of earlier glass. The principle of adapting the execution to the material pervades all ancient and indeed all original manufactured work, and it is vain to imitate the drawing without also imitating the material in which the work is to be executed. Hence it is that modern encaustic tiles, whatever may be the date of the pattern impressed upon them, always appear to be of the date of the manufacture of the tile. The east window of the College Library is of the time of Edward IV., and was moved to its present position from the south side of the college chapel. The arms in the refectory at St. Cross are of the latter part of the fifteenth century. Those of Cardinal Beaufort are uncommonly fine. The glass in the east window of the cathedral choir is perhaps a little earlier than 1525, and is the work of Bishop Fox, whose arms and motto, "*Est Deo gracia*," are introduced into it. This window must have been a magnificent one, but it is unfair to judge of it in its present state, when so little occupies its old position in the window. The top central light is filled with glass of Wykeham's time, and all the rest of the window with glass of Fox's time. In point of execution the painted glass in this window is about as perfect as glass could well be. The library at the deanery contains some excellent specimens of heraldic glass of the time of James I. and Charles I., in which, however, the decline of the art of glass-painting is very apparent.

Roman Buildings.

The roof, says Winckelmann, was either entirely flat or more commonly had a flat timber-work (*combe*) or terrace. In private houses all the cornice, upon which the roof in part bore, was made of terra-cotta, and in such a fashion that gutters might descend by it. Lions' heads for spouts was an Egyptian fashion, according to Plutarch, because the Nile overflows when the sign is Leo. Other accounts say that at Rome the conduits of the gutters in private houses were, in general, made with boards. Roofs of plates of silver, brass, &c., often occurred at Rome upon public or private buildings. Pliny mentions one which was fastened without nails, and could be taken to pieces at option. Pigeon holes in the roofs were common. The ceilings of Egyptian temples were either of slabs of stone, or sculptured, like the famous planisphere at Tentyra. The Greek temples at Athens had ceilings composed of marble slabs in compartments, and in the Temple of Minerva at Syracuse the long stones which connected the columns with the outer walls formed a ceiling in the style of a platband around the peristyle of the building. The ceilings of the most ancient temples were of wood, sometimes cedar or cypress, or vaulted. Those of

apartments were horizontal, of wood, and when they were formed only of planks, of which they covered the joists, they were named by the Greeks *phatnomata*; but when they had ornaments in square compartments (*renfoncés*), like those still in use in Italy, they were called *laquearia*. Those which had no ceilings or panels (*renfoncés*) were, in general, ornamented with works in stucco, as in a bath near Naples, with Venus Anadyomene, the Tritons, &c. The figures and panels were often gilt. Chambers which had no ceiling were vaulted with reeds bruised and flattened. The square temples, says Winckelmann, have, in general, no windows, and receive light only by the door, in order to give them a more august air by illuminating them with lamps. Some round temples have a circular aperture at top. In houses the windows were in general placed high, very small and square; tiers of them occur at Pliny's villa at Laurentum. The *valvate fenestra* were also windows from the ceiling to the floor. Glazed, and even bow windows have been found at Pompeii, but they were mostly closed with curtains, wooden shutters, or lattices hung upon hinges. It is not, however, true that the houses had no windows towards the street, though it was very unusual.

Salisbury.

The city of New Sarum, or Salisbury, unlike most other English towns, has its origin well defined and its prominent historic annals duly recorded. It has nothing Roman, Saxon or even Norman in its early annals, and is therefore distinguished from every other city of the kingdom. Of truly English origin, of unprecedented uniformity in plan and arrangement of parts, with a provision for cleanliness and healthfulness, Salisbury may be considered as peculiarly indigenous, unique and admirable. While every other city of England has or had its castle, and claims either a Roman or Saxon origin, we know that New Sarum was commenced under the auspices of a bishop, that it grew up under ecclesiastical, not baronial power and protection, and that though it was surrounded by fortified walls, it never had a monarchical or baronial fortress. The prefix "New" shows that there was an anterior Sarum, which obtained the name of "Old" when a younger and a new town was established. Old Sarum, about one mile north of the modern city, was probably at first a British town, and evidently a Roman station and fortress. At this city William the Conqueror "summoned all the estates of England and Normandy to swear allegiance to him, and to introduce one of the most remarkable changes that ever happened" in the English constitution—the establishment of the feudal system. In consequence of disputes, of "brawles and sadde blowes," as Holinshed states, between the clergy and the castillans, or men of war, the bishop and his associates removed their residences to a fertile valley at the junction of two rivers. There they built houses and commenced the present magnificent cathedral in the year 1220. In October 1225 an immense concourse of people assembled at the new city to dedicate three altars in the cathedral, and the bishop entertained several archbishops, bishops, barons, &c., at his palace. At this time the king had a palace at Clarendon, in the vicinity of Salisbury. A charter was granted by King Henry III., in the eleventh year of his reign, who therein states that he laid the first stone of the cathedral. "At this period an arrangement was made relative to the disposition of the buildings in the new city. The ground was divided into spaces or portions, each containing 7 perches in length and 3 in breadth, and these were again subdivided for the advantage of settlers." Such was the origin and first establishment of Salisbury, and that it was systematically laid out and regularly built may be inferred from the present arrangement of its streets. Differences and contentions, however, arose between the citizens and the prelate, the latter having paramount authority, and the former fancying that they could live and prosper better without ecclesiastical protection or influence. A year's trial convinced them of their error, and they again sought the aid and became subject to the bishop. In the time of Edward II., about 1315, they obtained a license to fortify their city with a rampart and ditch, and from remains of walls, &c., which were standing about a century back, it is evident that Salisbury was nearly of the same extent at the commencement of the fourteenth century as at the end of the eighteenth.

Greek Measures.

We have no ancient measures by which to determine the length of the Greek foot, but we have the general testimony of ancient writers that it was to the Roman in the ratio of 25:24. The Greek stadium, which contained 600 Greek feet, is said by Roman writers to contain 625 Roman feet, and also a Roman mile, or 5,000 feet, was reckoned equal to 8 Greek stadia or 4,800 feet; both of these calculations give the above ratio of 25:24. If therefore the Roman foot was 9708 of the English, the Greek foot was equal to 101125 English foot or 12135 inches. This value is confirmed by the measurement of the Parthenon. "Stuart," says Mr. Hussey, "measured the upper

step of the basement of the Parthenon, which is the platform on which the pillars stand, and is exactly that part of the building where we should expect that the measure would have been taken, if the name Hecatompodon was really given it on account of the dimensions. He found the width of the front to be 101 feet 17 inches, the length of the side 227 feet 7.05 inches, and since these two quantities are very nearly in the ratio of 100 to 225, he inferred that the two sides really contained these two numbers of feet. From this he calculated the value of the foot, from the front 12137 inches, from the side 12138 inches; of which the greatest exceeds the value given above by only .003 of an inch." Other measurements of the Parthenon and of other buildings at Athens tend to the same result. Strabo, however, quotes from Polybius a calculation which would make the Greek and Roman foot equal, but it is perfectly clear that there is a mistake in this statement. Plutarch again says expressly that the mile is a little less than 8 stadia, which would give a rather smaller ratio than that of 24:25 for the ratio of the Roman to the Greek foot. It is on the authority of this passage that Böckh gives the value above mentioned for the Roman foot. If, according to the supposition already noticed, a slight diminution took place in the Roman foot, this would account for the difference. But perhaps we ought not to consider this solitary passage of sufficient weight to influence the calculation. The Greeks used different standards at different times. The foot which generally prevailed over Greece was that by which the stadium at Olympia was measured, which was the one which we have been speaking of, and which was therefore the same as that used at Athens in her best days. Hyginus mentions this foot as being used in Cyrene under the name of Ptolemeius.

Duties of Clients.

It behoves an employer not to rush into building rashly. He must first feel a real and definite want and he must work out for himself the problem of what it is that he may with great propriety want. It would be obviously as ridiculous for a country clergyman in need of a modest parsonage house only to want a princely palace as for a nobleman of the highest social position and unbounded resource to propose to content himself with so humble a structure for his own accommodation and for the support in a fitting manner before the world of an hereditary dignity. Having clearly realised what it is that in the way of structure will best suit his needs and accord with his practical or æsthetic necessities, he must endeavour by comparison with what may have been done by others to ascertain approximately the probable cost of something like what he will require, and he will then be wise if he sets himself to provide the requisite funds, leaving a fair margin for contingencies of which he can form little or no estimate. It is at this stage that he will do well to select his architect, and he must look, if he would have his work satisfactorily done, almost as much for moral as for artistic qualifications. He should not call to his counsels a man of whom he cannot make a friend. He should with openness explain to the architect he may select his own views and necessities, but he should by no means be so far wedded to them as to be unwilling to receive, should it be necessary, a clear demonstration of any points of error of judgment into which he may have fallen with respect to them. On essentials, provided that they commend themselves to his reason as essentials, he should be entirely unyielding to his architect, within whose power it should be left to amplify or give an improved form to the supply of those necessities, but by whom the employer should never allow himself to be "talked out of" the omission of what he may consider to be indispensable to carry out the object for which he desires to call the structure into existence. It is this very reasonable firmness on the part of employers which forms the most valuable check against the possible domineering of an empiric. The possession of professional knowledge is always a snare to humanity and a temptation to dictate too arbitrarily. The architect himself is frequently under the domination of the traditions of his craft, and to give him a wise and clear programme in accordance with which he must frame his ideas of design is often to inspire him with the best elements for legitimate novelty and wise innovation upon effete precedent.

The Panathenaic Frieze.

When sculpture is only an agent, as it is in the frieze and other parts of architecture, its effects of chiaroscuro should become subordinate, and, like every other member, appear only as a co-operative part in the general effect of the whole building. This will be found to be the true reason for what may be thought the imperfect, inartificial mode of execution which was adopted in the bas-reliefs of the frieze on the Temple of Minerva at Athens. The figures which were intended to appear nearest the eye are inclining to the flat; they have, comparatively, the least convexity, and come off from their ground in a bold, square and detached way, with a rilievo similar to that of the triglyphs and pateras ordinarily used in those situations. Thus the lights being larger and less

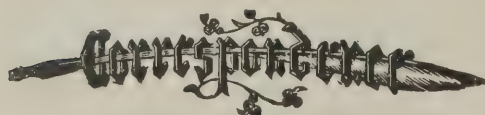
broken, the whole appearance of those advanced objects is comparatively more preserved and distinct than the others, and the effect proper to the occasion is perhaps better obtained than it could have been in any other way. If these works were, from architectonic and optical considerations, solely calculated to produce their effect in a certain given situation distant from the sight, it can be no wonder, nor is it any imputation of want of skill in Phidias or his workmen, that they should appear very differently, and much wanting when brought near the eye into a situation the reverse of that for which they were intended. Had they been calculated for the panels of an arched way, almost on a level with the spectator, like those beautiful bas-reliefs in the Arch of Titus, there can be no doubt but that a style of execution directly the reverse ought necessarily to have been adopted, and would have been adopted, for the knowledge which influenced the conduct of the artist in the one mode does actually imply the cognisance of the other. This procedure, where the most advanced objects are kept comparatively flat, naturally produces a broad light on those advanced objects, with smart shadows or touches about the arms, eyes, nose and other associated projecting and engraved parts, which are relieved and well set off by the more interior figures, in consequence of their being more rounded, and thereby affording a greater quantity of middle tint and scarcity of light.

Protection against Fire.

There were persons at Rome, called matricularii, appointed on purpose to extinguish fires; and Du Cange says that they carried sponges with irons, and other iron instruments by which they could go from wall to wall and so extinguish the fire. He adds that the ama was a water vessel, used for putting out fires, mentioned by Juvenal and Pliny; but Holstein contends that the ama was a very large hook or grapple fixed at the end of long poles, such as are now used for extinguishing fires. A very old method of putting out fires was by cutting away with axes and throwing buckets of water; and this is mentioned both by Petronius and Gervase of Canterbury. Watchmen against fires were instituted by Augustus. It had before been the care of the ædiles. In the Middle Ages women used to fetch water in brazen pails to assist, and the pall of the altar was brought out. In 1472 a night bellman was instituted at Exeter to prevent fires and felonies; and in 1558 leathern buckets, ladders and crooks were ordered to be provided. It was also anciently usual to fine for houses or chimneys on fire; the students in universities forfeit their caution money. At Shrewsbury in 1664 it was ordered, for want of ladders, to take down May-poles and make some. The cry of fire occurs in Apuleius.

The Roman Lararium.

The Lararium was a place in the inner part of a Roman house which was dedicated to the Lares, and in which their images were kept and worshipped. It seems to have been customary for religious Romans in the morning, immediately after they rose, to perform their prayers in the lararium. This custom is at least said to have been observed by the Emperor Alexander Severus, who had among the statues of his Lares those of Christ, Abraham, Orpheus and Alexander the Great. This emperor had a second lararium, from which the first is distinguished by the epithet "majus," and the images of his second or lesser lararium were representations of great and distinguished men, among whom are mentioned Virgil, Cicero and Achilles. That these images were sometimes of gold is stated by Suetonius. We do not know whether it was customary to have more than one lararium in a house, or whether the case of Alexander Severus is merely to be looked upon as an exception.



Procedure at the R.I.B.A.

SIR,—The meeting at 9 Conduit Street yesterday evening was pre-eminently a characteristic one—redolent of the early days of the present Council, some time ago now—and worthy of its traditional treatment of Associates.

The Council and its followers came with the fixed determination, evident in every feature, to preserve to the bitter end an unruffled front. The third chairman of this one-subject discussion certainly gave little opportunity for a fair and square fight, and two or three of the old and well-tried sticklers for soft phrases and buttered adjectives turned up, after a somewhat prolonged and regrettable absence from the meeting-

room, to give him the benefit of their ancient experience in quelling turbulent spirits.

The case which I wish now to place before the profession is this:—

The Council brought forward certain resolutions with reference to the election of Fellows.

A question arose as to whether Associates could vote on those resolutions, having regard to Clause 28 of the Charter.

The chairman at the meeting of June 14 (page 393, *Journal R.I.B.A.*), after reminding Associates of Clause 28, ruled as follows:—That "if, however, when the report was put as a whole, they (the Associates) objected to any part of it, Associates could then exercise their right of voting against its adoption."

The *Journal*, p. 394, states as follows:—"The motion for the adoption of the report as modified was then put, and carried by a majority of 19—44 voting in favour and 25 against."

By-law 62 states, *inter alia*, as follows with reference to a resolution affecting a by-law:—"If the same be supported by a majority of at least two-thirds of those present having a right to vote and voting thereon."

Now, Sir, I contend that the ruling of the Chairman gave Associates the right to vote on the report, and they voted, the result being that the two-thirds majority required by by-law 62 was not obtained; 46 votes were required and only 44 secured. It can surely never be contended that when the Chairman gave his ruling he was trifling with the Associates, and proclaiming peace when there was no peace. Then the alternative is that the whole proceeding is null and void, and must be, to become operative, gone through entirely again.

It is this, of course, which the dear old Council cannot contemplate with equanimity; it is this which threatened to moisten the starch of the unruffled front, and it is this which we Associates should do our best to put right. Personally, I have no objection to placing in the hands of the Council the election of Fellows as they desire. I have, as I stated in the room, confidence in their integrity in that respect; but I protest strongly against this transparent desire to shuffle through a mistaken procedure.

Clause 33 of the charter terminates as follows:—"Provided always that no such by-laws (this includes alteration of by-laws) shall be of any force or validity whatever unless and until they have been approved by the Lords of the Most Honourable Privy Council."

What we have to do, therefore, is to bring formally before the Privy Council the facts of the case, and to ask that the request of the Council to add to the by-laws as they desire be not complied with.—I am, sir, your obedient servant,

13 Southampton Street, Strand: WM. WOODWARD.
July 13, 1897.

GENERAL.

A Universal Exhibition is to be held in Liège. The date has yet to be fixed.

A Party of Mexican archaeologists have, it is said, discovered Chinese inscriptions on the ancient monuments in the Magdalena district of Sonora. There is a Chinese tradition that 2,000 years ago an exploring expedition found its way to the west coast of Mexico.

A Discussion on "Architectural and Decorative Art in the Service of the Church," in which the Rev. W. H. Draper, the Rev. Dr. Cox, Sir W. B. Richmond, R.A., and Mr. R. Hallward will take part, is to be among the proceedings of the forthcoming Church Congress.

The Prince of Wales has presented the drawing *Summer Slumbers*, by the late Lord Leighton, exhibited last winter among his works at Burlington House, as an addition to the collection of sketches which have been secured for the nation, and which are now being hung on the walls of the late president's house in Kensington.

Mr. J. Wright, of Derby, has taken Mr. T. H. Tomlinson into partnership, and the firm will be carried on under the style of Wright & Tomlinson.

Mr. Charles Holroyd has been appointed by the Treasury to be Keeper of the National Gallery of British Art, the gift of Mr. Tate to the nation.

It is Proposed to erect a new porch at the south entrance to the Abbey church at Sempringham, near Billingborough, as a memorial to the Queen, who is lay impropriator of the parish and joint patron of the living. The ancient door, which is covered with ironwork, said to be of Danish origin, is in need of protection from the weather, and the proposed scheme will prevent its further decay. One feature of the new porch will be that a handsomely carved Norman archway, which was removed from the church many years ago, and used in the construction of a dovecote at Spanby, will be restored to its original position.

The Architect.

THE WEEK.

AMONG the addresses presented to the Prince of WALES at St. James's Palace as representing the QUEEN was one from the Society of Architects. It was accompanied by the President, Mr. ROBERT WALKER, J.P., of Cork, Mr. WALTER EMDEN, J.P., L.C.C., Mr. HENRY LOVEGROVE, A.R.I.B.A., Major F. S. LESLIE, R.E., Mr. EDGAR FARMAN and the honorary secretary, Mr. ELLIS MARSLAND. The address was as follows:—"The President and Council of the Society of Architects humbly approach the Throne that they may, with other of your faithful subjects, offer with profound respect their loyal congratulations on the celebration of the sixtieth anniversary of your accession to the throne of your ancestors. In your Majesty, as in your illustrious husband, the lamented Prince Consort, the arts have ever found a noble patron, and the Council is therefore emboldened to hope that your Majesty will graciously accept this humble address in the name of the Society of Architects. That it may please the Great Disposer of Events to prolong your Majesty's glorious reign, and to grant you every blessing, spiritual and temporal, is the fervent prayer of your Majesty's obedient and faithful subjects." The address had been illuminated under the superintendence of Major LESLIE. With it was a list of members, bound in vellum and gold, containing as a frontispiece a portrait of the president, Mr. ROBERT WALKER. The Prince handed the following reply to the deputation:—"On behalf of the Queen, my dear mother, I thank you for your loyal and dutiful address, and for the affectionate congratulations which you tender on the completion of the sixtieth year of her reign. It is a source of profound joy to the Queen to receive the expressions of devotion to her person and family which are offered by her subjects throughout the empire. She is gladdened by the thought that the sixty years of her reign have been years of progress in knowledge and of increase in prosperity. And she prays that, by the blessing of Almighty God, she may always live in the hearts of her loving and beloved people."

7 SOME important additions to the remains of Roman Chester have been made during the week. In the excavations for a new shop in Northgate Row the base of a large column was found in its original position. It is of native red sandstone and rests upon the natural rock, some 2 feet below the level of the present street, and almost in a line with the west side of Northgate Street, which some archaeologists have contended follows the line of one of the ancient Roman *vias*. The block is 4 feet 6 inches square, with a base moulding 15 inches thick worked upon it, and is in a good state of preservation. The diameter of the column is shown to have been 2 feet 10½ inches, or 3 Roman feet, of 11·6 English inches to the foot. A day or two after the base was discovered a column—if not the identical column belonging to this base, certainly one of the series—was partially unearthed. It is lying in a horizontal position a few feet from the base, with a modern party wall built across it. A few Roman coins, also in a good state of preservation, have been found upon the site. The columns which stood upon this and similar bases must have been equal to eight, if not nine diameters, or 24 or 27 feet in height, and there must have been at least two, but more probably four or even six, of them if, as appears likely, they formed the front of a Roman basilica or temple, and the building generally must have been of very imposing proportions. At present it is impossible to say whether these columns formed the east or west front of such an edifice.

ON Monday a case which should serve as a warning to architects was tried at the Bristol assizes. It was another example of how little value is now attached to one's acting as well as judging and experience dictate. The plaintiffs, ROGERS & Co., Limited, who are brewers in Bristol, opened a branch on the Power Estate, in Newport, Mon. Mr. WATKINS, the defendant, is an architect practising in the

latter place, and he was asked to estimate the cost of a new building. It appears he returned the sum as between 600*l.* and 700*l.* The actual cost of the building was 1,163*l.* 17*s.* The plaintiffs brought their action to recover a sum equivalent to the difference between the two amounts, viz. 463*l.* 17*s.* The defendant said he worked out the cost at 5*d.* per cube foot, and it made 674*l.* He found it ought to have been 7*d.*, which would be about 900*l.*, and he wrote stating this. He wrote the letter at his house, and the letter produced was the original from which he wrote the letter to the plaintiffs. No mention was ever made to him as to the limit to the price. He admitted he made a mistake in his first estimate. Mr. Justice DAY, who heard the case without a jury, said he was not satisfied that the defendant had informed the plaintiffs about the extent of the expenditure, and that was negligence. His lordship assessed the damages at 150*l.* Mr. WATKINS had claimed 56*l.* commission on the amount expended, but the sum was reduced to 35*l.* A verdict for 115*l.*, with costs, was, therefore, given for the plaintiffs. It will be observed that the defendant has been doubly punished. His commission was not determined by the amount of expenditure, and he has had to contribute a large sum towards that expenditure, as if he had bound himself that his estimate would not be exceeded. In fact, Mr. WATKINS had stated that a large amount would have to be met, but apparently the letter went wrong in the post.

THE Louvre will have to be furnished in order that it may be worthy of its reputation when the world visits Paris in 1900. M. REDON, the architect who was lately placed in charge of the buildings, has therefore an onerous task. The dome of the Pavillon Denon has become dingy owing to the neglect of the metal-work, and his operations have commenced with it. Within the building the escalier Daru, which has a chilling appearance at present, will have a new balustrade, although it may be only of cement and white marble steps for a part of its length. The Salle des Etats will be completed and rearranged. There will be a central salon assigned to the works of RUBENS, and fourteen smaller rooms branching from it, where Dutch and Flemish pictures will be exhibited. But when are we to see an English salon in the Louvre that will be worthy of its title, or, in other words, with examples of the best English masters?

THE annual excursion of the Surrey Archæological Society will take place on the 28th inst. The places selected for visits are Epsom, Walton-on-the-Hill and Banstead. Mr. J. L. ANDRÉ, F.S.A., will read a short paper on "English Lead Fonts" in Walton-on-the-Hill Church. The Roman villa at Chussex Plain and various small entrenchments or camps on the Heath will be examined. Banstead Church will be described by Mr. F. A. HEYGATE LAMBERT, F.S.A. Mr. RALPH NEVILL, F.S.A., will relate the history and associations of "The Oaks." A collection of pictures, books and other objects of local and historical interest will be exhibited at Garratt's Hall, Banstead. Mr. M. S. GIUSEPPI will read some notes on Burgh Heath and its connection with HUBERT DE BURGH. The programme promises an interesting day for archaeologists.

THE phrase "town and gown" does not suggest in England philanthropic enterprises. In Edinburgh "The Town and Gown Association" is a limited company having for object the erection of students' residences, workmen's dwellings and the like. The Association has existed only a year, but it does excellent service and has paid a dividend of 4½ per cent. to the shareholders. Whether the success is owing to the absence of an architect from the staff we cannot say, but it is unsafe to meddle with new or old buildings without the help of an expert, and the Association may have to pay dearly for its temerity in trusting to solicitors, bankers, auditors and secretaries for advice on constructional questions. It is claimed that experience in many directions has been acquired and economies in management have been introduced, but do the words signify that there is no need for an architect's services? It is said the whole organisation steadily progresses, and with the aid of increased capital a much greater and wider activity will be possible.

AN INVENTORY OF ANCIENT SCULPTURE.

ACCORDING to the reckoning of OBERLIN, there were at one time in Rome about 60,000 statues; BARTHÉLEMY did not hesitate to make the number 70,000, and later archæologists who have tried their hands on arithmetical calculations have arrived at more astonishing results. Believers in the power of Roman acquisitiveness will say the number is underrated. But if we assume that Rome does not now contain more than 2,500 examples of ancient art, which is a very liberal estimate, the question then arises, How has it happened that so small a percentage has been preserved? The invasions of the Eternal City will be said to be among the principal causes of the destruction, but barbarians were not likely to be more disposed than modern men to find a recreation in stone-breaking. There is generally more agreeable work awaiting conquerors, and more amusement would be found in the defacement of statuary than in demolition.

A little consideration will show how little reliance is to be placed on the estimates of OBERLIN and all who have followed him. In the sixteenth century there was a sort of official inventory of all the pieces in Rome which could be considered as examples of antique sculpture. The number was found to be 531. By adding the torsos and headless objects of any value, it was found there were in all barely 700 perfect and imperfect works to represent ancient art. Then followed continuous explorations, and many statues, busts and reliefs were discovered which had been preserved in the soil of Rome. But there were years which were not productive. Some of the treasure-trove was smuggled out of Rome and adorns other cities. But in all Europe and Rome it would be difficult to enumerate more than four thousand marble statues of any value. As for bronze statues, it is not easy to find a hundred of them. These facts will explain the cause of the monotony of museums of casts, as well as of the illustrations which appear in histories of sculpture.

We assume that repetitions are not to be counted. The ancients did not possess machines, but they held possession of industrious slaves, who were no less competent to produce copies. Works of that class are not worthy of figuring in a catalogue of sculpture. They are different from works which to the uninitiated may appear to be copies because they are evidence of fidelity to some antique type, and from the variations, however slight, we can measure the progress of evolution in the art. The crowd of direct or debased copies, the handiwork of mere journeymen, should be eliminated in any survey of sculpture in which excellence is an essential quality. These works are now to be found mainly in museums, for although the majority among them were intended for exhibition in the open air, they have become too precious to be left at the mercy of the atmosphere.

Our annual exhibitions, and the continual necessity of endeavouring to tempt amateurs to give commissions, have made sculptors productive, and as a consequence it is imagined that the ancient sculptors were the authors of numerous masterpieces. Modern writers who treat of sculpture have somehow a pleasure in always speaking of works in the plural, and in this way carry on a delusion. For it is astonishing how many sculptors have gained renown by one or a few works. The name of BATHYCLES of Magnesia is associated with a throne of APOLLO; HEGESIAS is known by figures of CASTOR and POLLUX; DAMEAS by a statue of MILO; ARISTOCLES by a group representing a contest between HERCULES and an Amazon. The fame of PTOLICHUS rested on a statue of a boy, and HIPPIAS is known only through a similar work. The chief work of CALLIMAKOS, according to some authors, was a Corinthian capital. All that could be related of POLYCLES was "Hermaphroditum nobilem fecit." Tradition did not ascribe to GLYCON any other work besides the Farnese HERCULES; MENOPHANTOS became celebrated by a copy of the *Venus of Troas*. Three sculptors gained renown through the *Laocoon*. It would be easy to refer to many other cases to show that quality rather than quantity was enough to captivate the Greeks. There were sculptors who no doubt executed several works, but of late years critics have grown sceptical of the records unless there is uniformity of quality or characteristics in each case. The fame of PHIDIAS is in consequence bedimmed, and he is supposed

to have been an inspirer of other sculptors rather than an executant, because of the multiplicity of works with which he is credited. There were many reasons for deliberation with the sculptors. The production of a noble statue was an auspicious event in Greece; the immortals were supposed to have some share in it, it had to sustain public criticism, and the author was liable to pains and penalties if he were considered to have erred against the sacred traditions. The Greek sculptors would have been happy if there was no more severe tribunal than is made up by modern newspaper critics. From all we have said the scarcity of masterpieces may appear less remarkable. The Greeks were not compelled to make money as expeditiously as is now the case; they could wait for inspiration to arrive and they had confidence that their countrymen were able to appreciate niceties in form and arrangement which would be unobserved by eyes less keen and instructed.

But if masterpieces are less numerous than is commonly supposed, what is to be said about those which are unrestored or have no need of restoration? That is a subject which by a tacit agreement is avoided. If the rule which is sometimes recommended to architects in restoring buildings were applied to sculpture, that is, by making additions and alterations manifest to all observers, every collection of ancient sculpture would become a horrible sight. Fancy all the reparations in yellow or blue or other colour which would make the process plain to the simplest rustic. All those rigorous censors who are so opposed to restoration that, like Alderman CUTE, they appear to have resolved to "put it down," forget that the office of art is to give pleasure, and as people do not care for acrobats with wooden legs or arms, although performers of the kind find temporary acceptance from their novelty, we cannot expect them to delight in maimed buildings, statues or pictures.

As people do not comprehend either the number of ancient masterpieces which have survived or the extent of the restorations, it would be an advantage if an impartial survey of the sculpture galleries in modern museums could be prepared. Something of the kind was attempted by MÜLLER, but it is not a task for an individual. A lover of sculpture is sure to be carried away by human weakness, and will over-estimate or under-estimate the value of a work according to his mood. In the same way the officials of a gallery are apt to believe that there is some connection between their dignity as compared with officials elsewhere and the works they have in charge. Hence it is that so little reliance is to be placed on the catalogues prepared by them. What is needed is some inventory which would embody the conclusions of a sort of international jury, and which could be accepted as representing the results of investigations which have been in progress since the sixteenth century. If all the examples which can be considered as having qualities which are worth appreciation were photographed from several points of view and copies attached to the inventory we should then have a clue to the signification of ancient sculpture which is not afforded by the histories or catalogues which are now employed as guides.

ELECTRICAL DISTRIBUTION SYSTEMS.

THIS subject is becoming one of great importance to borough engineers, and, in fact, to all the officials connected with municipalities that are introducing or considering the introduction of electric lighting, and there are many points upon which engineers and surveyors can render great assistance to the electrical engineer, that they should endeavour to become acquainted with. One of these points which may be mentioned is the construction of underground transformer chambers.

The above subject was brought before the Municipal Electrical Association at their annual meeting by Mr. J. A. JEKELL, borough electrical engineer, South Shields, and also by Mr. J. A. BLAIKIE, chief assistant electrical engineer, Bristol. Mr. JEKELL deals with principles chiefly, Mr. BLAIKIE with details, and in the latter there are many points of interest in connection with underground boxes and sub-stations.

Considering Mr. JEKELL's paper first, we find at the very commencement a point which is pressing itself more and more to the front. The matter refers to

tenders and specifications in connection with local authorities. The question of the lowest tender is brought up, and Mr. JEKELL says that the lowest tender is not the best to accept, but the one which in the opinion of the engineer offers the best value for money, irrespective of the amount of tender. Mr. JEKELL, it seems to us, has supplied the retort to his own contention when he says, "Thus we find every reason why there are likely to be as many different opinions about systems as there are engineers, and even more, because it may happen that an engineer may be an advocate of one system to-day and another a short time hence." It appears from this then that the judgment of the borough engineer is not so very trustworthy, and is, to say the least of it, rather arbitrary. What, then, is the remedy for the complaints of contractors who have had their tenders rejected on the personal preference of the engineer for another contractor's system?

It is certainly very unfortunate that this personal preference should be allowed to reject on principle a tender which comes within the specification. If a borough engineer (electrical or otherwise) wishes to exclude certain systems or plant, the specification should be drawn up definitely to do this; but to issue a broad specification, invite tenders, and then only consider the one which the borough engineer prefers is certainly a very doubtful proceeding. It opens the way for much corruption and scandal, and will shake the public faith in the author. From another point of view it is advisable to draw up strict specifications. Contractors have plenty of preliminary expenses without putting them to the trouble of preparing estimates when it has already been decided to reject them, whatever the price. Such rejection often entails a quite unjust loss of reputation, and also as a firm has to prepare useless tenders it must raise its price to make up for the increased expenses. If a specification is properly drawn up, and the engineer knows and is not afraid to say what he wants, the lowest tender is surely the best, unless the firm is one which is known to shirk its responsibilities.

The author rightly says that no one would use high tension when he could use low, and the higher limit of pressure now allowed by the Board of Trade for low-tension systems (220 volts) will, he says, doubtless come into more general use, especially on account of this pressure being suitable for traction work, the combination of which with central stations is becoming one of the foremost characteristics of municipal electrical supply. The greater simplicity and reliability of the low-tension system, the fact that accumulators can be charged, and that the motors are better, all have an effect on the load factor and economy of the station.

The high-tension direct system is recommended as being good for reaching outlying districts which are in themselves fairly compact.

The high-tension alternating system is, of course, recommended for scattered districts, and but for this system many places now enjoying the electric light would be in darkness.

Whenever alternating current systems are used the question of sub-stations comes to the fore, and some space may be devoted to it, as it is of interest. The essentials of a good transformer chamber or sub-station are that it shall be dry, well ventilated and not subject to condensation of moisture from the atmosphere. Mr. JEKELL considers that if the transformers are to be underground, they should be placed in iron cases direct, and we feel inclined to agree with him. As the author correctly says, the system is beautifully flexible, economical and cheap, while it is eminently safe.

The combination of accumulators with alternating-current systems is advocated as being a means of improving the load factor. Mr. JEKELL further investigates the losses in the mains with various systems, and also the systems of mains. A very practical point, and one of great importance, is that "a cable, however good, may be irretrievably damaged by being badly laid and badly handled, and many of the faults which are put down to faulty manufacture are really due to bad laying. Gentlemen who have not had much experience in cable laying seem generally to think that anybody can lay a cable. Everyone who has had a wide experience, however, knows that this is a very erroneous idea." This passage from a man of good experience shows the necessity of those not specially trained to engage com-

petent electrical engineers to undertake their electrical work. They may have a general knowledge of the subject, but not sufficiently practical one.

Mr. BLAIE, in his paper, as before mentioned, deals more with details than principles, so it need not be dealt with so fully, although to the electrical engineer it is of the greatest interest. It is with details that electrical engineers are now mostly concerned, the principles having already been fairly fought out, at least for the present. Mr. BLAIE very rightly points out that overhead wires should be permitted by the Board of Trade, especially in small country towns, as they would enable a supply to be given when otherwise it would be impossible owing to the cost.

A very useful table is compiled, showing the proportions of various cables in use in Great Britain. Twenty-two stations use bare copper mains, 38 india-rubber, 8 bitumen casing, 8 solid bitumen and 56 lead-covered and armoured. The great increase in the use of lead-covered cables for mains is commented on and the reasons discussed. These reasons are chiefly that they have been found to be reliable and cheap, and we look for a still further extension of the lead-covered cables for all electrical work.

The author goes very fully into the question of transformer pits or sub-stations, and says:—"The first difficulty is to make such receptacles or chambers watertight, the next to insure their being free from gas, either leakage from gas mains or the explosive product of electrolysis; and thirdly, to keep hygroscopic insulators or walls from falling below the temperature of the air. Moisture in air does not matter unless it deposits." Here is a problem which we can commend to architects and borough surveyors. Any one who can comply with the above conditions and the condition of cheapness will earn the gratitude of electrical engineers. Various modes of construction are mentioned. "The commonest plan is to build double walls, have a space of from 1 to 2 inches in between filled with hydraulic cement, bitumen or pitch. In some instances these walls are 4½ inches and others 9 inches. Chambers about 7 feet by 7 feet by 6 feet inside of this type cost from 50% to 60%. Puddled clay outside the walls has been used, but the cost is not given.

"Cement concrete, having asphalte lining, costs about 70%; cement concrete, heavily faced with cement only, 28%; good dense bricks, laid in cement 18 inches thick, cost about 65%. One of the latest methods and the cheapest is the use of concrete with glazed tiles, having an L-shaped section. A glazed surface with fine cement joints makes an ideal watertight structure; the cost is about 25%." The author points out that the roof is an important detail, as the changing differences of temperature between the inside and outside tends to make the roof "sweat." A brick arch has the advantage that the water runs down the sides instead of on to the apparatus. The use of wood in a roof is recommended. "With a view to keeping the roof dry, independent of ventilation, some roofs have been constructed in the following manner:—One-inch flooring boards treated with creosote are laid on 2-inch by 3-inch joists (wood), over this is laid sheet roofing lead with soldered joints quite flat, and the edges well over the outside of the walls. Sand to a depth of 2 inches is laid over the lead and then iron joists and concrete. The wood being non-hygroscopic keeps the inside dry. It could not do any external damage if by any extraordinary means it should take fire." Artificial ventilation is condemned, as the heat of the transformers should be sufficient. The best ventilation is by means of two pipes led to about 6 inches above the pavement level, one from the top and the other from the bottom of the chamber. Tables are given showing the differences of temperature actually existing, the greatest being about 35 deg. F.

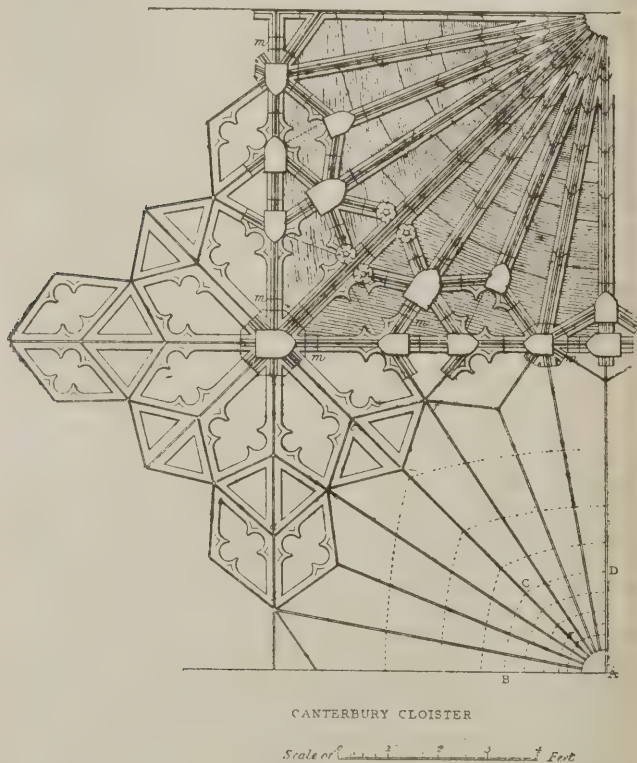
The rest of the paper deals with purely technical matters of interest only to central station engineers, and need not be discussed here.

H.E.H. the Princess Louise (Marchioness of Lorne) opened the new buildings in connection with the Grosvenor Hospital for Women and Children, Vincent Square, Westminster, on the 21st inst., to which new special hospital and out-patients' department Messrs. Roumieu and Aitchison are the hon. architects.

CANTERBURY CATHEDRAL.—IV.

CANTERBURY CATHEDRAL continued to be a part of "the Priory of Christ Church" until the sixteenth century. Unlike most of the monastic establishments, it was not suddenly suppressed in the reign of HENRY VIII. There was a show of method in the transaction. The procedure adopted was curious. First, certain festivals which were celebrated in harvest-time were prohibited. Then the Feast of St. THOMAS was abolished. A year or two afterwards, by the King's orders, he was declared to be unworthy of being considered one of the saints, as he had been unfaithful to his king. As a consequence, his images and pictures were ordered to be removed from all churches. The degradation of the patron was followed by proceedings for the dissolution of the priory. A commission was formed, consisting of nine members, who were directed to take possession of the monastery, to make an inventory of all goods, chattels and other property, and to remove all jewels, plate and money, which were to be surrendered to the master of the jewel-house in the Tower of London. From the time of LANFRANC, the prior of the monastery held a position that was similar to the dean in other cathedrals, but after the dissolution a chapter was organised.

The cloisters, without further evidence, would be enough to prove the connection of a monastery with the cathedral. What we see are among the works constructed in the beginning of the fifteenth century. Probably they are on the site of the early cloister along which BECKET walked to his doom. His aim was to die at the high altar in the choir, and he would not listen to those who suggested that he should seek safety in the crypt. Accordingly, he would not allow the doors in the cloister to be secured against his foes. Having passed along the cloister and through the transeptal chapel he ascended the steps towards the choir. But when he heard the knights calling for the traitor the archbishop came back and met them in the chapel. He stood against a pillar which no longer exists, and there he died.



The vaulting of the cloister is elaborate, and when the seven hundred shields were emblazoned in proper colours must have offered a fine spectacle to all lovers of heraldry. The system of construction, although it appears to be intricate, is considered by Professor WILLIS to exhibit as little system as a spider's web, and yet the effect, he acknowledges, is after all rich and peculiar. The Professor gives the following account of the system employed:—

The mechanical construction of these lierne vaults is various. Most of them, at least the larger and simpler examples, are built exactly in the same manner as rib vaults,

that is, a stone framework is constructed of ribs, liernes and boss stones, all of which are rebated for the reception of stone panels or vaulting surfaces, which are dropped in from above. When the vaults are large and the ribs and liernes few, these intermediate surfaces are built of light rough masonry as before; but when the intervals are made smaller by the increased number of the reticulating ribs and liernes, the connecting surface becomes a mere panel of one or two stones, each of which was probably scribed, as a carpenter would call it, to fit the frame. An example of this method from the cloister of Canterbury Cathedral is shown.

The span of this vault is 13 feet, the ridge ribs are level, and it approaches in effect very near to a fan vault, although it is not one. In fact, the middle plans of the spandrel, instead of being circles round the impost A, as in fan vaults, are of the figure B, C, D. The *tas de charge*, or portion of masonry above the impost which contains the nascent ribs in their state of entanglement, is laid in three courses, of which the lower is 2 feet 6 inches in thickness and the others 1 foot 3 inches and 9 inches respectively. The upper stone has inclined beds formed for each rib to spring from, and the plain portions of rib which connect this stone with the boss stones in the crown of the vault are built of voussoirs, about 18 inches more or less in length. The bosses are so numerous and lie so close together that the stumps of ribs that are in one piece with adjoining ones touch for the most part, as shown in the drawing, with one or two exceptions, where small thin slices of rib are interposed; these are marked *m* in the figure. Some of the compartments are foliated, but the cusps are attached to and worked out of the boss stones. The panels are laid in in one or two pieces, as the case may be. Their joints, which occur irregularly, are indicated by dotted lines. In this and similar examples the stumps of ribs which spring from each boss stone are worked separate as so many branches. This is shown at the margin of the figure. In other vaults of this class, however, the boss stones are so worked that they each contain a portion of the panel surface between the short ribs.

Not the cloisters only would be strange to the eyes of the martyred archbishop, but it may be doubted whether, with the exception of a part of the crypt, one stone remains which he could have observed. In the course of the works which were carried out from time to time some of the old stones were likely to be utilised, but it would be in places where they were not too apparent. The monks would endeavour to suggest how well they had applied donations in a new creation.

After the completion of the choir there was a period of nearly two centuries which was not signalised by the erection of any important work. Then there was another century in which several of the most interesting parts of the cathedral were undertaken, including the transepts, the cloisters, the south-west tower, the nave, the chapel of HENRY IV., the lady chapel and the central tower. For those works there was no second GERVASE in the monastery to relate for the benefit of future ages the progress of the workmen. Such an account may have been prepared, but it perished with other documents at the dissolution. Building had become more scientific, and an account by an onlooker would be a most valuable source of information. All that the study of various detached documents could produce has been presented by Professor WILLIS for one part of the work, but it must always be regretted that neither his industry nor the labours of other archaeologists can fill up the voids. He says:—

In December of the year 1378, Archbishop Sudbury issued a mandate addressed to all ecclesiastical persons in his diocese enjoining them to solicit subscriptions for rebuilding the nave of the church, and granting forty days' indulgence to all contributors. The preamble states that the nave, on account of its notorious and evident state of ruin, must necessarily be totally rebuilt, that the work was already begun and that funds were wanting to complete it. In the year 1397, Archbishop Arundell appropriated to the convent the parsonages of Godmersham and Westwell, in Kent, at their petition. The preface to the instrument of appropriation (dated in the above year) expressly states the reasons for this grant to be that "Simon of Sudbury, formerly Archbishop of Canterbury, and our predecessor, had caused the nave of our church to be taken down to the foundation and demolished at his own expense, for the purpose of re-erecting the same, as he intended and fervently desired to do, but was prevented by his violent death on June 15, 1381 (he was murdered on Tower Hill by some of Wat Tyler's men); and that the prior and convent had laudably expended upwards of 5,000 marks out of their common property upon the construction of the said nave and other necessary

works about the church. Also, that 6,000 marks would be too little to finish the work as begun, and others that must be done about the prostrate cloister and the chapter-house, which is thought to be in a dangerous state;" and he also states as a reason for thus augmenting their funds, his wish that so laudable and necessary a work should be carried on, lest its final completion might be retarded "by the loss of the present prior," or by other adverse circumstances.

In the obituary it is recorded that Archbishop Courtney gave more than 1,000 marks to the fabric of the nave of the church, the cloisters, &c.; and that Archbishop Arundell gave five sweet sounding bells, commonly called "Arundell ryng," as well as 1,000 marks to the fabric of the nave.

Of Prior Chillenden, the same document states that "he, by the help and assistance of the Rev. Father Thomas Arundell, did entirely rebuild the nave of the church, together with the chapel of the Blessed Virgin Mary, therein situated, and handsomely constructed." Also the cloister, chapter-house and other buildings enumerated.

The epitaph of this prior, preserved by Somner, confirms this statement by saying, "Here lieth Thomas Chyllindenne, formerly Prior of this Church . . . who reconstructed the nave of the Church and divers other buildings . . . and who, after holding the priorate twenty years, twenty-five weeks and five days, completed his last day on the assumption of the Blessed Virgin (Aug. 25), A.D. 1411."

The history of the nave resembles that of the choir of Elnulf in this respect, that the archbishops assisted the work with funds and influence, but that it was really carried on by the convent under the immediate direction of the prior. It is not even certain that the prior was the actual architect in either of these instances; for in those times, as in our own, men in high official situations were to be found who took the greatest pleasure in promoting the erection of buildings, and assisted in the carrying on of the works in various ways, by advising, criticising, furnishing funds and cheering on the proceedings by continual countenance and sanction. And to such men the credit of the enterprise may very justly be attributed, but not the credit of the design artistically speaking. This was often due to some obscure monk, or workman, whose name has been lost. For example, Matthew Paris records that a new roof was formed of oak for the aisles of the church of St. Albans, as well as for the tower, and substantially covered with lead, all which was done at the instigation and by the labour of Michael of Thydenhanger, monk and camerarius. Nevertheless, he adds:—"These works must be ascribed to the abbot out of respect to his office, for he who sanctions the performance of a thing by his authority is really the person who does the thing." This doctrine, however true it may be in the sense in which the author intends it to be taken, is fatal to the history of art; for it has been largely acted upon by the monkish chroniclers, who attribute architectural works, without reserve, to the bishop or prior whose biography they are writing, when in reality these labours were carried on by the monks and directed by artists whose names, with few exceptions, are lost.

The nave, transepts and pillars of the central tower of Canterbury all evidently belong to the same period and constitute one work, for they are all in the same style and of the same design (except, of course, the buttressing arches and additions to the tower piers). The work of the nave, therefore, above mentioned, must be held to include these transepts. The documents just quoted, which in fact contain all that is known upon the subject, have told us that Archbishop Sudbury pulled down the nave about 1378 on account of its ruinous condition, intending to rebuild it, but was prevented by his death in 1381, and that the succeeding archbishops, Courtney and Arundell, contributed largely to the funds. Prior Chillenden, who held that office from 1390 to 1411, seems to have been the most active person in conducting these and other buildings, and is thus alluded to in the Arundell grant.

This grant is dated in the second year of Arundell's archbishopric, and the seventh of Chillenden's priorate, and the works seem then to have been in a great state of forwardness, but our information fails to give us the real architect or the exact year at which they were commenced, and from which the design must be dated. Nine years intervened between the death of Sudbury and the beginning of Chillenden's priorate; but he may have conducted the works in the meantime in some other monastic office.

When the rebuilding of the nave and transepts was undertaken the portion they were designed to replace was the original nave and transepts of Lanfranc; this was considerably lower than the eastern church. Now in the nave the whole of Lanfranc's piers, and all that rested on them, appear to have been utterly demolished, nothing remaining but the plinth of the side aisle walls. In the transepts more parts of the Norman walls were allowed to remain, especially on the eastern side and at the angles; and of the tower piers the western are probably mere casings of the original, and the eastern certainly appendages to the original. But of course it must be under-

stood that I have no evidence to show how much of Lanfranc's pier was allowed to remain in the heart of the work. The interior faces of the tower walls appear to have been brought forward by a lining so as to increase their thickness and the strength of the piers with a view to the erection of a lofty tower, which, however, was not carried above the roof until another century had nearly elapsed.

THE BRITISH SCHOOL AT ATHENS.

ON the 15th instant the annual meeting of the British School at Athens was held. Sir E. J. Poynter, P.R.A., presided. The report of the managing committee stated that, in spite of the recent war, the school had had a very satisfactory session. The number of students had been considerably above the average, and good work had been done both at home and in the field. The students' hostel, to which reference was made in last year's report, had now become an accomplished fact. The total cost of the building would probably be about 1,500*l*. The subscriptions to the building fund amounted to rather more than 1,000*l*., and the committee invited further aid in order that the scheme might be carried through without trenching upon the ordinary funds of the school. In the winter and spring the excavations begun last season on the supposed site of the gymnasium of Kynosarges in Athens were carried to completion. The cost of this undertaking had been met by funds provided by private friends. After various difficulties and delays, work was resumed in Melos on the site of Phylakopi early in May, and carried on energetically for four or five weeks. There was now no doubt that the remains of an important prehistoric city had been discovered, the complete excavation of which, in a subsequent session, might lead to results of first-rate interest. The school being now in a position to plan its work in advance, the committee had under consideration several schemes for further excavation. The number of the school annual recently issued contained papers which might be regarded as permanent contributions to archaeology or to history. In the course of the session considerable additions had been made to the library, especially in the department of travel, which was intended to form the special feature of the collection. The sale of the library of the late Professor Overbeck enabled the committee to acquire some books of special value and interest, and the committee had been in negotiation with the executors of the late Mr. George Finlay for the purchase of at least a part of his valuable library. The leave of absence granted by the trustees of the British Museum to Mr. Cecil Smith had now unhappily expired. It had therefore been necessary to look for a new director. The committee had been fortunate enough to secure, for three years at any rate, the services of Mr. D. G. Hogarth, Fellow of Magdalen College, Oxford, a former student of the school, and well-known as an explorer in Asia Minor and Egypt. The committee had to regret the loss of one of their number, Mr. Theodore Bent. To the seat thus left vacant Professor Ernest Gardner, formerly director of the school, had consented to accept nomination. Mr. George Macmillan, who had acted as honorary secretary of the school since it was first opened in 1885, had found himself reluctantly obliged by increasing engagements to resign the office at the end of the current session, though still willing to serve upon the committee. The committee expressed their regret at the loss of Mr. Macmillan's invaluable services. Mr. William Loring, one of the most distinguished students of the school, had consented to take up the work. The committee had to announce that the Government grant of 500*l*. a year for five years was duly ratified by the House of Commons before the end of last session, and the first instalment had been received. But the present resources of the school were barely sufficient to carry on the work on the present scale. The committee saw no reason to be dissatisfied with the results of the past session. Indeed, it might be doubted whether during this particular year any other foreign school in Athens had got through so much. So long as the school had no permanent endowment it could not enjoy entire freedom of action. It behoved, therefore, all friends of the school to keep its claims and requirements continually before the public.

The Chairman moved the adoption of the report. The necessity of preparing the Gallery of British Art, shortly to be opened, and other engagements had prevented him from preparing an address which should be worthy of such an audience. His interest was naturally on the purely artistic side of Greek archaeology, and in that respect he would be glad to give such help as he could. He earnestly pleaded for assistance for the school, which was not so much competing as co-operating with the richly-endowed schools of other nations. The school owed much to Mr. Smith's indefatigable labours. The hostel would be a great boon to students, and Mr. Smith's work in raising the funds deserved their gratitude. Excavations were the life of archaeology, and it was to be hoped that the funds of the school would enable it to purchase land in the city itself from which valuable results might be hoped. Students had the

advantage of attending the lectures not only of this but of other schools, and Athens might thus become the seat of a university of archaeology.

Mr. Percy Gardner seconded the resolution, and made warm acknowledgment of Mr. Macmillan's services.

The resolution was unanimously carried.

The director (Mr. Cecil Smith) then read his report, in which he said that the political troubles and, still more, illness—and especially that of Mr. Bosanquet—had seriously hindered their work. But good work had been done, and the school was more numerous than any of the other schools. Some good finds had been made at Patras, especially a statuette of Athene, of singular interest and beauty, which might safely be attributed to the third century B.C. It was hoped that the labours of the students, in the islands particularly, would be rich in discovery. Each student had his own sphere of research. They had also found important traces of a town of the Mycenaean period, and a bronze statuette of the same age. The new law applicable to excavations made the outlook for archaeologists of the future very grave, and could not but operate injuriously to the cause of archaeology.

The proceedings concluded with the usual votes of thanks to the director and the chairman.

SUSSEX ARCHÆOLOGICAL SOCIETY.

ON Tuesday last a very large number of members of the Sussex Archaeological Society attended the annual excursion, when some places in the neighbourhood of Worthing were visited. Although the district is known to strangers, it has been rather neglected by the Council of the Society. In the first half-century of the Society's existence there was only one visit, which was twenty-three years ago.

Sompting Church.

The first building selected was Sompting Church, which was described by Mr. J. Lewis Andre. The interesting character of the building had been duly acknowledged, he said, by many eminent authorities on church architecture, and there could be but one opinion as to its value as an example of very early work. The name was recorded in Domesday Book, and the parish was said to have a church and five servi or serfs, whom Horsfield erroneously termed ministers. In 1154 William de Harcourt and William de Braose gave the impropriate to the Knights Templars, and on the suppression of that Order it passed through Sir Andrew Peverell to the knights of St. John of Jerusalem. After the dissolution of monasteries, the living passed through several hands into the possession of the Barker family, and then into that of the Crofts, who still held it. The registers dated from 1546. The tower was in all probability erected just before the Conquest or early in the eleventh century, while the nave and chancel were of twelfth-century date. North of the tower were ruins of a chapel of fourteenth-century work, and in the fifteenth century the earlier features were to some extent obscured by the introduction of numerous windows of the Perpendicular style. The spire was unique in having all four sides gabled, and in ending in a pyramidal roof. An interesting feature of the interior was a tomb identified by Lower as that of Richard Burre, who, in his will of the 19th of Henry VIII., styled himself "farmer of the parsonage of Sountynge, called the Temple," and ordered that his body should be buried in the chancel of the church, and that his obit should be kept for eleven years, and 12s. 4d. spent on these occasions on priests, ringers, clerks, and "pouer people." The monument bore the arms of the Fishmongers', Leathersellers', and Goldsmiths' Companies, with those of the Tregoz family. It was also an interesting fact in connection with the parish, that in 1262 the manors of Cokeham and Stanham were rented for a pair of white gloves.

Broadwater Church.

At Broadwater Mr. Andre again served as cicerone. He pointed out, in the first place, the curious distribution of the parish, parts of which were to be found as far north as Horsham and Midhurst. Domesday Book, he said, informed them there was a church at Broadwater and three servi, and the registers commenced as far back as 1558. He explained the architectural features of the building, and called attention to the handsome brass to the memory of John Mapleton, a rector, who died in 1432. The chancel tomb of Thomas Lord la Warre, who died in 1526, was the finest specimen in Sussex of an Easter sepulchre tomb. It was described as a Gothic tomb with Renaissance details. The decoration included the initials "T. G." in a love-knot, and the crampette, or end of a sword sheath, which was the famous badge bestowed on an ancestor, Sir Roger la Warre, for valour on the field of Poitiers, when, with the help of another Sussex worthy, Sir John de Pelham, the French king was made captive. Another fine tomb was that of Thomas Lord la Warre the younger, who died in 1554.

West Tarring Church.

After luncheon there was a visit to West Tarring Church. Mr. J. Lewis Andre said the first notice of West Tarring was in a record stating that before the year 944 it had been granted

by King Athelstan to the Church of Canterbury. Its possession by the Archbishop of Canterbury was mentioned in Domesday Book, from which it appeared there was a second church at Heene, dedicated to St. Botolph. The earliest portion of the present church dated from the thirteenth century, and the building contained a valuable example of a low screen of Mediaeval origin. The churchwarden's book contained some curious entries, among them being one in 1556 "for making Mary and John and Sent Aundero, 21d." The church was thoroughly restored in 1854 at a cost of 4,000*l.* The remains of the palace of the Archbishops of Canterbury were also visited.

A Saxon Cemetery.

Lastly, came the visit to the Saxon cemetery on Highdown Hill, discovered and excavated by Mr. Edwin Henty, J.P. The cemetery lies within the encampment, and the *Sussex Daily News* says that already 120 interments have been found. The skeletons lie east and west, and are discovered by means of trenches dug in the transverse direction, and though the bones are very fragile, and sometimes imperfect, there have been some valuable finds in the shape of weapons glass vessels (supposed to have been even in those remote days "made in Germany"), fibulae, buckles and ornaments of various descriptions. Mr. Henty has taken great interest in the work of investigation, and has a fine collection of these articles at his house at Ferring. The graves are about 3 feet 6 inches in depth, and the period of interment is supposed to have been from the sixth to the ninth century. The first grave opened on Tuesday proved a blank, but at a second excavation the removal of a few shovelfuls of earth and chalk laid bare the arm bones of a skeleton. Search was then made near the skull for the drinking cup and other articles sometimes placed there, but nothing was found, and the skull bones themselves had to a large extent disappeared, leaving little besides a handful of teeth. On the breast of the skeleton was a small brass fibula of a rather interesting character, on which could be distinguished some ornamentation, in the form of circles. There was also found in this grave a piece of rusted iron, which had been either a buckle or fastening of some kind, and the blade of a knife, the handle of which had altogether vanished. A third grave was opened, but gave up nothing but bones, and a small flake of iron rust, which, from the position in which it was found, was thought to have been once a knife.

A vote of thanks was passed to Mr. Henty for the trouble he had taken. The party then drove to Ferring, where they were allowed to inspect the museum of articles found at Highdown.

PUBLIC LIBRARIES.

AT the Conference of Librarians on the 15th inst. Mr. F. J. Burgoyne, librarian, Public Libraries, Lambeth, read a paper on "Public Library Architecture from the Librarian's Standpoint." He treated chiefly of the internal arrangements of library buildings. The problem was different according to the means at the disposal of the authorities. The rooms should not be too large; two or more of a smaller size were better than the same area in one room, as small rooms were less draughty and warmer. Books should be accessible without ladders; the windows should be high, the ceiling lofty, the lighting good and well distributed, skylights should be double so as to prevent the access of the direct rays of the sun, and the windows should be double where there was much traffic. If gas was used ventilating shafts should be provided to carry away the fumes, and some form of incandescent gas should be employed. The Aberdeen Public Library was a model of what such a library should be.

Mr. Crunden, Dr. Justin Winsor and others expressed their opinions on the most desirable appliances for heating, ventilating and other matters. The chairman (Lord Crawford) gave an account and criticised the lighting and ventilation of the Houses of Parliament.

The Chairman announced that M. Delisle, the principal librarian of the Bibliothèque Nationale, Paris, had presented through M. Omont a copy of the first volume of the great printed catalogue of the library which had just been published. It was estimated that this vast undertaking would extend to about 150 volumes, which would be printed as soon as the demand of the public made it possible.

Mr. Beresford Pite, F.R.I.B.A., subsequently dealt with the question from the architect's point of view. A good collection of books, he urged, deserved a good building, as a good book deserved a good binding. Dignity, simplicity and restraint should be the main features of a library, and in the rooms ornament should not distract attention from the books.

Sir H. Howorth, M.P., said the question was, Are the books meant for the library or the library for the books? In his view the librarian ought to arrange his books, whereas generally a library was intended mainly to glorify the architect. Smirke's room at the British Museum was an admirable example of the adaptation of a room to its use.

Mr. Dewey said the most conspicuous failures had been the libraries at Boston and Chicago, on which a mint of money had been spent. In designing a building the best thing would be to compile a list of things to be avoided, and if such things were avoided the best conceivable plan would be found in the residuum.

Dr. R. Garnett said that to him many years ago an empty shelf was a much more beautiful object than a full one, for he had no place for the ever-accumulating mass of books. But now he had not the same satisfaction at unoccupied space which he used to feel, for the sliding press had, in the economy of space effected, been a veritable boon to the librarian. It would be a good thing if the architect would subordinate all æsthetic considerations to practical requirements, and would make his plans not only for the present, but for the future.

THE FRANKS' BEQUEST.

THE personal estate of Sir Augustus Wollaston Franks, late Keeper of British and Mediæval Antiquities in the British Museum, who died on May 21, aged seventy, is valued at 118,670*l.* net. A codicil to the will has the following bequests:—"I bequeath to the trustees of the British Museum all collections lent by me on loan to the said Museum or to any other museum or exhibition, my collection of finger rings and personal ornaments of olden times, and any of the curiosities or works of art in my possession at the time of my death, which the said trustees may please to select, excepting oil and water-colour paintings, prints, and books and manuscripts not specifically bequeathed to them. I also bequeath to the said trustees my collection of book plates (*ex libris*), trade cards and tickets, together with my catalogues of the same, and such books as I have indicated by a note in them as belonging to my said collection of book plates, and I request that the said collection, catalogues and books may be placed in the Department of Prints, and that the book plates may be kept together as such, and not distributed under the engravers' names, except in the case of duplicates. I further bequeath to the said trustees such of my books on pottery and porcelain as are not already in the library of the Department of British and Mediæval Antiquities, to be added to the said library. And as to these bequests to the British Museum I desire my executors to apply to the Government for a remission of probate duty with respect to them. And if this be not granted I declare my said bequests to the trustees of the British Museum to be null and void, and I desire and direct that the objects which would otherwise have passed to the British Museum be sold by public auction and the proceeds added to my general residuary estate." Sir Augustus Franks bequeathed to the Society of Antiquaries of London, of which he was president, such of his printed books on antiquities, art, history and genealogy as are not already in the library of the said Society, together with his heraldic manuscripts and any of his drawings and engravings of ancient seals which the Society may desire to possess.

CHRIST'S HOSPITAL, HORSHAM.

IN the House of Commons on Monday Mr. Giles asked Mr. Grant Lawson, as a Charity Commissioner, whether the bills of quantities for the school buildings of Christ's Hospital on the new site at Horsham had been completed, and, if so, whether they exceeded the estimate; whether the expenditure of 20,000*l.*, sanctioned by the Commissioners for the work of draining roads, levelling and planting, was now expected to be insufficient owing to the soil being so deep and strong a clay; whether, since the acquisition of the Horsham site, the number of scholars had considerably decreased, and, if so, to what extent, and if the governing body had been obliged to sell stock to meet the current expenses of the school, and, if so, to what amount; and whether, having regard to the great interest taken by the public in this great national institution, he would take steps to provide that the names of the members constituting the governing body and committees, and their proceedings, be no longer kept secret, but be published from time to time.

Mr. Grant Lawson, in reply, said the bills of quantities for the school buildings on the new site at Horsham have not, so far as the Commissioners know, yet been completed. The Commissioners are not aware that the expenditure of 20,000*l.* for draining roads, levelling and planting is now expected to be insufficient. A reduction in the number of boys has been found necessary during the period of transition through which the Hospital is passing, and it is understood that the Council of Almoners do not propose to fill the boys' school to its full extent before its removal to Horsham. The number of girls has been considerably increased since the purchase of the Horsham site in 1892. The total number of scholars is now about 200 less than in 1892. Sales of stock to the amount of about 12,070*l.* were made for meeting current expenses of the first two years (1891 and 1892) in which the scheme was in operation. Since 1892 no stock has been sold for that purpose.

The Commissioners understand that printed lists of the Governors and Council of Almoners may be purchased at the counting-house of the Hospital in Newgate Street. The Commissioners have no reason to believe that the practice of the Hospital in respect to the publication of names and proceedings differs from that of most other charities, and they have no power to make the suggested provision.

Mr. J. H. Johnstone asked whether the Commissioners had any reason to suppose that the decrease in the number of scholars at Christ's Hospital was due to the fact that the bills of quantities were in excess of the estimates, or that the expenses of laying out the grounds were more than the 20,000*l.* allowed; and whether it was not the fact that Colliers School at Horsham, which stood on similar soil, had at the present time 99 out of the 100 scholars which it was built to accommodate four years ago.

Mr. Grant Lawson said that he had no personal knowledge of Colliers School, but he had no reason to doubt that the facts stated by the hon. member were correct, and that as the bills of quantities had not yet been sent in nor the cost of laying out the grounds finally ascertained he could hardly suppose that the decrease in the number of scholars at Christ's Hospital was due to either of those considerations.

EDINBURGH ARCHITECTURAL ASSOCIATION.

DURING the winter session of this Association Mr. Thomas Gibson, of Eglinton Crescent, put at the disposal of the Council a sum of 30*l.*, to be given in prizes for the best design for a fireproof dwelling, taking as the basis of the design a house similar to those in the west end of Edinburgh. The Council appointed Mr. W. W. Robertson, of Her Majesty's Board of Works, Mr. Westland, C.E., and the then president of the Association, Dr. Rowand Anderson, to examine and decide on the relative merits of the designs submitted. In response to the invitation of the Council five sets of designs were submitted. After their examination the design submitted by Mr. James Cairns was placed first, that by Messrs. J. Gordon Smart and Louis Blanc second, and the one by Mr. Alexander Arnot third—15*l.*, 10*l.* and 5*l.* being awarded to them. Mr. Gibson, in addition to giving this money for prizes, generously defrayed the expenses incurred by the Association for printing, &c., amounting to 12*l.* The first and second successful competitors are assistant and pupils in the office of Mr. Hippolyte J. Blanc, N.S.A., and the third prizeman is of the office of Messrs. J. D. Peddie & Washington Browne.

HONOURS FOR ARTISTS.

THE effect of honours and rewards has been insisted on as a necessary incentive to artists; they ought indeed to be, they sometimes are, the result of superior powers; but accidental or partial honours cannot create genius, nor private profusion supply public neglect. No genuine work of art ever was or ever can be produced but for its own sake; if the artist do not conceive to please himself he never will finish to please the world. Can we persuade ourselves that all the treasures of the globe could suddenly produce an "Iliad" or "Paradise Lost," or the *Jupiter* of Phidias, or the *Capella Sistina*? Circumstances may assist or retard parts, but cannot make them—they are the winds that now blow out a light, now animate a spark to conflagration. Nature herself has set her barriers between age and age, between genius and genius, which no mortal overleaps; all attempts to raise to perfection at once what can only be reared by a succession of epochs must prove abortive and nugatory; the very proposals of premiums, honours and rewards to excite talent or rouse genius prove of themselves that the age is unfavourable to art, for had it the patronage of the public, how could it want them? We have now been in possession of an Academy more than a century; all the intrinsic means of forming a style alternate at our commands—professional instruction has never ceased to direct the student; premiums are distributed to rear talent and stimulate emulation, and stipends are granted to relieve the wants of genius and finish education. And what is the result? What does an Academy exhibition present in the aggregate but a gorgeous display of varied powers, condemned, if not to the beasts, at least to the dictates of fashion and vanity? What therefore can be urged against the conclusion that as far as the public is concerned the art is sinking, and threatens to sink still deeper, from the want of demand for great and significant works? Florence, Bologna, Venice, each singly taken, produced in the course of the sixteenth century alone more great historic pictures than all Britain taken together, from its earliest attempts at painting to its present efforts. What are we to conclude from this—that the soil from which Shakespeare and Milton sprang is unfit to rear the genius of poetic art—or find the cause of this seeming impotence in that general change of habits, customs, pursuits and amusements which for near a century has stamped the national character of Europe with apathy or discountenance of the genuine principles of art?

NOTES AND COMMENTS.

M. BERNIER, the architect of the Opéra Comique, which is now in course of erection in Paris, has had a model of the building prepared which is on the unusual scale of one-fourth full size. It was prepared mainly with the desire to anticipate the effects of the proposed decorations. The principal artists who have obtained commissions have accordingly co-operated in the completion of the model. When photographs are taken they will appear to be derived from the actual building. The painters will be able with more confidence to produce their large decorations, as they can realise the effect of the portions into which the pictures will be divided for the sake of convenience. The illumination of the theatre will also be facilitated by so large a model, and the effect of the electric light on every gilded ornament or moulding can be anticipated. It is remarkable to have so large a model, but if the sculptors insist on full-size figures, no matter how large may be the scale, and even if they are intended only for the adornment of a steel bridge, surely painters may be excused if they decline to risk their reputation on miniature models. No less interesting are the models of the two palaces of art which are to be erected in the Champs Elysées as part of the buildings of the International Exhibition of 1900. They are now in preparation. The scale is far smaller than is required for the new opéra-house, but they are signs of the eagerness of the modern Paris to supplement geometrical drawings by substantial models when the buildings are of sufficient importance.

THE most interesting part of the Palais de l'Industrie, which is now almost demolished, is the central portion. It has been suggested that the block should be spared the fate of the rest of the group, or if removed should be set up again as a gateway in some other quarter of Paris. That it will be temporarily preserved there is little doubt, for it is proposed to utilise it as the façade of the offices in which the numerous architects and draughtsmen who are employed on the drawings of the Exhibition buildings can labour in comfort. When the new palace is nearly complete the remnant of its predecessor can be removed. Adjoining the palace is, or rather was, the pavilion of Paris which was used for exhibitions in which the citizens were most interested. It was crammed with paintings and statues which had been purchased from time to time by the Municipality. The paintings alone numbered 984. They have been all removed to the dépôt at Auteuil, which is already overcrowded with works of art.

THE American "National Sculpture Society" now offers prizes for a design for a sundial through the generosity of Mr. T. KELLY, of New York. The prizes are 500 dols. for the best design and 250 dols. for the second best, the competition to be open to sculptors only. The sundial is to be placed out of doors on a lawn free from buildings or other objects, and no restrictions are made as to cost, the prizes being for the models alone. The designs

shall be submitted in plaster models, uncoloured, executed to a scale of 3 inches to the foot. All models must be delivered free of expense to the Society and at the owner's risk, addressed to the Secretary of the National Sculpture Society, 215 West 57th Street, New York, any time during the months of January and February 1898. The models shall bear no signature or other mark by which they may be identified, but each shall be accompanied with a plain white unmarked envelope containing the designer's name and address. Designs will be numbered in order of receipt. The competition will be judged by a committee to be appointed by the Council of the Society for that purpose, but the right is maintained to withhold the prizes in case no sufficiently meritorious design be submitted. It is stipulated that the prize designs shall become the property of Mr. KELLY, who will in no case have either of them reproduced, save by the sculptor designing it; and Mr. KELLY further agrees to place the prize designs at the service of the artists for reproduction for others than himself if it is desired. At the conclusion of the exhibition the models not receiving prizes are returnable to their owners at their expense. The Society can assume no responsibility for them after the close of the exhibition.

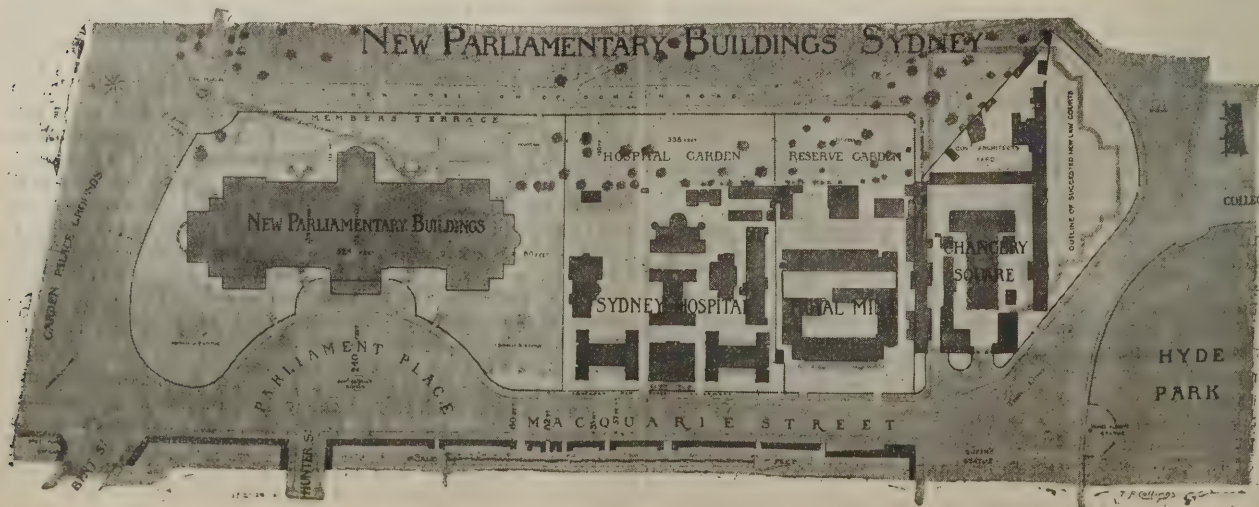
THERE is one passage in the annual statement of the Chairman of the London County Council which will gain general approval. After referring to a conference with the representatives of various bodies interested in the preservation of buildings of historic and architectural interest, of which London had so many, but of whose existence they sometimes heard only at the moment at which their destruction was threatened, Dr. COLLINS adds:—"If by preparing a register of such buildings or otherwise the Council could assist in checking such needless vandalism, it would be acting in a worthy and civic spirit." Much will depend on the meaning which the word "otherwise" is to have, for although a register of the old buildings of the Metropolis would be most useful, yet we need not invoke the machinery of the Council for so simple a matter. Will the Council do whatever is necessary at a reasonable expense to preserve the buildings from destruction? In that way some of the errors of the Council would be condoned. What is no less important, the example would be likely to find imitation in other councils.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: ENTRANCE TO MARTYRDOM FROM CLOISTERS.—NORTH AISLE, LOOKING EAST.

NEW PARLIAMENTARY BUILDINGS, SYDNEY, N.S.W.—VIEW OF PUBLIC LOBBY.—FRONT ELEVATION.

IN addition to the plates we give a block plan which shows the position of the proposed Parliamentary Buildings to the Hospital, the Mint, &c., and which also face Macquarie Street. Such an opportunity for effective combination is only to be obtained in a new city like Sydney.



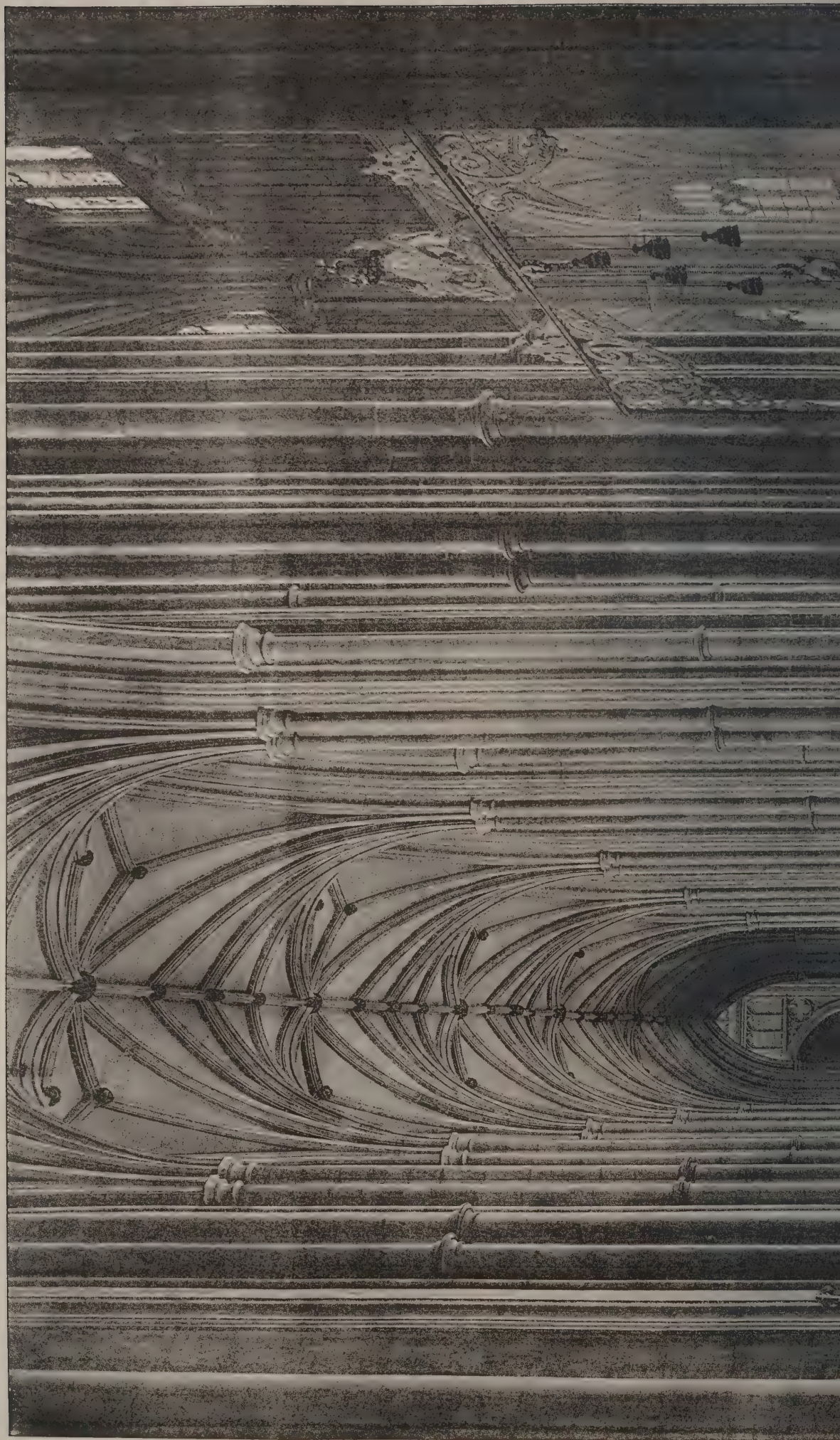


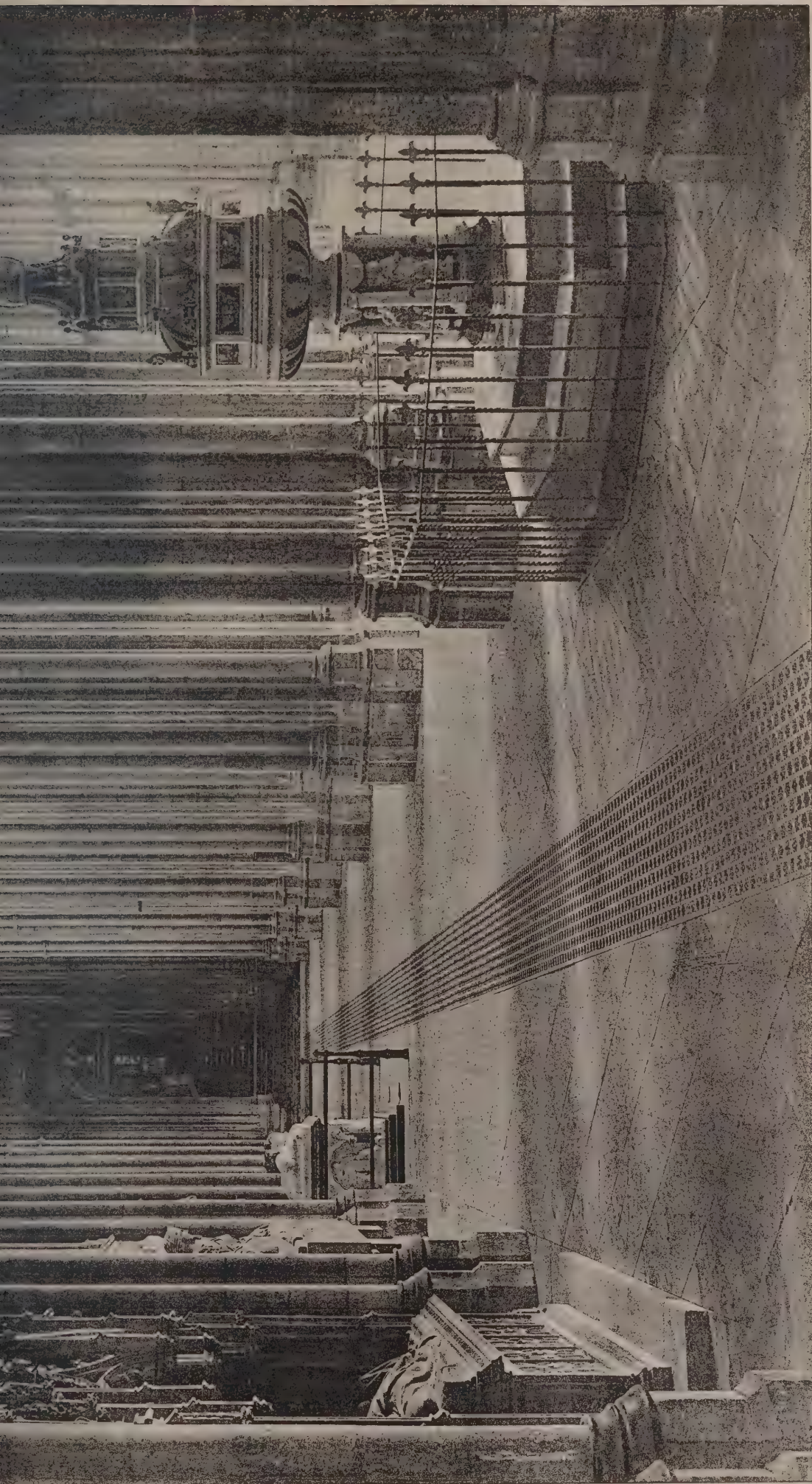


PHOTOGRAPHED BY S. B. SOLAS & CO. LTD., LUDGATE HILL, E.C.

IN THE PHOTOGRAPH BY S. B. SOLAS & CO. LTD. 243: HANDING STREET FETTER LANE E.C.

CATHEDRAL SERIES, No. 58.—CANTERBURY: ENTRANCE TO MARTYRDOM FROM CLOISTERS.



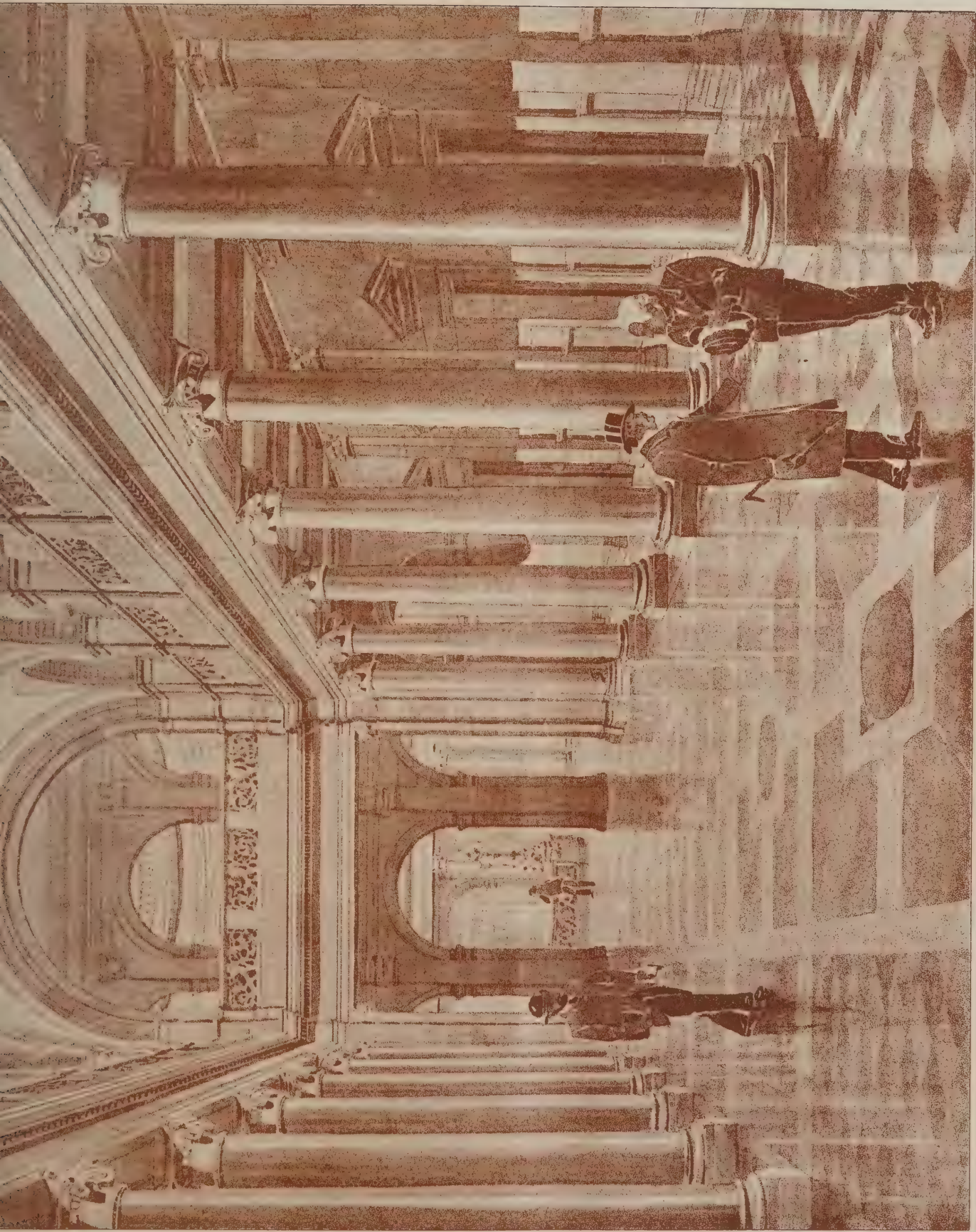


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INK-PHOTO, SPRAGUE & C^Y 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 59.—CANTERBURY: NORTH AISLE, LOOKING EAST.





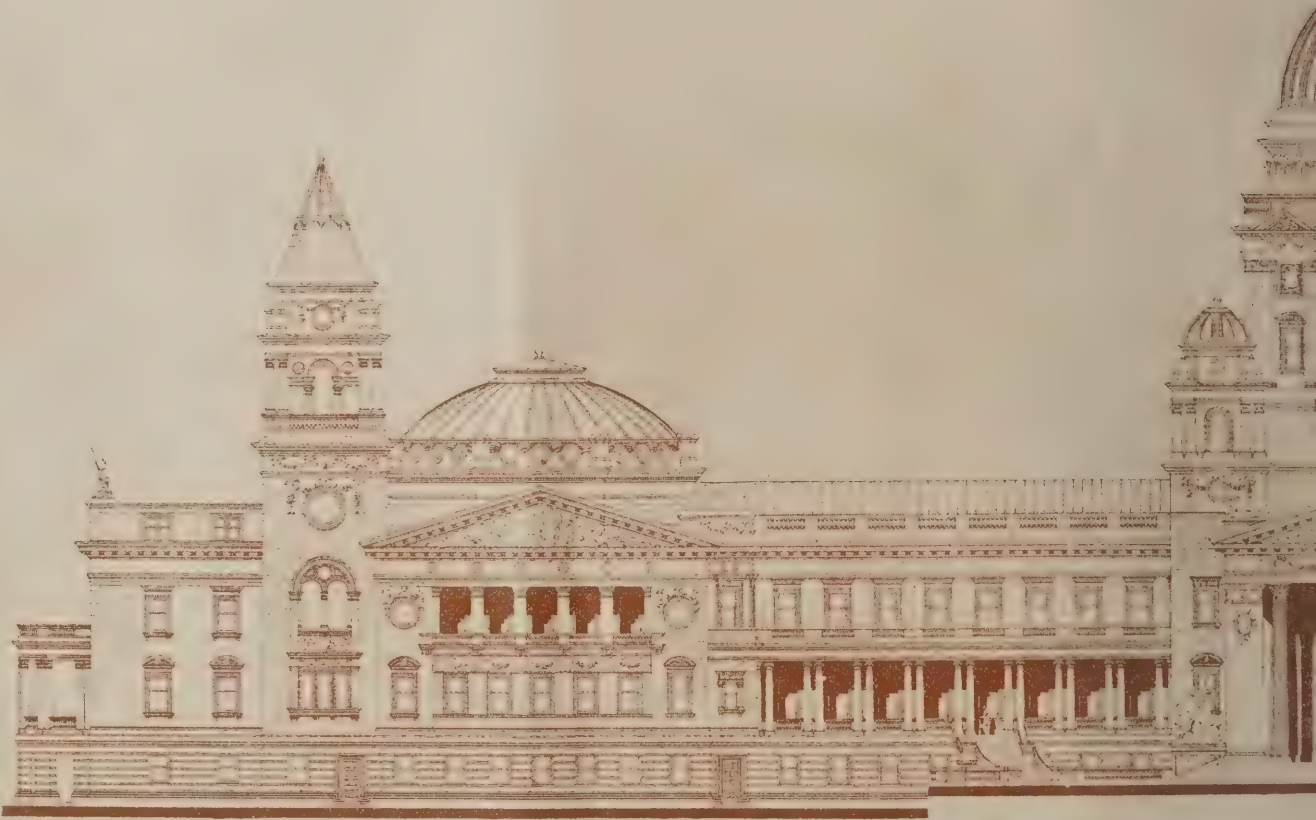
INN- PHOTO, SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

NEW PARLIAMENTARY BUILDINGS, SYDNEY, NEW SOUTH WALES.

New Parliamentary Buildings
Sydney.

eat Dome

Fl Towers



From
to Mac

NEW PARLIAMENTARY BUILDING
FRONT ELEVATION
W. L. VERNOR

23rd 1897



Elevation
Market Street

W. H. Sprague
1897

INK-PHOTO SPRAGUE & CO. 4 & 5, EAST HARDING STREET FETTER LANE, E.C.

SYDNEY, NEW SOUTH WALES.
MARKET STREET
W. H. Sprague, Architect.

THE SOCIETY OF ARTS' EXAMINATIONS.

THE Society's examinations are conducted simultaneously at a number of different centres throughout the kingdom, through the agency of local examination committees established for the purpose by the Society. The papers in each subject are sent down in separate envelopes to the secretary of the committee immediately preceding the day of examination. The envelopes are opened in the presence of the candidates, and the papers distributed. The worked papers are sealed up at once and despatched to the office of the Society. In the present year, 1897, 7,513 papers were worked by 6,919 candidates at 221 centres. The subjects in which examinations are now held are:—1. Arithmetic; 2. English; 3. Book-keeping; 4. Commercial Geography; 5. Shorthand; 6. Type-writing; 7. Economics; 8. Précis-writing; 9. French; 10. Elementary French; 11. German; 12. Elementary German; 13. Italian; 14. Spanish; 15. Elementary Spanish; 16. Portuguese; 17. Russian; 18. Danish; 19. Chinese; 20. Japanese; 21. Domestic Economy; 22. Rudiments of Music; 23. Harmony; 24. Practice of Music.

The examination system of the Society of Arts was an outcome of the Great Exhibition of 1851, which, as is well known, was originated by the Society.

In November 1851, Mr. Harry Chester, then a vice-president of the Society, and afterwards chairman of the Council, submitted to the Council a scheme for the formation of a union of mechanics' institutions, the principal object of which was to encourage the founding of such institutions, and to develop the educational facilities which they provided.

Among the early suggestions for the utilisation and development of such institutions was a proposal for a general system of examinations among their members. In December 1853 Mr. Chester definitely proposed the establishment of such a system, and in the spring of 1854 a scheme of examinations was published. The scheme was of a very comprehensive character, and included the following subjects:—1. Mathematical Sciences; 2. Experimental Sciences; 3. Sciences of Observation; 4. Mechanical Sciences; 5. Social Sciences; 6. Fine Arts; 7. Moral and Metaphysical Sciences; 8. Literature. This very elaborate programme proved a little impracticable, and it is not to be wondered at that only a single candidate offered himself for examination in March 1854. The promoters of the movement were not, however, discouraged; the scheme was remodelled principally by Dr. Booth, at that time an active member of the Society, and in 1856 an examination of fifty-two candidates was held at the Society's house. The subjects of the first examination were:—1. Book-keeping; 2. Arithmetic; 3. Algebra; 4. Mensuration; 5. Geometry; 6. Mechanics; 7. Chemistry; 8. Animal Physiology; 9. Botany; 10. Agriculture; 11. Geography; 12. Physical Geography; 13. English History; 14. English Literature; 15. Latin and Roman History; 16. French; 17. German; 18. Freehand Drawing.

In the following year, 1857, the first attempt at provincial examinations was made, and an examination was held at Huddersfield, as well as in London, the examiners of the Society going down for the purpose. The desire of increasing the number of examination centres and the obvious impossibility of sending examiners simultaneously all over the country led in 1858 to the elaboration of the system of local committees to supervise examinations worked from a single centre.

The Society of Arts, however, cannot claim the sole credit of the invention of the system of local examinations. In 1850 the College of Preceptors (established in 1846) was considering the best means of examining the schools of its members. It commenced by sending down examiners, but in 1853 the experiment was tried of collecting pupils to a centre and examining them by means of papers sent down from London. The experiment proving successful, the system was regularly organised in the following year, 1854, and has been continued ever since.

It will be seen that the College of Preceptors' examinations preceded those of the Society of Arts by two years, but the objects, the conditions and the methods of the two systems have been so different that there has never been any but the most friendly rivalry between them. In 1856 a conference was held at the Society's house between representatives of the two bodies, the College being rather afraid that the Society's examinations would interfere with their own. It was soon apparent that the two systems were intended to occupy different ground, and were not likely to affect one another. In practice this has proved to be the result, and it has never been found that the two systems have interfered in the least with one another.†

To the Society's examinations in 1858, 58 institutions sent up 288 candidates; in the following year there were 480; in 1860, 586. The numbers increased steadily till 1865, when

there were 1,899; the next year showed a slight diminution, and then there was a further increase, till the number of 2,160 was reached in 1869.

The University Local Examinations were established in 1858. The establishment of elementary drawing examinations by the Department of Science and Art was about contemporaneous with that of the Society's examinations. The science examinations began later, in 1861, and as these developed, it was found that the Society's examinations were in many respects competing with those of the Department. The same candidates were being examined in the same subjects, and there was an evident waste of power. In 1870 this led to the abandonment of seventeen out of the thirty-six subjects then included.

In 1871, when the Council were considering the establishment of a system of technological examinations, of which an account is given below, they passed a resolution to discontinue the general examinations, but on the application of some of the more important institutions in union, they rescinded the examinations resolution and determined to continue for a further period. This was done on the same system as before, till 1876, when the programme was revised, and the plan on which certificates were granted was somewhat modified. Previously, certificates had been granted for single subjects, but in that year a "Commercial Certificate" was established in addition, to take which it was necessary to pass in, at least, three subjects. Very few of these certificates were ever taken, the system of single certificates for single subjects being more popular and better suited to the needs of the class of students who take up the Society's examinations.

In 1879 the question of abandoning the examinations again arose, it being thought that the ground was covered by other agencies. To quote from the report of the examination committee in 1879:—

"The committee feel that the time has now come when the Society should cease to compete with other educational agencies more influential in the work of examination. With the Educational Department examining millions of children in elementary schools and thousands of young persons in night classes; with the universities holding their local examinations throughout the country for young persons of a higher class; with the Science and Art Department examining students in every branch of science and art; with the new City Institute developing yet further the technological examinations just handed over to them by the Society; with other agencies, such as the College of Preceptors, doing kindred work, the Society of Arts may well retire from the field, having in all these various directions acted as the pioneer. It held science examinations before the Science Department, examinations in literature before the universities went afield to meet the classes who could not go to Oxford or to Cambridge. It has seen the system it established develop, with the aid of Government funds, as it could never have grown without such help, and the time has now arrived when it may cease to compete with the agencies it has done so much to foster."

In pursuance of the course mentioned in this report, no examination was held in 1881, but again, however, some of the institutions where the examinations were held protested, and on further consideration it was determined to continue the examinations, but to try whether they could not be made self-supporting. Hitherto they had been free. In 1882 a fee of 2s. 6d. was charged to each candidate, and this charge has been continued to the present date. The "Commercial Certificate" was abandoned, and the old system was resumed of giving a separate certificate for each subject. The natural result was a considerable falling off in the numbers examined. In 1882 only 695 papers were worked as compared with 2,325 in 1880. The numbers, however, soon began to increase again. In 1890 there were 2,474; in 1894, 4,375; in 1895, 5,108, and in the present year, 7,513. This very considerable increase is doubtless, to a very great extent, due to the fact that the county councils have now large funds available for the promotion of technical education; and that certain commercial subjects are scheduled by the Science and Art Department as subjects coming within the scope of the Technical Instruction Act, 1889. The commercial subjects so scheduled are precisely those in which the Society of Arts has now for just forty years been holding examinations.

The technological examinations, referred to above, were instituted in 1873 at the suggestion of Sir John Donnelly. These examinations were intended to test the knowledge possessed by artisans of the subject-matter of their respective industries. It was arranged that they should be held in connection with the May examinations of the Science and Art Department, the technological papers being given out with those of the Department. Before a candidate could obtain a certificate he was required to pass a Department examination in certain specified science subjects, these varying according to the technological subject taken up. Certificates of three grades were given—elementary, advanced and honours—corresponding with those of the Department examiners. No attempt was

* A paper by Sir Henry Trueman Wood, M.A., secretary of the Society, read at the International Congress on Technical Education.

† The writer of this memorandum may be permitted to mention that he was for a short time one of the examiners of the College.

made to test practical skill, but each candidate was required to produce a certificate from his employer in which his competence was stated. The number of candidates was never great. In the first year (1873) only six entered, and the numbers gradually increased to 68 in 1870 and 184 in 1878.*

In 1879, on the foundation of the City Guilds Technical Institute, the technological examinations were handed over to that body. From the funds placed at its disposal by the City companies the Institute was able to offer to teachers payments on the results of the examination in the same manner as the Science and Art Department does for its examinations. Teachers were thus enabled to form classes and send pupils for the examination, and a large increase in the number of candidates took place. These examinations now form an important part of the Institute's work and attract annually a very large number of candidates. In 1897 the number entering was 29,494. Large additions have also been made to the list of subjects, which now number sixty-three. No great change has been made in the general character or system, which remains much the same as that proposed by Sir John Donnelly, but the details have been considerably modified and in some cases a practical examination to test handicraft skill has been provided.

In addition to the examinations above referred to, the Society conducted, from 1856 to 1894, elementary examinations. These were really carried on by district unions and local boards in connection with the Society. All the Society did was to supply identical examination papers, the results being examined and certificates awarded by examiners appointed by the local boards. The Society supplied the certificates, but accepted no responsibility as to their award. The system, though useful at its first establishment, was never found to work in a very satisfactory manner, and in 1895, the place of these examinations being better filled by examinations entirely under the control of local institutions, the Society's system was abandoned.

THE ROMAN COUNTRY HOUSE.†

IN all the detailed enumeration by Pliny of the charms of his two favourite villas—the winter villa at Laurens and the villa at Tuscum, where he preferred to pass his summer leisure—what is not said is almost as remarkable and suggestive as what is said. There is a general impression of amplitude and luxury, indeed, of magnificence in the descriptions, but hardly a word is vouchsafed regarding the architectural dress and detail of this extensive abode. We have no hint of precious marble wainscoting, of panelled and gilded ceilings of cedar, of Grecian mosaic and columns of porphyry. It would seem that splendours of this kind were to Pliny's mind beneath the notice of a literary man and philosopher, betraying conceit or vanity if paraded in his own letters—as if one should exalt the elegance of his own dress, or that he had really preferred to expend his ample resources upon size and comfort, extensive grounds and delightful vistas, rather than upon ornament and display. He might have said with Horace:—

No ivory, nor gleam of gold
From panelled ceiling richly carved and fair
Within my home mayst thou behold,
Nor beams Hymettian, upborne on rare
Numidian shafts from Africa's shore, &c.

Yet we know that the period of Trajan, to which these villas belong, was one of great splendour of material in architectural work, and especially in the use of costly marble from distant lands.

Another peculiarity of Roman dwellings generally was the moderate size of the rooms in the more private and domestic portions of the residence. The bedrooms, for instance, were for the most part of small dimensions. This is true even in the great Villa Hadriana, at Tivoli, in spite of its extraordinary magnificence. Pliny mentions the loftiness, but not the spaciousness, of any of those in his own villas. On the other hand, the *triclinia* and banquet-halls were often of considerable size. But the extent of the larger villas is remarkable rather in respect to the number than the size of the several rooms. Suite after suite is mentioned. Private apartments, libraries, drawing-rooms, porticoes, sitting-rooms and galleries succeed each other again and again—each with a different exposure, view, or degree of seclusion. What is the explanation of this extravagance of reduplicated accommodation? The answer is threefold. In the first place, these arrangements reveal a certain restiveness within walls. If compelled to remain in his residence, the Roman must at least have constant change of scene provided.

To spend a whole day shut into two or three rooms would have been imprisonment to him. Accustomed in the city to long vistas, imposing perspectives and endless colonnades, he refused to be more closely confined in inclement weather in his villa than in town. Hence the long suites of porticoes, porches, galleries, drawing-rooms with endless windows and doors, closed by shutters or portières, or in some cases with glass. Even in his villa the Roman could feel distance, space and change, and stroll up and down the long halls with his friends. For the same reason the architectural effects were chiefly those of long perspectives and multiplied openings, not the magnificence of carving and precious incrustations. These were reserved for the *thermae* and dining or banquet-halls, where hours together were passed at a time. The walls of all rooms were painted more or less elegantly after the manner we call Pompeian, and the floors set with *opus tessellatum* or *Grecanicum*; but there was much less effort at sumptuousness in interior decoration in the living rooms than we are apt to imagine.

The second reason for the vast size of the villas is to be found in the Roman habits of hospitality. The wealthy Roman was expected to entertain hosts of guests. These required a great number of apartments, and Pliny tells Gallus that at Laurens "most of the apartments in this side of the house appropriated to his slaves and freedmen are sufficiently elegant to entertain any of my friends who are inclined to be my guests." Statesmanship and public life had their drawbacks then as now, and the wealthy and influential Roman of Pliny's time was compelled by his rank and condition to entertain hosts and hordes of friends, admirers, clients and sycophants, who were liable to descend upon him at any time. In one letter Pliny begs a friend to forewarn him of his coming that he may have the baths heated and ready in good season against his coming. The sudden and unexpected invasions of friends and politicians must be provided for; hence this seemingly extravagant multiplicity and reduplication of rooms.

In the third place, one must bear in mind the slave system of ancient Rome, which rendered wholly unnecessary many of the economies of disposition practised in modern housebuilding, even among the wealthy. An army of dependents was at hand to wait upon every wish of the master, making not only possible but necessary a spreading out of the apartments and a multiplication of accommodation almost incomprehensible to our minds.*

If from generalities we proceed to details, the path is not so clear before us, at least with regard to the dwelling. To restore a Roman country residence with anything like confidence in the correctness of our results is not possible. Everything we have but the details; these are singularly lacking. Even the general plan of the villa dwelling can only be conjectured. While we have ruins of almost every other type of Roman building sufficient for a fairly complete restoration of at least the plan, of not one villa-dwelling can the ground plan be traced with adequate completeness. We are thoroughly acquainted with such house-types as those of Pompeii and Herculaneum, and with other examples of the urban and suburban dwelling in Rome and the provinces. On the Palatine Hill, at Spalato and in the ruins of Tibur (Tivoli), the imperial ages have bequeathed to us important and splendid remains of the magnificent palaces of the rulers of the antique world. But on the sites of the ancient villas all remains of the houses themselves seem to have vanished, although the terraces and gardens, *piscinae* and colonnades have in many cases been admirably preserved, as at Castel Gandolfo, where the modern villa in its landscape gardening follows absolutely the lines of the Villa of Domitian. For our conceptions of the dwelling, therefore, we are dependent largely upon literary sources, and the two letters of Pliny already cited, with others in which briefer reference is made to his estates, and incidental passages in Cicero, Varro, Vitruvius and other writers, must be the basis of all our restorations.

The restoration both of the Laurentian and Tuscan villas has been a favourite problem with archaeological architects. I have before me plans of the former by Bouchet, Semper and two former students of the Massachusetts Institute of Technology, and of the latter by Semper. The very great variation between the different versions of the Laurentian house reveals the difficulty of working from a familiar description instead of a detailed specification. It soon becomes evident that Pliny has omitted to mention many of the rooms and accessories of the plan, while the precise relation between the different parts is not always easy to conjecture. Who nowadays would expect to be able to draw a correct and detailed plan of a large American or English country house from a mere epistolary description in the familiar correspondence of its owner? The

* The following were the subjects included in the 1878 examinations:—Cotton manufacture, paper, silk, steel, carriage-building, manufacture of pottery and porcelain, gas manufacture, glass, cloth, silk-dyeing, wool-dyeing, calico-bleaching, dyeing and printing, alkali manufacture, blow-pipe analysis.

† From a paper by Mr. A. D. F. Hamlin, in the *Architectural Review*.

* The slave population of Rome in Pliny's time is believed to have outnumbered the free by a ratio of three to one, and it was not uncommon for a well-to-do citizen to own as many as 500 slaves or more. Upon a single estate, like that at Laurens, there would be at least 100, of whom the half were most probably lodged in the villa itself. This estimate may very possibly be much too low.

wonder rather is that agreement should prevail as far as it does in the efforts of different persons to reconstitute the plan of the house so charmingly but unscientifically described by the distinguished Roman advocate.

One important question not fully solved is that relating to the number of storeys. It is commonly assumed that Roman houses, other than the great tenement-house blocks or *insulae*, were but one storey high. This assumption is probably correct in the main and is supported by many considerations, but I cannot think it is demonstrated for the villas. The Pompeian and Herculanean ruins for the most part show houses of one storey, except where, as in the so-called Villa of Diomed, outside the walls of Pompeii, the slope of the site naturally dictated for a part of the plan a second storey. Only in one or two cases are stone stairways to be found or any demonstrable provision for wooden flights. The references to stairs or to upper storeys in the letters to Pliny and Cicero, in Vitruvius and Varro, are singularly scanty, and the broad extent of the plans described by these writers certainly points to a strong preference for living on one floor, and that on the ground level. Moreover, the great care taken to exclude dampness by hypocausts, and the importance of the *atria*, peristyles and courts in the domestic life of the Romans, prove that rooms on an upper floor could have been little used by the family, either as living, sleeping or sitting-rooms. Without doubt the life of the inmates, the owners of the villas and their guests, was almost wholly passed on the ground floor.

Yet the few exceptions noted in Pompeii and the specific description by Pliny of two second-floor apartments of several rooms each at Laurens, prove that upper rooms were not unknown and that they were not in all cases, at least, assigned exclusively to slaves and attendants. The advantages of elevation, both for the sake of a wider prospect and of the freer movement of the air, would render desirable the provision of at least a limited number of upper chambers. These would have the further advantage of completer privacy, a deeper silence and greater remoteness from the movement and chatter of the throngs of clients, serfs and guests in the *atrium*, *cavadium* and more public parts of the villa than could be had below. They may have been confined to the remoter parts of the villa, except where, as in the house at Laurens, they formed one or more square turrets, dominating the general mass (as shown in Bouchet's perspective) and breaking its long horizontal roof-lines. No one denies that on sloping sites, as at Tuscum, the second storey became indispensable. But in this case it was reached from the upper level and only incidentally served by interior stairs, perhaps of wood. The grand staircases of modern palaces were wholly unknown in Roman interiors.

The external mass and composition of the villas, like the plans, was irregular and picturesque. We know almost nothing of their decoration, or whether they were at all treated with any special external elegance. The Italian villas of the sixteenth century, like the Pia of the Vatican, the Medici, the Pamfili Doria, with their three or four storeys, their graceful turrets, open loggias and playful richness of adornment, can hardly claim any resemblance to the Roman dwellings, however closely their gardens follow the antique models.

The literary documents are, as we have said, curiously brief or silent with reference to the interior decoration of the villas. Pliny and Cicero have little or nothing to say about wall-paintings, floor-mosaics, columns or marble incrustations. The treatment of ceilings is not mentioned. But precisely where the books are silent the architectural documents supply the lack. The villas themselves—that is, the houses—have wholly perished. But however widely these may have differed from city dwellings and suburban residences in arrangement and general aspect, the detailed treatment of floors, walls and ceilings must have been in substantially the style exhibited by the ruins of the larger and finer houses and palaces of the cities.

For the most part it would appear that the walls built of rubble or concrete, faced in some cases with brick, were finished both externally and internally with stucco and a fine smooth coating of plaster to receive painted decorations. The painting was, for the more ordinary work, of the kind called *tempera*, in which the medium was water thickened with gum or glue. But the finer paintings were executed in encaustic colours. For these wax was the medium; the colours were applied warm with a sort of spatula, and graded, scumbled and spread with the help of hot irons held near the wall to soften the fast-hardening wax. The result in skilful hands was a remarkable combination of vigour and finish. The style of decoration used was that made familiar to the modern world by the ruins of Pompeii and commonly called Pompeian. The name is a misnomer except when carefully restricted to the local peculiarities observable in that city; the general style prevailed throughout the Roman world. The finest examples indeed of this style of wall-painting are to be seen in Rome. Upon the Palatine those extraordinary subterranean ruins known as the *Thermae* of Titus, in which the substructions of Titus's Baths and of the Golden House of Nero are so strangely mixed, offer many beautiful examples of the art. It was from these that

Raphael learned the style of fresco decoration which he, with Giovanni da Udine and Giulio Romano put to such masterly use in the Vatican *loggie* and elsewhere. The Casa Livia, on the Palatine, presents other examples of the art, while in the Museo delle Terme are several walls removed bodily thither from a house exhumed on the banks of the Tiber in 1879, in which the painting of light and fanciful architectural ornaments, wreaths and festoons, on a ground of black or dark red, has been carried to a degree of refinement and elegance hardly matched in any other example.

Besides this so-called Pompeian painting, with its fantastic architecture in impossible perspective, its wreaths and garlands, and its graceful figures floating airily on the rich dark background, the walls of Roman villas received other decorations, such as wainscoting with marble or draping with hangings and tapestries from Eastern looms. Marble veneering, which the Romans used with such lavish hand in their *thermae* and basilicas, was wholly confined to the imperial period, for in 88 B.C. M. Lepidus was censured for providing his house with a threshold of Numidian marble. But the use of marble once introduced became a fashion, then a fad, finally a craze. We may be certain that in the later villas the flash and sheen of polished marble from Numidia, from the Sea of Marmora, from all parts of Italy was everywhere present. Where and when marble was beyond the means of the owner an imitation of its veinings, colours and surface often took its place, executed in hard plaster. Roman taste was never fastidious on such points—not more so than the modern taste which tolerates galvanised-iron cornices, shamming stone, or lath-and-plaster Gothic vaults.

Besides these resources of colour the Roman mural decorator made most effective use of modelling in low relief in the wet plaster. Most of the work of this sort that has come down to us shows an extremely delicate and artistic treatment of the relief. It appears to have been wrought freehand, for the most part if not entirely, and, as the drying of the plaster necessitated rapid work, it has a peculiar charm, a snap, a freedom and individuality which render it extremely attractive and well worthy of study. It is a style of work which might easily and wisely be revived in this time and country, for it can be made as monumental or as playful as may be desired, and is admirable as an adjunct to mural paintings.

Ceilings were probably of wood or plaster, except in corridors, crypto-porticoes, baths and a few of the monumental apartments in which vaulting was employed. No vestiges or moulds of panelled wooden ceilings have been preserved to us in the ashes of Pompeii or the ruins of villas or palaces. The concrete-and-brick coffering of the Pantheon and Basilica of Constantine, and the richer panelling of some of the stone ceilings of Palmyra and Baalbec, give us suggestions of the probable treatment of the more important horizontal ceilings, while those of the minor rooms were in all likelihood plain flat plaster ceilings, more or less enriched with painting.

The furniture of the villa was in keeping with its extent and cost. Some of the accounts we have of Roman extravagance in this respect are almost incredible. The luxury there displayed was, however, of a somewhat different character from that of modern times. It was more ostentatious, but far less comfortable. Silver, gold and bronze, marble and ivory were the materials most favoured for the long couches or beds of the *triclinia* (dining-rooms) and the thrones and tables of the rooms of state.

The furniture was sumptuous, ponderous, often admirably designed, but stiff, formal and cold according to our notions. It is of course possible that wood and upholstery, to which we owe the luxurious ease and comfort of modern furniture, were more largely used than the paintings and reliefs would indicate. But whatever may have been lacking in this respect was more than made up by the splendour of the surroundings; the Oriental rugs and tapestries, the perfumed silken *velaria* or awnings intercepting the hot sun's rays, the babbling fountains in basins of silver, mosaic or marble, the magnificent floors of mosaic, the brilliant colours of the court walls, the flash and glitter of silver and gold, the vistas through colonnades, halls and courts; while attentive servitors waited upon every want of the owner and his guests, and music, poetry and the luxury of the many-chambered bath served to add physical and intellectual pleasures to the delights of the eye.

Doubtless there were discomforts. Glass was costly and rare as a filling for windows—it was neither smooth nor clear. Horn and mica and oiled parchment would seem to us poor substitutes for plate-glass, and dripping and odorous and smoky oil lamps, however graceful and artistic in form, a very inadequate and trying means of illumination at night. With all the ingenuity of the varied exposures of the Roman villas, the wind and cold could not well be shut out without also shutting out the sunshine and daylight. The modern fiction that sunny south lands are always warm did not keep the ancient Roman from shivering in December or March, any more than it does the modern tourist in Italy. The hypocausts and furnaces of the antique villa, at the cost of an enormous con-

sumption of fuel, could hardly in severe windy weather have warmed Pliny at Laurens as comfortably as a modern hot air or hot-water furnace in the 5,000-dollar house of an American village shopkeeper.

The conditions which produced the Roman villa can never exist again. But the landscape gardening and the architectural embellishments which surrounded it had much in them which it has proved possible to revive in modern times, and are full of lessons for those worthy persons of artistic tastes who are minded, in our day, to surround themselves with whatever is sumptuous and beautiful in nature modified by human art.

THE EASEMENT OF SUPPORT.

THE following judgment was delivered on Monday in the Court of Appeal by Lord Justice Lindley in *Howarth v. Armstrong* :—

The plaintiffs and the defendant are respectively entitled, as lessees under the Ecclesiastical Commissioners, to two adjoining houses in Drake Street, Rochdale, and the question raised by the appeal is whether the defendant is entitled to have his house supported by one of the walls of the plaintiffs' house. The Vice-Chancellor has decided that the defendant is so entitled. The plaintiffs contend that he is not. The question arises in this way. In 1797 both houses belonged to the vicar of Rochdale, and he granted one long lease, ending in 1895, of them both. Each house was afterwards sublet separately from the other, and in 1864 each was held under a sub-lease which expired a few days before the head lease. Up to this time (1864) neither house supported any part of the other. Each had a garden in front, and between the two gardens there was a low wall 11 feet 3 inches long, in a line with the south wall of the plaintiffs' house. In 1864 James Howarth was sub-lessee of the plaintiffs' house, and James Chadwick was sub-lessee of the defendant's house. Howarth had raised the above-mentioned 11 feet 3 inch garden wall to the extent of about 13 feet, with the permission of Chadwick. By an agreement dated October 3, 1864, Chadwick agreed to let Howarth maintain the wall so built by him during the remainder of the head lease of 1797, less the last twenty days thereof. For this permission Howarth was to pay 5s. a year. This agreement treats the low garden wall on which Howarth had built as Chadwick's wall. In 1870 the sub-lease of the defendant's house was vested in Armstrong by assignment from Chadwick. Armstrong had, with Howarth's permission, built into his wall, and by an agreement, dated March 25, 1870, Howarth agreed that Armstrong might maintain and enjoy Howarth's wall during the remainder of the head lease of 1797, less the last twenty days thereof. For this permission Armstrong was to pay 5s. a year. This agreement is not clear as to what wall of Howarth's was meant. I understand, however, that it included not only that part of the south wall of Howarth's house which has been called his gable wall, but also the wall which Howarth had erected, with Chadwick's permission, on the 11 feet 3 inch garden wall already mentioned. At any rate, as I understand the facts, Chadwick did put beams into this raised wall with Howarth's consent, as stated in the agreement of 1870. The material fact to be borne in mind is that, whatever cross-easements were agreed to be granted by one lessee to the other in 1864 and 1870 as before mentioned, those easements were temporary only, and were created by agreements to which the lessors were not parties, and those agreements came to an end in 1895, twenty days before the expiration of the head lease of 1797 and ten days before the expiration of the sub-leases under which the tenants held their respective houses. Pausing here to consider what the rights of the tenants would have been when the agreements of 1864 and 1870 came to an end if nothing further had happened, it seems plain that each could have removed or required the removal of what had been built into his own wall. This right would have come to an end in the sense that it could not be infringed after the expiration of the sub-lease under which he himself held. Still, the existence, even for a short time, of this right of removal becomes very important in considering the effect of what took place in 1871. In that year Howarth, without surrendering his underlease, obtained a new lease from the Ecclesiastical Commissioners for a term of 999 years, to be reckoned from the date of the lease, *i.e.* 1871, but as regards possession to take effect from one day after the expiration of the subsisting head lease of 1797, *i.e.* 1895. In March 1889 Armstrong also obtained a long lease of his house from the Ecclesiastical Commissioners framed in the same way. There is nothing to show whether the Ecclesiastical Commissioners had or had not any knowledge of the agreements come to between the tenants of the two houses in 1864 and 1870 as above mentioned. The Vice-Chancellor has decided, and it is now admitted, that the plaintiffs' lease of 1871 comprised the whole of the walls referred to in the agreements of 1864 and 1870, and since 1895, when the head lease

of 1797 fell in and those agreements came to an end, those walls, including the 11 feet 3 inches garden wall (treated in 1864 as Chadwick's), and the erection upon it, have been the plaintiffs' for the rest of their present lease. The question is whether the defendant has acquired any right to keep the ends of his beams in the plaintiffs' wall, although the agreement under which his predecessor put them there is at an end. There is no agreement between the plaintiffs and the defendant conferring any such a right on the defendant. But he contends that the lease by the Ecclesiastical Commissioners of the plaintiffs' house to the plaintiffs in 1871 operated so as impliedly to reserve to the lessors a right to have the defendant's shop supported as in fact it then was, and that this right passed to the defendant by his lease of 1889. This view has been adopted by the Vice-Chancellor, and its correctness turns on the terms of the lease of 1871. An examination of this lease shows that the lessors reserved the mines and minerals under the property demised, but nothing else in express terms. The covenants by the lessee are, however, very important. Howarth agreed with the Ecclesiastical Commissioners that he would keep up the value of the property demised to an amount there specified by maintaining and repairing the then existing house, or by rebuilding or improving it, or by erecting one or more other houses in lieu of it or in addition to it. The appellants counsel contended that this was inconsistent with any implied reservation of a right to have Armstrong's house supported by the house demised to Howarth. But the lease contains other covenants by the lessee which require attention. There is a covenant by the lessee that he will not carry on certain trades, "nor do or permit to be done anything which may tend to the annoyance or damage of the other tenants of the glebe land," by which is meant other adjoining land belonging to the Ecclesiastical Commissioners, including that which they afterwards let to Armstrong. Then there is a covenant to keep the property demised in good repair, and so to yield it up at the end of the term. The lease to Armstrong is in similar terms, and the same form of lease is no doubt adopted by the Ecclesiastical Commissioners for all their property forming what is called the glebe land. The Ecclesiastical Commissioners are not parties to this action, and it is not necessary to consider whether they could obtain an injunction to restrain the plaintiffs from removing the defendant's beams and thereby annoying and damaging him. On this point I express no opinion. But, assuming that such an action could be maintained, I have come to the conclusion that it would be going too far to hold that the lease to the plaintiffs in 1871 impliedly reserved to the lessors the right to have the adjoining house supported by the plaintiffs' wall. Such a reservation cannot, in my opinion, be treated as dating from the date of the lease of 1871, for it was not to come into operation, as regards the interest and right of possession, until 1895. As regards easements impliedly reserved to the lessor, the lease of 1871 can only be treated as coming into operation from the end of the old head lease of 1797—that is, from 1895—but it was quite uncertain in 1871 what the state of things would be when the old head lease would come to an end. Both houses might then have been restored by the tenants to the state in which they were before the agreements of 1864 and 1870 were entered into. To stipulate for a future easement of support, if wanted, might be reasonable enough, but such an easement cannot be implied on the ground of necessity, nor upon any other principle with which I am acquainted. It was contended that the lease of 1871 should be treated as if granted in 1895, and as a lease of the plaintiffs' house as it then stood. But it is, in my opinion, impossible so to treat the lease. We must take it as it is, and not as if it were something quite different. The peculiar facts of this case render the authorities relied upon by defendant inapplicable. *Roach v. Jones* is the nearest, and might have covered this case if the lease of 1871 had been granted in 1895, and if the plaintiffs' and defendant's houses had been then in the state in which they in fact were. But courts cannot legally imply reservations of easements unless it is clear that such reservations are necessary in order to give effect to the real arrangements which the parties were making, and in this case I am unable to come to the conclusion that there is any such necessity. The appeal, therefore, must be allowed, and it must be declared that the defendant has no such easement of support as he claims. This being the controversy between the parties, and the defendant being in the wrong, he must pay the costs here and below.

Lord Justice Lopes and Lord Justice Rigby concurred.

The Bill authorising the New River Company to raise 1,000,000l. additional Debenture stock has passed the House of Lords as an unopposed measure. The money raised by this issue will be spent upon providing the company with an independent line of pipes from the authorised Staines reservoirs.

"THE GRAVES" AT KILHAM.

ONE of the most important and interesting archaeological discoveries of recent years has been made at Kilham, on the East Yorkshire Wolds, when, under the auspices of the East Riding Antiquarian Society, several of the small tumuli popularly known as the Danes' Graves were opened. These mounds, of which there are 178, says the *Eastern Morning Post*, have for centuries been variously regarded by the historian as the resting place of either Danish settlers or those who fell in battle, probably against Harold. The conjecture of the historian, supported as it has been by local belief, has now, however, been proved to be entirely false, and we have it on the word of Canon Greenwell—perhaps the greatest living authority on these matters—that far from being the graves of Danes they belong to an age at least 1,000 years before the Conquest; that is, to about 2,000 years ago, and prior to the Roman invasion. To this conclusion he has come after an exhaustive examination of the tumuli, of which thirteen were laid bare, and in one of which were found not only the bones of the ancient Briton quietly reposing there, but the iron tyre of his chariot, the iron bit and trappings of his horse, and, most interesting of all, a bronze pin, beautifully designed and enamelled. The discovery of these, together with the shape of the graves and the curled-up position of the skeletons, leave no doubt as to the age to which they belong, and satisfactorily dispose of the wrong theory which has prevailed for generations.

For some days past the excavations have been going on under the careful guidance of Mr. J. R. Mortimer and Mr. Thomas Boynton, permission having been given by Mr. Harrison Broadley, who, we understand, has expressed the wish that whatever may be found shall be deposited in the York Museum. When, therefore, the visit was made by a number of members of the East Riding Society, the work was in an advanced state, and they were rewarded by the sight of the valuable finds to which we have already briefly alluded.

Canon Greenwell prefaced his remarks with a brief sketch of the races which have occupied the land from the earliest times. Beginning at the beginning, he said that of the earliest occupants of England they had no trace whatever in this part of the country. He did not think that there was any trace of them whatever further north than the south of Norfolk, and when he had to speak of these earliest inhabitants and some later ones down to the people who threw up those mounds, he would not speak dogmatically, but rather tentatively, because they really knew very little on the subject. The first people in England was Palæolithic man, who used stone implements. They had found no bony remains which could be attributed to him. There had been several skulls attributed to that time, but he thought that there was no evidence to show that they did not belong to a later period. Therefore, they had not to regard these early people from their bony constituents and personal appearance, but from their stone implements and so forth found in the gravel beds of rivers. These implements found in these river gravels were never ground or polished. They were all no doubt acquainted with polished stone axes found in the land, these were reduced into form undoubtedly by chipping, and there was no instance known where implements of that period had been found which showed the least trace of grinding or polishing. It was quite vain to say—quite foolish to say—what they were intended for, because they did not bear sufficient indication to enable them to be described as a spear-head, a knife, and so on. Having described other features of the Palæolithic age, Canon Greenwell said that it was impossible to fix anything like an approximate date for it. Some had said 200,000 years, some a million, some 20,000; at any rate, they might be quite certain that a very, very long time had elapsed. They had records in Egypt going back 4,000 or 5,000 years before Christ, and they had representations of animals and fauna of that country in abundance. There was no difference between them and the present; but in the Palæolithic age they had man associated with implements of a different class, and changes in the animal life and fauna which could only take place after a very long period. Up to the present day they had not been able to bridge over the distance between the Palæolithic and Neolithic age—the time when implements were ground and polished. There was no trace of the bridging. It must be that man was driven out by the glacial descent to a more southern place. Some day we might get all the evidence. Up to the present we had made mere scratchings on the earth's surface; a great part of the globe was practically virgin soil in that respect. These Palæolithic implements were spread over a very wide area—France, Spain, Syria and Egypt. One of the most extraordinary discoveries had been made in Somaliland, where implements had been found in large numbers. He had no doubt that what had been found in that spot would be found all over that country. Those which had been found were precisely identical with everything in this country, and it was quite difficult to think that they could have been made without some intercourse and copying. With regard to the Neolithic age—a very much later period—he could not tell them anything at all positively. The skulls of these people

were of the long-headed type. We could find the most typical Bronze period headed men and Stone headed men living amongst us to-day. The Neolithic people buried in a peculiar form of mound—a long one—and we found very few articles buried with them; and we did not find many implements, but some pottery which was quite different from the pottery of the Bronze period. In the Bronze period we came to a time nearer our own, but he did not think it would be safe to say with any certainty when the Bronze people arrived in this country. He had no doubt that they were an invading people who conquered the long-headed people, and were not so tall, not so strongly made; they were pleasanter-looking people, because the bony remains showed that they were really a very good-looking people indeed, with soft features and without the high cheekbones of the Bronze people. The Bronze people came into the country across the sea. The South Germans approached more than any others in their appearance to these round-headed people. He thought that the bronze-using people came with superior material, being a stronger people, and that they conquered the stone-using people. Some might think that they extirpated them, but it was very rarely that the conquerors extirpated the old inhabitants in days gone by, when all the people were white people with the same mental characteristics, and more or less people descended from the same general stock, and therefore did not absorb each other. The primary interments in the long barrow were always round-headed people, but when one came to the barrows of the bronze-using people, there were round and long-headed people, and a mixture of the two. Seeing that when the round-headed people invaded the country they did not extirpate the other, but lived with them and intermarried with them, these people were the persons who raised all the enormous quantity of barrows which remained over the Yorkshire wolds and other parts of England, and due to the examination of these sepulchral mounds we had obtained a great deal of information about the people, their mode of living, and, to some extent, of their political constitution. It was fallacious to suppose that these people went about without clothing and painted their bodies. On the contrary, they were clothed nearly as well as we were. Buttons and various classes of dress had been found, so we must put out of our heads altogether the notion that the Bronze people were savages. They were people possessed of a considerable amount of civilisation, and had beautiful weapons and implements, because nothing could exceed the grace of the spear-heads and swords used by them. After the Bronze period we come to what was the early Iron period, or late Celtic period, and in this the proceedings of that day were centred. He was standing on the burying-place of a man or woman of the early Iron people. They were the people who occupied England at the time of the Roman invasion. Cæsar did not meet savages, but a people with smart weapons, iron swords, chariots beautifully ornamented, and, he believed, efficacious and altogether an armament which even the Roman legion found it difficult to fight against. Cæsar met with such a reception that he never attempted it again, and it was not until Claudius that the Romans conquered the country, not only with a good courage but with good weapons. They had spear-heads of iron and shields made of wood, covered with leather, and in some cases further covered with bronze ornamentation in a variety of ways and set in some instances with coral and very frequently with enamel. These people were a long-headed people, very much like the people of the Stone period. It had struck him, and he had seen nothing which induced him to take a contrary view to what he took many years ago, that the growth of the Iron people was not due to any further invasion, but that they were the people who had been conquered by the Bronze people, who had reasserted themselves. He thought he might state without any hesitation whatever that the use of iron came in England 200 or 300 years before Christ. He thought that the facts might be taken as conclusive that about 250 B.C. iron succeeded bronze. These people were extremely skilful in the manufacture of all kinds of metallic processes. But, besides that, they had enamel. He did not think that enamel originated here; it was not known where it originated, but it was used to a very large extent by the early Iron people, from whom the Romans copied it. Up to that day very little was known of the people who threw those mounds up. They were called the Danes' Graves, but that meant nothing whatever. We had other places attributed to the Danes which had nothing whatever to do with them. We had Danes Dike and the Grim's Graves, which he opened in Norfolk. The fact was that our Teutonic ancestors, when they came across anything they did not understand, very naturally attributed it to either the Danes, from whom they suffered considerably, or to the Devil, whom they feared. Until that day no one had been able to say positively what these graves at Kilham were. Thirty years ago he opened some, and he acted in a most foolish manner. He opened some of the little ones, and found only a few ornaments and pottery, and a few rusted bits of iron, which told nothing whatever. Therefore, he could not come to any certain conclusion,

although he had held the opinion for many years that they were the burying-places of people of the early Iron period. He was led to the opinion by an iron bracelet in the Ashmolean Museum, Oxford, found in one of the graves at Kilham. That was emphatically an armlet of the early Iron period. Now all doubts had been set at rest entirely. Mr. Mortimer had found a very beautiful bronze pin enamelled. It was a specimen of early British enamelling, and a type quite peculiar to the early Iron period. It had a peculiar twist in the shank, which made it quite conclusive. Here they had behind them much more conclusive evidence. In the graves they had the remains of a chariot. The chariot was an important element in British warfare. Caesar found it a very important means of offence, especially when scythes were fixed to the wheels. He did not know whether there was a scythe on the chariot now discovered. He had opened two other graves, at Arras and Beverley, in which chariots had been found, and in the one at Arras there were the tyres and naves of the wheels complete. The tyres were iron, but the naves bronze. Then there was an iron mirror with bronze mountings, and curiously enough the person buried was a woman. She was no doubt a great lady, for she was buried between two pigs, to serve her in another world. There was also the end of the shank of the whip of bronze, and two or three rings from which the reins of the chariot had been carried. There was nothing of the belts and other things found with the bones at Beverley. The bones there had gone to decay, but at Arras the human bones and the pigs' bones were just as fresh as if they had been buried only 100 years. There was no trace of the horses, except the bits, therefore the man must have been buried with the chariot and his horses, represented by the wheels and the bits. Similarly at the grave at Kilham.

CLERGY AND ARTISTS' ASSOCIATION.

ON Monday the Bishop of Rochester presided over the second general meeting of this Association, held at Victoria Tower Chambers, Millbank Street, Westminster. The Chairman said the Association began its operations a little more than a year ago on a very small scale, and it was gradually gaining the support and confidence of the public. Its object was to enable the clergy to approach the artist more directly with the idea of obtaining the direct work of the artist in the decoration of churches, and of forming a centre where examples of artists' work executed in churches could be seen and information given. Within the past year the membership had increased by about fifty. The growth of the work was very evident, and the demands made upon the Association were steadily increasing. Mr. R. Hallward, hon. secretary, gave a detailed account of the progress of the work of the Association, the members of which now amounted to about 150. The income last year was about 180*l*. A discussion upon the question of work at future conferences terminated the proceedings.

TESSERÆ.

Peculiarities of Normandy Churches.

NORMANDY in the twelfth century was an English province. The difference in style between that and the other districts, even in the north of France, and joining on to it, was far more marked than between Normandy and England; even the very plans of the churches are quite distinct. In England and in Normandy we have long narrow naves, with side aisles, also generally narrow in the earlier buildings. In Anjou and Poitou the style of that period is called by the French antiquaries the "Plantagenet style," and correctly, as matter of history; but the name has not been adopted by English writers, and we have no similar building in England. Neither in Normandy nor in England was the central space, whether choir or nave, vaulted over before the middle of that century. The vaults over the central space of the abbey churches at Caen are additions to the original building almost a century later. At Sens, also, the central vaults were added after the great fire in 1184, that is, just after Canterbury was finished. In Normandy the round abacus of the capitals is common; it is rarely found in any other part of France, and yet it is almost a necessary feature of the Gothic style. The plain round moulded capitals also occur, though not so frequently as in England. Detached shafts to the jambs of windows or doorways are common in both windows of two lights and of three lights, separated by mullions, and without tracery at first, are also both English and Norman. In an architectural point of view, Normandy may be considered as a part of England, from the time of the Conquest to that of King John, that is, during the whole period of the Anglo-Norman style.

Greek Vases.

All Greek fictile vases were formed, with the help of a potter's wheel, out of a lump of moist clay, and subsequently baked in a furnace. Their surface was ornamented with a variety of designs painted on the clay, and in some instances incised or modelled. The subjects with which these vases are decorated are for the most part derived from the divine or heroic legends of the Greeks. Many of the incidents represented belong to well known myths. Others are chosen from legends which, though they may have been quite familiar to the Greek mind, are not so well known to us. Though it may be assumed that the greater part of the compositions depicted on vases represent mythical incidents, or have a symbolical import, there are some which seem to be simply scenes from real life. Thus we find many subjects relating to the chase, the public games or the indoor occupation of the women which cannot be connected with any known myth. These representations of the actual life of the Greeks have a special interest as evidence of their manners and customs. We learn from vases many curious particulars in reference to the Hellenic ritual, games, festivities and domestic life; and we have representations of many products, instruments and technical processes of the mechanical arts. These curious details may be studied not only in the vase pictures which seem to represent scenes of real life, but also in those which are certainly mythical; because in Greek art, as in Greek poetry, the gods and heroes are constantly represented in the figure and attire of mortals, and in the legends relating to them many incidents and traits are borrowed from real life. Hence, in vase pictures, whether gods, heroes or mortals are represented, we find a general similarity in the costume and character of the figures. The relative antiquity of the different classes of vases may be determined approximately by the style, and in the case of the inscribed vases by the shapes of the letters, mode of writing, orthography and grammatical forms.

Renaissance Architecture.

The especial struggle made by the Renaissance architects developing out of Gothic architecture was towards the increase of domestic enjoyment, through the hall, the hearth and the home; while the tendency of the Italian Renaissance architects developing out of culture direct from classicality was towards that semi-public domesticity which took the form of the more stately palace. That modification of the later Italian architecture which became popular in France from the time of Louis XIV. onwards was essentially aristocratic and courtly. Vast in extent but poor in proportions, the architecture of the Frenchman of Louis XIV.'s time was no bad reflection of the characteristics of Louis himself—at once pretentious, and incompetent to convey any other idea than that of inability to rise to the grandeur which he felt it his duty to aim at, even while unable to attain it. In most of our modern architecture, up to within a comparatively recent period, men throughout Europe have seemed content to follow a sort of accidental system based, not upon the study of principles, but upon the works of any fashionable or successful contemporary. A species of rule of thumb, varied only by the endeavour to do a little better than some immediate predecessor, seems to have ruled very generally, and it was not until periods of revolution had wakened men to a free assertion of their rights of intellectual judgment in all directions that an effort was made to throw off the feeble shackles of an empty academic system. With this free trade of thought sprang up a respect for many a long-forgotten mind, whose existence beyond the pale of the academic curriculum had doomed his life and labours to all but oblivion. With new respect for such men came new respects for old systems, and with respect for old systems, for old monuments. The reaction from the destruction which took place in revolution was naturally increased care for all that revolution had spared.

Roman Grouping.

The Romans seem to have affected the practice of grouping buildings together as features in one general symmetrical plan. Their temples and basilicas were frequently placed, as the principal architectural objects, at the extremity of a forum or other regular area enclosed with colonnades. The Temple of Nerva stood at one end of, and partly projected into an enclosure (measuring about 360 by 160 feet), the entrance end of which had five open arches, and the sides were formed by screen walls, decorated with Corinthian pilasters and columns immediately before them, over which the entablature formed breaks. Of Trajan's forum, which was surrounded not only by colonnades but various stately edifices, nothing now remains except the celebrated triumphal column that occupied its centre, and which, so placed as a principal object, must have heightened the splendour of the whole. Like that of Nerva, the Temple of Antoninus and Faustina was placed at one end of a court of moderate dimensions, whose sides were adorned with coupled columns placed immediately against the walls; and only the portico part of the temple (a Corinthian hexastyle, triprostyle) advanced into

the enclosed area in front. The forum of Caracalla was nearly a square, entirely surrounded by arcades, presenting thirteen arches on each of the longer and eleven on each of the shorter sides. In the centre was a Corinthian temple very similar in plan to the Pantheon, with a hexastyle, triprostyle portico in front, and remarkable for having inner columns behind the second from each angle, so that there was a double range of them at each end, and the central space within the portico was a perfect square equal to three intercolumns. Unlike those of Greece, peripteral temples were of comparatively rare occurrence among the Romans; they were mostly prostyle, the portico being attached only in continuation of the cella, whose walls formed the flanks of the building, though the order of the portico was frequently continued along them either in half-columns or pilasters. Such is the plan of that celebrated one at Nîmes, known by the name of the *Maison Carrée*, which is a Corinthian hexastyle, pseudo-peripteral, the cella being ornamented with attached columns, thereby making ten intercolumns on each flank, three of which are open, or belong to the portico, which latter is accordingly triprostyle. The Corinthian temple at Assisi was similar in plan, except that it was not pseudo-peripteral, the sides of the cella being plain. That of *Fortuna Virilis* at Rome was an Ionic tetrastyle, diprostyle and pseudo-peripteral. Besides contributing to variety, temples of this kind possess a certain variety of effect in themselves, owing to the depth of the portico and the contrast between that part and the cella.

Instruments and Geometry.

It is usual to say that the rule and compasses are the instruments of Euclid's geometry, which is not altogether correct, unless it be remembered that with neither ruler nor compasses is a straight line allowed to be transferred, of a given length, from one part of space to another. It is a plain ruler, whose ends are not allowed to be touched, and compasses which close the moment they are taken off the paper, of which the Greek geometry permits the use. It is altogether uncertain by whom these restrictive postulates were introduced, but it must have been before the time of Plato, who was contemporary with (if he did not come after) the introduction of those problems whose difficulty depends upon the restrictions. We may here observe that in actual construction the ruler might have been dispensed with. It was reserved for an Italian abbé at the end of the eighteenth century, when all who studied geometry had for two thousand years admired the smallness of the bases on which its conclusions are built, to inquire whether, small as they were, less would not have been sufficient. In Mascheroni's "*Geometria del Compassa*," published at Pavia in 1797, it is shown that all the fundamental constructions of geometry can be made without the necessity of determining any point by the intersections of straight lines; that is, by using only those of circles. This singular and very original work was translated into French, and published at Paris in 1798 and 1828.

Coloured Statuary.

The influence of the material is everywhere evident in Greek art. As the Egyptians did not paint their statues of granite or porphyry, but only those of wood, limestone, or sandstone, so the Greeks, as soon as they began to employ marble and ivory, which is of a nature allied to marble, discovered the true law for the application of colour—a law which they never afterwards transgressed. It corresponds precisely with the law which regulates the use of colour in the marble temples. As in the marble temple the main body of the temple was white, and only particular parts such as the metopes, the triglyphs, the cornice and the ornaments of the ceiling were brought into prominence by means of colour, partly to heighten the effect of the pure white by a lively contrast, partly to secure for the sculpture an effective background, so in the sphere of plastic art the body was kept quite pure, and only certain portions of the face, which in the natural human form are sharply distinguished from the prevailing flesh-tone by an intensified colouring, received additional prominence. The full use of colour takes place only in the dress which certainly is sometimes painted, not merely along the borders, but throughout, as in the Panathenaic procession of the Parthenon cella-frieze. The decoration supplied by colour marks the robe emphatically as ornament, and distinguishes it from the more profoundly significant corporeal forms; while the wreaths, diadems, weapons and symbolic attributes of gilded metal all serve to strengthen the affinity between plastic and living forms, as the shields won in battle which were fastened to the architraves of the temple connected the ideal world of architecture with real life. Nor need we be afraid of finding that bronze statuary transgresses this well-defined law. The bronze statue is by its very nature still further removed from artificial colouring. Here again, accordingly, we find only eyes, lips and hair, and some parts of the dress brought into prominence by means of gold, silver and precious stones, but so far from any attempt at deceptive imitation being made, the lips, for example, are regularly plated

white with silver. When the anecdotes of art, then, tell us of the sun-burnt skin of the statues of the athletes, of the blush on the cheek of Athamas, of the deadly paleness on the countenance of Jocasta, or even of the red on the cheeks of the Lemnian Athene of Phidias, such stories may help to give us a lively conception of the high perfection to which the art of fusing metals had been brought, and may show a certain amount of degeneracy in that art; but, like the descriptions of Callistratus, they are for the most part to be considered as strongly tinged with rhetorical exaggeration. The ancients themselves put a high value on the fine green tone of the patina produced by oxidation; it is the *nobilis ærugo* of Horace. But how could they do so if they at the same time demanded from the bronze deceptive resemblance?

The Nude in Greek Art.

The kings, princesses and heroes of a Corneille and Voltaire never forget their rank in the most vehement passion, and they put off their humanity far sooner than their dignity. They are like the kings and emperors in the old picture-books, who go to bed with their crowns on. How different with the Greeks and those of the moderns who have composed in their spirit. The Greek is never ashamed of nature; he allows to the sensuousness its full rights, and yet is always secure from being overcome by it. His deeper and more correct intellect permits him to distinguish the contingent, which a bad taste magnifies, from the necessary. But all in man that is not humanity is contingent. The Grecian artist who has to represent a Laocoon, a Niobe, a Philactetes, knows of no princess, no king, and no king's son; he busies himself only with men. For this reason the wise sculptor throws aside the vestment and shows us only naked figures, although he knows very well that this does not occur in actual life. He esteems clothing as something contingent, to which the necessary need never be postponed, and the laws of propriety or need are not the laws of art. The sculptor should and will show us men, and garments only conceal them; he is right, then, in throwing them aside.

Theories of the Beautiful.

Alison would make the beautiful simply consist in association; Burke would be content to identify the beautiful with the merely agreeable, and would call sweetness, for example, beautiful to the taste, in the same sense in which a flower, a picture, or the window of a Gothic cathedral is beautiful to the sight; Dugald Stewart goes far towards identifying the beautiful with the useful or the appropriate, and would explain it on the theory of an adaptation of means to ends; Sir Joshua Reynolds held the beautiful to consist in a mean between two extremes, so that the Greek nose, for example, would be beautiful, as being the due medium between that of the Roman and the negro; and, in short, interpreted the beautiful simply on a theory of habit, even to the extent of believing that if that which we now are accustomed to call ugliness had predominated in the world we should feel in it the same pleasure which we now do in the beautiful. There is one theory which has the singular recommendation of being at once the earliest and the latest propounded on this subject, that of the Greek school of philosophy—of St. Augustine, of Coleridge, and of the Père André—viz. the doctrine that beauty is unity, or to express it as is occasionally done, is "plurality in unity," or the combination of the many into one, so as to form a whole. The objection to this definition is the vagueness of the word unity, which may signify anything or nothing. Plotinus says the triangle is the first-born of beauty, as being the most elementary combination possible of the "many" to form "one." Now it is obvious to ask if the connection of three lines into a definite figure is a creation of the beautiful, as being the union into a whole of three parts, what are we to say to the figure resulting from the union of three lines of unequal length? The scalene triangle, which is the figure in question, is certainly not beautiful, though it realises the definition, or seems to do so, and consequently the definition itself is either obscure or not true.

Street Lighting.

It is certain from Jerome that the streets of Antioch were lighted, and it is probable that Rome and a few other cities had some streets lighted. Lamps were suspended near the baths by ropes, but the classical ancients used lights in going home. Beckman says that Paris was the first of modern cities which was lighted, at the beginning of the sixteenth century, because the city was infested with street robbers and incendiaries. This was merely an order for the inhabitants to keep from 9 P.M. a light burning before the windows which fronted the streets. In 1558 fallots or cressets were erected at the corners of streets, three in different parts of a long street, but in the same year this light was changed for lanterns, like the modern. In 1667 lighting the streets was put upon its present footing. In 1414 lanterns were ordered to be hung out in London between Hallowtide and Candlemas. Several attempts were afterwards made, but none succeeded before the application to Parliament in 1744 and 1766. The reverberating lamp was the invention

of Bourgeois de Château-bianc in 1766. Beckman furthermore gives an account at what periods the several cities of Europe were lighted. Pall Mall was illuminated with the new invention of gaslights in or about 1806 or 1807.



Liskeard Church Tower.

SIR,—I am not in a position to fully go into the letter of Mr. Geo. H. Fellowes Prynne of July 5 in *The Architect*, owing to the fact of our tower faculty being under reconsideration. We have had a great number of thoughts stated and restated by Mr. Prynne about this *semi*-Norman tower. Many architects have paid this old church a visit—their *bona fide* opinions I courted in my first letter. Mr. Prynne has dished up for us this tower in your paper, in the *Western Morning News*, in the *Church in the West*, in the *Builder*, and I know not where, until it has become nauseous. Well, let us look at this grand old tower of 600 years' standing. 1. We will look at the west side, to find nothing but some grotesque leads, and these are by some not even allowed a Norman birth. We go to the south side, and we find very little of the Norman work, and that little is covered over with blue slate slabs, cramped together, and then stuccoed. You look at the east side. To do that you have to climb the roof of the nave, and then you are vastly disappointed. Take the north side. There you have your reward in the sight of a heap of small rubble stones, three small and very plain windows. The fact is the bulk of the tower is of the seventeenth century. Mr. Prynne estimates the cost of repairing at 800*l.*, for which we shall have a patched-up tower, bolted with eight iron rods, supported by two buttresses, slabbed with granite blocks to harmonise with the seventeenth-century west end for "many years," "for many generations." The repairing-patching-up done by the seventeenth-century men is not enough. We must spend 800*l.*, and hand down to the future the burden of repairing-patching-up again. I am human, and, therefore, cannot help thinking that Mr. Prynne is disappointed in our refusing to follow his wisdom. He knows best. For myself, I have no intention of being a party to such waste of money. Let us go forward.

Yes, it is true Miss Pedler, in the year 1890, left 1,000*l.* towards the rebuilding of this tower—not repairing-patching-up—on our raising 2,000*l.* by 1900, failing which this 1,000*l.* must gravitate to Truro Cathedral, and augment her former gifts of 13,000*l.* (I am told 15,000*l.*) to that building.

Miss Pedler was guided in this her gift by the opinions of gentlemen of well-known standing in the architectural world. The rebuilding scheme of this tower is not the dream of a night, but the dream of 400 years. The gentlemen of the fifteenth century who nobly built this large Perpendicular nave—having taken down the small Norman nave—would have erected a tower worthy of their new nave had their cash been sufficient. Had they meant the Norman tower to have remained, why did they not rebuild their Norman nave? If the men of 1627 had dreamt of the Norman tower remaining they would have done their repairs and rebuilding in the Norman. The fifteenth-century architects were prevented from carrying out their noble scheme from want of cash, not from want of ability or desire, but from want of the needful money. My supposition is quite as sound as that put forth by Mr. Prynne.

Mr. Prynne says "I hope the Chancellor will not insist on having the tower rebuilt as at present, as it can well be repaired as before stated." No one ever said it could not be repaired. You can repair any building at any cost, but the wisdom of it is another thing. Mr. Prynne says it can "well"; here we differ. To spend 1*l.* 10*s.* on repairing a worn-out and useless suit of clothes when 3*l.* will buy you a new suit is not commendable. You can do what you like with your own money, but you have no right to ask others to give you their money to do a work in which you have reasonable doubts. I say, too, that Mr. Prynne is *ultra vires* in his expressions. Suppose we say, Yes, repair at a cost of (at least) 800*l.* Who will or has to find the money? Mr. Prynne? The Royal Institute of British Architects (from whom we had last week a long letter on vandalism), or any other society? I would like to say more, but I must remember "*sub judice*." I object to the photo of our church tower in your issue of July 9. It is cleverly done. The south porch is dragged in to cover the blue slabbed-stuccoed condition of a portion of the tower, and the long vertical crack is omitted.

I have no hesitation, for my own part, in saying, for the benefit of Mr. Prynne and the few of his school, that without the incentive aid of Miss Pedler's 1,000*l.* there would be no prospect of either repairing this tower, at half of the cost estimated by Mr. Prynne, or of rebuilding this tower, incorporating, as we have stated and restated, the few precious stones of the Normans, of the Perpendiculars, of every sound

stone of this tower into the proposed semi-new tower. Liskeard is not the wealthy town of twenty-five years ago; but with a strong effort, with much self-denial—and we are all unanimous—we can build a tower "more worthy of this church" to cost not less than 3,000*l.* by our raising not less than 2,000*l.* I also candidly acknowledge that Mr. Prynne has not furthered our scheme, but no doubt has influenced many against us. Be that as it may, we paid Mr. Prynne for his visit here and report; having done that, we are under no further obligation to him. We shall try to do what we deem best, guided by the powers under whom we are.—Faithfully yours, J. NORRIS.

July 20, 1897.

Sydney Statuary.

SIR,—I notice in your issue of July 16 a reproduction of the selected group of statuary for the Sydney markets, together with a few remarks thereon. As there are several inaccuracies, I trust you will allow me to correct them.

As I, in conjunction with Mr. Illingworth, was one of the competitors, I am in a position to state the actual facts. For this same reason I shall not attempt to criticise the Council's selection.

Where your account is incorrect is—

1. There were no prizes offered, at which we all greatly demurred.

2. Instead of three competitors, there were sixteen or more.

3. The models submitted were in plaster or wax. Two insignificant ones might have been in clay.

4. Since leaving Sydney I have been informed that Mr. McIntosh contracts to supply three groups for 3,150*l.*, not two, as you stated. The facts are as follows:—The latter part of last year the Council voted 3,000*l.* to erect a single group of statuary for the new markets. Some time later we were invited by advertisement to send in sketch models with tenders, stating price in either bronze, marble or freestone. There was nothing said about three groups, but we were told *ex officio* that two more would be required later. The group was to be 14 feet 6 inches high and 14 feet 6 inches at the base. It was to be erected 50 feet high, fronting a narrow street. No size was stated for the models, and no material was mentioned. About 16 models were sent in, ranging from small sketches to quarter-size models, and coloured white, pink, terra-cotta and bronze. Some of the competitors spent months of time and a serious amount of money to perfect their groups. Ours cost us 50*l.* in hard cash, and about three months' actual labour. The designs were exhibited in the vestibule of the Sydney Town Hall, which is lighted only by a circular light at the top, and has the dim religious light generally connected with a cathedral or cloister. This made it bad for some, as bronze was most in favour, and groups were modelled to be looked at from below. Finally, after much delay, the Council appointed the city architect, the Government architect and the mayor to select three groups, out of which the final selection was to be made. After this I have since heard that Mr. McIntosh was selected, and contracts to supply three groups in marble for 3,150*l.*—Yours faithfully, HERBERT C. ODLING.

London: July 19, 1897.

GENERAL.

Mr. Reginald St. A. Roumieu has been selected as surveyor to the Girdlers' Company. He has also been appointed hon. architect and surveyor to the School for the Indigent Blind, St. George's Fields, S.E., a corporation established by Royal Charter.

The Annual Report of the Palestine Exploration Fund announces that the limits of the Pool of Siloam have been determined, and portions of the rock-hewn steps which led down to it have been found. The church which was known to have existed at Siloam has been discovered, and its plan, which presents many features of interest, has been ascertained. The paved street which has been followed a long distance up the Tyropeon Valley is apparently that by which the pilgrim Antoninus (570 A.D.) descended from the "Double Gate" or "Triple Gate" of the Haram to Siloam.

The New Iron Railway Bridge over the Adour at Tarbes broke down while being tested on Saturday. Two engines and three trucks containing twenty-five persons fell into the river. Some were seriously injured, but it is hoped that they will recover.

The Subject for the Grand Prix in Painting in the Ecole des Beaux-Arts is *Vulcan aided by Force and Violence enchain-ing Prometheus to one of the rocks of the Caucasus*.

A Memorial Tablet has been fixed on the wall of the Ecole Normale in the Rue d'Ulm, Paris, recording the discoveries of Pasteur in the laboratory of the building, from 1857 to 1885. The portrait of the chemist is by M. Auguste Patey.

A Sum of more than 15,000*l.* is now available to establish a professorship of Public Health and Sanitary Science in the University of Edinburgh.

The Architect.

THE WEEK.

THE competitors for the Cardiff Town Hall will have the advantage of Mr. WATERHOUSE's services as assessor. It is arranged to pay him a fee of 300 guineas for the troublesome work of examining the designs. Mr. WATERHOUSE suggested that it was undesirable that the proposed 5 per cent. commission to be received by the successful competitor should include travelling expenses. Every inducement should be afforded to the architect to devote as much time as possible for personal supervision of the building operations, and nothing should be done to handicap the ablest architects obtainable in the country. The committee have agreed to the proposal, and, as Mr. WATERHOUSE has succeeded in Cardiff, there cannot be much difficulty in obtaining a similar concession in other towns. Mr. WATERHOUSE's recommendation that the time for sending in designs should be extended to December 4 was also adopted.

THE perversity of a party of members of the London County Council was again exemplified on Tuesday. After the late scandals, and the voting which followed, the works committee was supposed to have no more than a nominal existence. Decency dictated also that the supporters of so questionable an institution would henceforth avoid any attempt to renew arrangements which have brought discredit on the system of local government. But on Tuesday advantage was taken of the absence of members who are in favour of economy. Works were grasped which are beyond the capacity of the works department as it is now constituted. There are to be at least three more undertakings, for which the people of the Metropolis may be certain they will have to waste a higher sum than would satisfy a contractor as his profit. At Millbank sewers and roads are to be constructed on the amateur system at a cost of 11,653*l.*; a block of dwellings is to be raised in Boundary Street area for which the estimate is 17,943*l.*, and another costing 5,460*l.*, or in other words 34,453*l.* can be expended, with the certainty of a further outlay, in order to gratify a party that has been tested and failed. As showing the absurdity of the arrangement, there are two other blocks in Boundary Street area with which the committee dare not meddle, as the estimates are supposed to be insufficient. If they have the hardihood to try their administrative ability on two blocks, why should they be daunted with an additional two? The fear suggests that the Council's estimates are not prepared on a uniform system, and that is enough to excite grave reflections in the public mind.

THE contest on Saturday last for the seat in the Académie des Beaux-Arts, rendered vacant by the death of M. FRANÇAIS, the landscapist, was really confined to M. HARPIGNIES, another landscapist, and M. VOLLON, the painter of still life, although MM. BUSSON, AIMÉ MOROT, DAGNAN-BOUVERET, FRANÇOIS FLAMENG and A. MAIGNAN were also inscribed as candidates. Thirty-five Academicians took part in the voting. After several attempts, in which the required eighteen votes were not obtained by anyone, it was found that for M. HARPIGNIES there were seventeen votes, and for M. VOLLON sixteen, while M. MOROT attracted two. On the retirement of the last, his supporters gave their votes to M. VOLLON, and the struggle was decided. The new Academician is a native of Lyons, and is the most successful of the French painters of still life. His splendid colour and the brilliant accessories he introduces make his pictures dangerous neighbours in an exhibition. It is remarkable that in England his class of work is rarely attempted, although it affords exceptional opportunities for skill in colour and arrangement. One of M. ANTOINE VOLLON's works would be not only a novelty in an Academy exhibition, but an experiment that would determine whether there was a market for refined "still life" in England.

THE international congress on the subject of fires which it is proposed to hold in Paris is approved by several ministers, senators, deputies and municipal councillors.

But what gives the project importance is the support it has received from architects. Among them are MM. BOUVARD (Inspecteur Général of the Service d'Architecture of the City of Paris), VAUDREMER, CHARLES GARNIER, LEGROS ("Architecte-Voyer en chef"), PIERRON ("Architecte-Voyer en Chef, adjoint"), and BUNEL (Architecte en Chef to the Prefecture of Police). There are also several professors of medicine and of various sciences. At the present time Paris is certainly the most eligible place for the discussion of the subject. From their peculiar construction there is less danger in the houses of fatal or dangerous conflagrations than in most other cities. The general confidence in the safety of every structure thus removes all anxiety when sheds are run up like that for the bazaar in the Rue Jean Gougon. But the Municipal Council will have to insist on less flimsy work on other occasions; and, moreover, it will be necessary to provide an organisation and appliances which will be equal to emergencies. For that purpose, as Mr. HOARE, the English representative of the Congress, says in his letter:—"France requires in this matter to get assistance outside her own country, and nowhere can she get it better than in England."

THE affection of Americans for England will be often appealed to if Devizes Castle and the demesne around should be acquired by a purchaser from the States. Advertisements of the forthcoming sale have appeared in New York papers. What is more important, the influence of Mr. A. J. BLOOR, the architect, has been obtained, and he descants on the interest attached to a building which was the dower-house of twelve English queens, and was protected by a moat, "the waters of which once engulfed many an armour-weighted besieger." The owner, it appears, is eager to have a successor who will do justice to the place, and, says Mr. BLOOR, "I think there are, somewhere between the Atlantic and Pacific seaboard, men in this community who have both the wealth and the sentiment to indulge in, and to appreciate in all its bearings, the possession of such a place, and among these bearings I count as not the least the owner's opportunities for helping to foster the brotherhood of the English-speaking peoples, and through them the civilisation and best interests of the world." In that desire we join, and indeed it would be satisfactory if several additional Americans could be induced to settle among us.

AN extraordinary case has been decided by the Supreme Court of New Jersey. It seems that a new city hall was lately built in Jersey City, and among its decorations were intended to be some "allegorical groups." These were included in the contract, but the specification required that they should be executed "in an artistic manner." When these groups, which were of sheet-metal, were put in place, they failed to satisfy the committee of the City Government, who found a statue of FLORA, which appeared in one of the groups, "out of all proportion to the human figure," and, in general, considered the "sculptures" to be "a disgrace, rather than an ornament" to the building. They accordingly refused to accept them as "artistic" within the meaning of the contract, and notified the contractor to furnish others. This he did, protesting, however, that the original groups had been made "by a reputable firm in Ohio," and were in accordance with the specification, and when the committee were at last satisfied, he sent in a bill for extra work, including these and some other things, to the amount of 26,000 dols. As the largest item was that relating to the "sculptures," the important question was whether those originally furnished were "artistic" within the meaning of the contract. As the person who drew this up was so incautious as not to specify who should be the judge of their artistic quality, the decision came upon the jury, which, naturally enough, concluded that the contractor had done his duty in this regard by ordering them of a "reputable firm," and brought in a verdict in his favour. The moral of this story is, says the *American Architect*, that if an owner or architect wishes to get anything "artistic" under a building contract, he should specify in the contract who shall be the judge of the artistic quality of the object. If he does not do this, the contractor's opinion is, legally, just as good as his in regard to its merits, and, if they cannot agree, a jury must decide between them.

OPERA-HOUSES AND THEATRES.*

THE first volume of Mr. SACHS'S stately work on theatres and opera-houses revealed so excellent a plan, the utmost we can expect from succeeding volumes is to have a correspondence between them and it. There is no doubt about the second volume attaining the standard originally proposed. The plates are again careful copies of the architects' geometrical drawings. They exhibit a class of buildings having much in common with other varieties of modern work, while they have their own peculiarities. The use of the volume is not therefore confined to builders of theatres. For ornament especially many of the plates will be found to abound in suggestions. With so many excellent precedents at the command of English architects we hope soon to have an end of the terribly commonplace theatres which so often deter lovers of architecture from seeing plays. Beside so much inane pretension as can be found in London and provincial towns, a canvas booth almost rises to the dignity of a work of art, and the O of Bankside becomes one of the wonders of architecture. We have no wish to see anybody suffer financial loss, but it would be an advantage if three-fourths of the theatres constructed during the last quarter of a century were consumed and left not a wrack behind.

What makes buildings of the class more terrible is the apprehension that they are inevitable. According to the President of the Royal Academy, "a strong feeling for the higher forms of art has never existed in this country, or, rather, the artistic faculty has never in our race risen of its own accord towards the higher forms of art." The majority of the British theatres are evidence of an indifference to form which is not found elsewhere. What is the cause? It cannot always arise from some inherent weakness of the race. Mr. SACHS in his first volume kept together examples of Teutonic or of Anglo-Saxon origin, while in the second playhouses from Latin countries were to appear. His belief is that "little if anything is to be learnt from modern theatres in France, Italy and Spain; taken generally, the examples from countries subject to Teutonic and Anglo-Saxon influences alone show a marked development in theatre construction." That arrangement could not be rigorously carried out. English theatres appear in both volumes, and it must be said they do not surpass the Latin or the Teutonic examples.

The plates in the second volume begin with the Paris Opera House. There is no modern building which so quickly fascinates a stranger, and by a sort of perversity not one is more severely criticised. It is said to be of a debased Roman type, the exterior is considered too low, the interior too high, there is too much gilding according to some, too much sculpture and painting according to others, the eye is said to be too distracted to enjoy the living pictures behind the footlights and repose becomes impossible. All these remarks are only efforts to account for the sway which the building exercises. The Opera House was erected at a time when costliness was supposed to be a virtue and display was a necessity of life. It exemplified as well as is possible in a building the imperial principle which in 1861 was believed to be enduring in France. It still retains some of the emblems which made it more expressive, but others are now wanting which would have given emphasis to that expression. It was accepted as more than a theatre both by those who lived on Napoleonism and their enemies. When, therefore, dark fluid was cast on the group of *The Dance*, all parties accepted the stain as the handwriting on the wall—an omen of the overthrow of the Governmental system. Mr. SACHS renders more justice to the architect than is usual with critics who are less competent to judge. In one place he says:—

There is one feature which, though characteristic of his work, has not been generally recognised, namely, that Garnier designed with a very distinct purpose in his mind, that every line in his sketches and drawings was based on a system, and what may appear eccentric or even ill-advised in the architectural rendering was in no case the outcome of an unthinking mood. We find in Garnier, in fact, an architect who most

studiously examined the requirements of his client and the public taste of the period for which he had to cater. He was no mere talented artist who, as is often the case, designs spontaneously but without method. The very fact of his tour of inspection immediately after obtaining the commission speaks forcibly on this point. Combined with his natural genius and his great facility with the pencil was a power of application and, further, a strict regard for business. It is this combination that has given him the position which he holds to-day. It may appear curious to have to state so simple a fact here, but general opinion, particularly in art circles, has been disinclined to accord to Garnier anything but great talent. He has always been regarded as an artist of genius, and rarely as an architect in the fullest sense of the term, who gave equal attention to the three aspects of architecture—the business, the scientific and the art sides. Anyone who has followed the history of the Paris Opera House closely will comprehend what infinite pains the architect expended upon the most trivial technical details, and what amount of thought was, for instance, given to stage machinery, a department too generally relegated to other hands than those of the designer. It may indeed be news to some that official documents show that Charles Garnier was actually considering the resignation of his commission should the Government, his client, compel him to use in the auditorium *strapontins*, a kind of seat which he deemed a dangerous obstruction in the gangways in the event of a panic.

What St. Mary, Walbrook, is to St. Paul's, the Casino Theatre, Monte Carlo, is to the Opera House of Paris. Sculpture and painting, gold and colour in profusion, suggest wealth, as the numberless broken lines hint of the disregard of rules and precedents which wealthy gamblers can exercise. The exterior is an Italian villa embellished by French taste, or rather a combination of the Renaissance of the two countries as interpreted by M. GARNIER. It is to be regretted that a little of his spirit was not caught by M. BERNIER when designing the New Opéra Comique of Paris. The uncertainty which attended the competitions, the conflicts between officials on the subject, and the financial limitations imposed must have affected the architects who meddled with the project. Mr. SACHS is compelled to regard the building as proof of his assertion that "there has been little or no progress in France since the erection of the Paris Opera House." He adds:—"One would almost imagine on looking at the plan that the architect was unacquainted with the advance which has been made in other countries during the last few decades, and that he had overlooked the fact that his site had been the scene of a terrible fire; the isolation of staircases and the separation of the audience into sections, which are the most elementary features of the modern theatre plan, have been neglected, although the ground offered fair opportunities for skilful planning in this direction. As to the academic rendering of the exterior, its mediocre treatment can only be termed regrettable." The Eden theatre which used to stand in the neighbourhood of M. GARNIER'S opera house was mainly made up of cement and plaster over an iron skeleton, but it had a massiveness which was more suggestive of India than of France. It has now disappeared, but it was remarkable, both from the system of construction and the novelty of style which formed a pleasing sight in a city which has an excess of Renaissance façades. Mr. SACHS illustrates three Italian theatres. The Municipal Theatre of Palermo is severely classic in appearance, and would be suitable for a people who take their pleasures sadly. The Palermo building is very large, for it accommodates 3,200 people; but it would hardly be called a safe theatre owing to the character of the staircases. The architects were FILIPPO and ERNESTO BASILE; but Mr. SACHS says modern Italian theatres are generally erected by master-builders who are speculators, and who design and erect theatres for a fixed sum, and manage to do so without the aid of an architect. The "Lirico" Theatre, Milan, was constructed by ACHILLE SPONDRINI, whose organising power is greater than his knowledge of design. The building, we are told, was practically carried out without any plan, and the builder it appears did not receive much school education or technical instruction. Much better in style is the People's Theatre at Turin, of which Signor CAMILLO RICCIO was the architect, in which modern requirements have been met. The Municipal Theatre in Bilbao is like much else in Spain—that is, out of correspondence with the rest of Europe. The lowest seat is 26 feet above the

* *Modern Opera-houses and Theatres.* Examples selected from Playhouses recently erected in Europe. By Edwin O. Sachs, architect. Vol. II. With 100 plates and 95 illustrations in the text. London: B. T. Batsford.

street, and three out of the four staircases leading to the house are curvilinear in plan, but the external appearance is pleasing, and we suppose that is enough.

The Court Opera House in Vienna is worth comparing with its Paris rival. The exterior is simpler and more severe, and if there is less ornamentation in the interior, that is not altogether a disadvantage. There is only one staircase, but it is not so prominent a feature as M. GARNIER'S structure. The Vienna building was designed by VAN DER NÜLL and LICEARDSBURG, and was completed under the direction of GUGITZ and STORK. It cost half a million sterling.

Another excellent theatre is the Czech National Theatre, Prague, which has arisen on the ruins of an earlier building, which were utilised as far as possible. A handsome theatre on a triangular site is found at Salzburg. It can accommodate about a thousand spectators, and yet cost only 25,000/. The Municipal Theatre at Laibach and the "Raimund" Theatre at Vienna complete the Austrian examples; the last is an experiment, for in it the "Asphaleia" scheme of construction is adopted. The stage is lighted by side-lights, which are concealed from the audience and are supposed to be an improvement on the old footlights.

The most important of the German examples is the Municipal Opera House, Frankfort, which was opened in November 1880. Mr. SACHS says he knows of no playhouse of an earlier date in which the same clearness of plan and the same grasp of the requirements of the audience as regards accommodation are manifested. Care is taken to express the difference between the auditorium and stage and the administrative parts. The building cost 230,000/., and those who praise foreign architects for economy may be glad to know it was stipulated originally that the building was not to cost more than 60,000/. HEINRICH SEELING is an advanced architect whose name is associated with several German theatres. Mr. SACHS introduces his buildings at Essen, Rostock and Bromburg. It is considered that SEELING'S work "particularly deserves the attention of English architects, as many of the features which distinguish his buildings could, subject, of course, to modification, be adapted to the requirements of larger private establishments in this country." The "Lessing" Theatre in Berlin is a private speculation. The exterior is suggestive of machine work, but within it is excellent for hearing and seeing, and the staircase is sufficiently capacious to give safety in a time of panic. It accommodates an audience of 1,160, and the cost was 40,000/.

The next section deals with modern English theatres. The first shown is the new Her Majesty's. What Mr. SACHS says of the architect, the late C. J. PHIPPS, is marked by leniency:—

With his departure we have lost a man who has excelled in his specialty to an extent that can scarcely be understood by an outsider. He had been able to satisfy the requirements of the typical theatrical speculator, who primarily demands the greatest accommodation in a limited space at as low a cost as possible, and, what is more, he enjoyed full confidence, since no one had cause to fear any inclination on his part to incur expenditure merely in the interests of art. I hold that the deceased could have achieved far better work from an artist's point of view; but had he sought to do this his large practice would have dwindled, and he would not have retained the support of those whose financial aid was necessary for the development of his schemes. It is, alas, a sad fact, but one that is only too true. The theatre architect who aspires to treat his work from a more ideal standpoint would not, in London at least, find favour with those promoters who are responsible for the origin of the majority of our playhouses, unless they were convinced that the higher style would cost neither extra time nor money, or that if put to a greater expense they would be amply recouped by the greater popularity of the house with the general public.

Mr. PHIPPS'S Lyric Theatre is also illustrated, and he was to some extent responsible for the Garrick Theatre, originally designed by Mr. WALTER EMDEN. The Empire Theatre has undergone several transformations. When it was handed over to the late Mr. T. VERITY, it was no easy task to make it commodious, attractive and profitable. The results testify to his skill, and the later work is also creditable to the good taste of his son, Mr. F. T. VERITY. According to Mr. SACHS, money could be saved if in the back of the house modern stage machinery were freely introduced.

Another London example of a variety theatre is the Oxford, which is also successful in accommodating crowds. Mr. SACHS' awards merited praise to Mr. UNSWORTH'S Memorial Theatre at Stratford-on-Avon. Having the advantage of novelty, it might be supposed that speculators would be found to venture on the adoption of a similar style for a new theatre, but conventionalism is very strong in theatrical affairs. The building is unique as an application of Gothic, and we are afraid will long remain so. The Grand Theatre, Leeds, like the Stratford building, forms a group. It was designed by Mr. GEORGE CORSON, and is a good example of a comfortable theatre, where all the spectators are able to enjoy themselves.

The English series is brought to a close by Mr. RÜNTZ'S new theatre at Cambridge. Mr. SACHS does not exaggerate when he says "it is one of the most important instances of recent theatre construction, since we find in it, for once, a playhouse which, though essentially a commercial establishment and situated on a piece of back land, revives in every detail evidence that the greatest possible pains have been taken to give it an architectural rendering fully in accord with its purpose." That judgment would be confirmed by our readers who have seen the illustrations we have published of the building.

It is a long way from Cambridge to Athens. The next building is the National Theatre in the Grecian capital, which was designed by ERNEST ZILLER, a German architect. It is classic, although more suggestive of Berlin than of Athens. Among the peculiarities are the treatment of the front of the second tier as a balustrade and the absence of a moulded frame from the proscenium.

The remaining examples are the Municipal Theatre, Rotterdam, the National Theatre, Bucharest, the Municipal Theatre, Geneva, and the Municipal Theatre, Zurich.

It will be seen that Mr. SACHS has sought after variety in his volume, and has succeeded. By itself it is almost enough to equip an architect who desires to design theatres; but when the information respecting details which will be furnished by the third volume is added, the subscribers will be in a fair way to be qualified as experts.

The construction of theatres is not only an interesting subject for architects, it is one which should be encouraged by statesmen and all who wish to have the tedium of life made less oppressive. But there is another side to the subject. The life of a theatre may be assumed to be of the briefest. In a separate volume published by Messrs. C. & E. LAYTON, entitled "Fires and Public Entertainments," Mr. SACHS has with great industry collected particulars of the fires which are known to have occurred in buildings for amusement during the past century. They number about 1,100, and the fatalities amount to 10,000. Such statistics are appalling, but they should have the effect of putting an end to that policy of *laissez-faire* which commonly is dangerous, but in regard of building regulations is fatal. Mr. SACHS has done good work in presenting so startling a picture to the public.

CANTERBURY CATHEDRAL.—V.

FIREs and other causes made changes inevitable in Canterbury Cathedral. Apparently there would have been little difficulty in preserving the chapel of St. Benedict, wherein Archbishop BECKET was slain, in the condition it presented on December 29, 1170. The chapel of St. Blaise, which was over it, would also have interest. The alterations began soon after the martyrdom, when the column against which the Archbishop stood was removed in order to allow the people kneeling outside the chapel to see the altar erected as a memorial. This is evident from the description given by GERVASE, the monk:—

Between this space and the aforesaid apse is a solid wall, before which that glorious companion of martyrs and guest of the Apostles, the holy Thomas, fell in the body by the swords of raging men, but transmitted his unconquered soul to heaven, to be straightway crowned with the glory and honour of the eternal kingdom. This place of martyrdom is opposite to the door of the cloister, by which those four notaries of the devil entered that they might stamp the seal of the genuine prerogative of the martyr between the anvil and hammer, that is, that they might adorn the head of St. Thomas, prostrate

between the pavement and their swords, with the stamp of the Most High, the chaplet of martyrdom.

The pillar which stood in the midst of this cross, as well as the vault which rested on it, were taken down in process of time out of respect for the martyr, that the altar, elevated in the place of the martyrdom, might be seen from a greater distance. Around and at the height of the aforesaid vault a passage was constructed, from which the *pallia* and curtains might be suspended.

Professor WILLIS says the flat or solid wall mentioned above is to this day preserved, "for this masonry of the fifteenth century which clothes every other part of the transept does not intrude itself here, but is cut off many feet above."

According to GERVASE, the Archbishop had entered the transept chapel while the monks were singing vespers in the cathedral. He was accompanied by three or four of the monks, the faithful GRIM or GRIMES, whose arm was severed, being one of them; but whether a larger number surrounded him is uncertain. Evidently the monks were panic-stricken. But nobody thought at the time of charging them with cowardice or unfaithfulness. Both Celts and Saxons considered the Normans irresistible. If so large a number of monks as inhabited the Canterbury priory had fallen on the four knights who had resolved to remove the king's enemy, they would have conquered the intruders by weight alone. In their first interviews with the Archbishop the knights had exposed themselves to danger, for they left their swords outside the building. Yet not one of the people attached to the cathedral or the priory dared to remove the weapons. From their manner of acting we might suppose the knights had anticipated a different sort of arrangement of the dispute between the Archbishop and the king which would make their swords an encumbrance. If they cared they could easily have slaughtered the whole of the terrified community who had sought safety in nooks and corners of the crypt, behind altars, or wherever darkness was likely to conceal them, and were apparently half dead already with terror. The knights committed no excesses, but limited themselves to the carrying out of the king's desire. The blow received by GRIM was not intended for him. Apparently so much moderation was appreciated. To GERVASE they were "notaries of the devil," which may have signified instruments of HENRY II., and in that age obedience to a chief was accepted as inevitable. In the assessment of ecclesiastical punishments which followed the crime the knights were let off rather lightly if compared with the king's fate, for they were ordered to share in the Crusade, which was generally considered to be a privilege. What is still more remarkable, their statues were set up over the south porch of the cathedral, and three of the figures existed when ERASMUS visited Canterbury. REGINALD FITZURSE, WILLIAM DE TRACY, HUGH DE MOREVILLE and RICHARD BRITO, or LE BRET, were "raging men," but, as good often comes forth from evil, their misdeeds brought riches to Canterbury, in the presence of which, as ERASMUS said, "MIDAS and CRÆSUS would have seemed beggars."

The quarrel between HENRY and his favourite arose out of many causes. TENNYSON does not hesitate to suggest that jealousy on account of the Archbishop's influence over FAIR ROSAMUND was the most influential of all. Many investigators consider the breach was caused by the course adopted by BECKET in dealing with the "Constitutions of Clarendon." If judged by a nineteenth-century standard, the object of the arrangements which bore that title appears right and just. Ecclesiastics, who were unable to inflict more than light punishments, were then able to try criminal cases, and it was the desire of the king that lay judges who could impose sentence of death should try all cases. It is supposed that BECKET, in his opposition, wished to screen wicked clerics from the fate which awaited ordinary offenders against the law. But that is too narrow a conclusion from facts. In an age when four privileged men could scare some hundreds, it was well that privilege could be met by privilege. As MACAULAY says:—"A society sunk in ignorance and ruled by men by physical force, has great reason to rejoice when a class of which the influence is intellectual and moral rises to ascendancy; such a class will doubtless abuse its power, but mental power, even when abused, is still a nobler and better power than that which consists merely in corporeal strength." BECKET did not

seek immunity for clerics alone. Under that class was comprised the bohemianism of the twelfth century. The wandering minstrel who indited a few verses in sarcasm of some noble, the broken-down scholar who manifested his superiority over a courtier, the embryo man of science who was supposed to be a necromancer, or to have an evil eye which affected the great; all, in fact, who could plead their ability to read and write were safe from the intolerance of beings who looked on themselves as belonging to a more exalted race. The clergy might be too lenient as judges, but the Norman magistrate would treat such culprits with scant mercy. Whether BECKET was a Norman or a Saxon cannot be ascertained; but there can be no question that he was accepted as the representative of the downtrodden natives and a martyr to nationality. Patriotism must have had as much to do as religion with the reverence of which he was the object, and which brought English pilgrims from all parts of the island to Canterbury.

How were those pilgrims accommodated? That is a question which is likely to arise in the mind of every reader of CHAUCER'S tales. We know that the majority of the monastic orders exercised hospitality, and from their peculiar constitution as pioneers of agricultural science in wild districts, the Benedictines could hardly be indifferent to the necessities of wayfarers and other pilgrims. In Canterbury guest-chambers and a refectory for strangers undoubtedly existed. This is evident from the ancient drawing which is found in a psalter belonging to Trinity College, Cambridge. It bears no title, but after the investigations of Professor WILLIS there is no doubt it represents the Benedictine monastery of Canterbury. It represents the building at some period between 1109, when Archbishop ANSELM died, and 1174, when the fire described by GERVASE broke out. There was a division between the part assigned to guests and the buildings occupied by monks. The refectory is supposed to be represented by one of the existing residences. The prior's house was so placed and arranged that from it all the principal altars in the cathedral could be observed—a prudent arrangement, for the valuable offerings were enough to excite thieves to commit sacrilege. There was an infirmary, with a chapel, hall and refectory. A part of the walls of the general refectory exists, the kitchen was of large size and octagonal in plan, and there were also a brewhouse, bakehouse and granary in connection with it. There was a circular water-tower or *castellum aquæ* (the remains are known as the baptistery), where water was collected from a reservoir placed about a mile outside the city and distributed by wooden conduits. The dormitory was placed near the cloisters and measured 145 feet by 80 feet. The Benedictines were not as rigorous in adhering to a stereotyped plan as their offshoot, the Cistercians, but everywhere there must have been arrangements for the labours prescribed to the order, viz. agriculture, literature, copying manuscripts, the arts, metal-work, mosaic, history, &c. Canterbury was likely to have been a sort of type of the Benedictine monastery, for to it belonged St. DUNSTAN and LANFRANC, who were restorers of the original rule. In all the other cathedral monasteries the Canterbury system appears to have been followed with one exception, viz. Carlisle.

THE LIGHTING OF SMALL DISTRICTS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

IT is unfortunately to be noticed that many villages and parishes have no form of street illuminant.

In order that a parish may be lighted it is necessary that the Lighting and Watching Act* of 1833 and its amendments be adopted, as the necessary outlay is otherwise not provided for. This Act makes provisions for the lighting and watching of parishes in England and Wales, and is so worded that it is possible for every village or even a part of a parish to adopt the Act and to participate in the benefits conferred. A clear two-thirds majority of a parish meeting, or a poll if demanded, is necessary for the adoption of this Act.

* According to the Local Government Act (1894) in every rural parish the Parish Meeting has the power of adopting that Act.

When the Act is adopted the form of illuminant generally decided on is oil, owing to the low first cost, as a loan cannot be raised (according to the Local Government Act) without the consent of the County Council, and the expenditure must not exceed a 3*d.* rate. When the parishioners have become somewhat accustomed to the illumination of their streets in this manner their interest in the matter disappears, or they adopt a critical attitude and discover that the light is very poor and that there are frequent failures owing to the elements or the lamp trimmer, and it is very frequently found that the light is abandoned owing to the expense and its unsatisfactory character.

When, however, the streets are again in darkness, and perhaps in a dangerous state, the inhabitants become even more anxious to adopt some form of illuminant which will give greater satisfaction, and the erection of a gas works is suggested and enthusiastically discussed until the question of cost is considered. The initial outlay is very heavy in proportion to the size, and the matter is postponed till an indefinite date, and, in fact, generally until taken in hand by private enterprise and a syndicate formed. In this case private lighting is also anticipated; the benefits of the light are therefore extended, and the inhabitants take an interest in the matter. If private lighting were not considered, the cost of the lighting would be out of all proportion to the light obtained in the streets, and if supplied at a reasonable price per lamp per annum the works would be a complete failure.

In connection with this matter it will be of interest to note a few of the provisions of the Act before mentioned, generally with reference to gas. The pipes must be laid at least 4 feet from any water-pipe, with a view to the prevention of contamination of the water due to leaky pipes. Advertisements must be placed in the local newspapers inviting tenders unless the sum of the contract is less than 20*l.* This applies to plant or to the contract for the lighting of the streets.

For many reasons it is advisable that the supply of an illuminant should be in the hands of the Council. The ratepayers have a direct interest in the matter, and each has an incentive to persuade his friends to adopt the light, and the undertaking is far more likely to be successful, not only because of the benefits to be derived from private lighting, but because the revenue will in many cases cover the cost of the street lighting.

Combinations of neighbouring parishes are permitted by the Act, and herein may be found the means for making the plant a complete success. The application of two parishes to the County Council for a loan is much more likely to be granted, the works will be less expensive proportionally to each, and the cost of supply will be less.

The reasons why a council can supply light at a less cost than a company are that the capital required is less, owing to the absence of company promotion fees and the fact that, most likely, land already owned by them can be utilised, also to the less cost of working, as there are no directors' fees or shareholders' dividends to pay, the interest charged for the loan being much less than that expected by shareholders as dividends. The management expenses are considerably reduced, as the Council is the manager, and, in fact, expenses are lower all round.

A parish council has the power of raising a loan (under the same conditions as a district council), which may be spread over a number of years with the consent of the County Council and Local Government Board.

When small stations are compared, it is found that the cost of erecting a gas plant is considerably in excess of that required for an electric light plant. The reasons for this are that the plant required in a gas works and the buildings are, necessarily, of such a nature as to cover a large area, and cost to erect an amount increasing rapidly in proportion as the sizes diminish. Again, in comparison the cost of working is usually much above that of a large concern, and the reason for this is that, apart from the inherent advantages of a large concern over a smaller one as regards cost of management, &c., the by-products cannot be sold to any advantage. In large works the sale of the coal-tar products, coke, retort, carbon, &c., are as important as the sale of gas, but in the small ones there is practically no market for anything that cannot be sold locally, so one large source of revenue is removed. A gas works cannot take advantage of any local sources of energy, such as water-power, and the cost of the

coal required is often excessive owing to the cost of cartage, and also the gas mains must be buried in the ground.

With regard to electric lighting, it must be borne in mind that this is governed by the Electric Lighting Acts (1882 and 1888). When we consider the position of an electric lighting plant in a rural district, we must remember that the cost of mains may easily be very low, no excavation being necessary if overhead wires are used. This, and the fact that the cost of electric lighting plant is less than that for gas in small sizes, makes the capital outlay smaller. With reference to the cost of working, the prices charged by small gas companies are always far more than the price which could be charged for electricity. The prices of gas from 4*s.* to 7*s.* per 1,000 cubic feet are common, while even with a steam-power station the price for electricity need never exceed the equivalent of 4*s.* per 1,000 cubic feet, and very seldom does.

In cases where water power is easily available, the price of electricity in very small works can easily be as low as 4½*d.* or 5*d.* per unit, equivalent to from 2*s.* 6*d.* to 3*s.* per 1,000 cubic feet of gas. There are very many small country districts where there are disused mills, or other available falls, where plant can be laid down at a reasonable cost.

By the adoption of overhead wiring and the use of water-power (if reliable) there is no doubt that in almost every instance the cost of supply can be less (especially in small towns) than the minimum possible price of gas.

If, added to this, the greater convenience, purity and cleanliness of electric lighting and the facility with which it can be transmitted over considerable distances be taken into account, this form of illuminant should most certainly be adopted in every case for a small district.

The above will apply in every case, as regards distribution of the light, because the overhead mains will cost less than gas-pipes.

With regard to the use of overhead wires, this is permitted in a rural district by the Board of Trade when the undertakers work under a licence or provisional order. The Board of Trade regulations must of course, however, be complied with in any case, but these are not in any way irksome and are really the precautions which any electrical engineer would naturally adopt.

It is usually out of the question to obtain a provisional order, owing to the cost, in the case of a rural district; and therefore the Board of Trade's consent need not be obtained in the matter, provided that their regulations for the protection of the public safety and the wires of the Post Office are complied with; and it may be of interest to give a few extracts relating to overhead wires here.

Extracts from the Board of Trade Regulations.—Every aerial line shall be attached to supports at intervals not exceeding 200 feet where the direction of the line is straight, or 150 feet where the direction is curved, or where the line makes a horizontal angle at the point of support.

Every support of an aerial line shall be of a durable material, and properly stayed against forces due to wind pressure, change of direction of the line or unequal lengths of span. . . . Every support, if of metal, must be efficiently connected to earth.

Aerial lines shall be attached to insulators, and shall be so guarded that they cannot fall away from the support. Conductors covered with insulating material shall not be attached to the insulators by uninsulated metal binders.

An aerial line shall not in any part thereof be at a less height from the ground than 18 feet, or where it crosses a street 30 feet, or within 5 feet measured horizontally or 7 feet measured vertically from any building or erection . . . except when brought into a building for the purpose of supply.

Service lines from aerial lines shall be led as directly as possible to insulators firmly attached to some portion of the consumer's premises which is not accessible to any person without the use of a ladder or other special appliance, and from this point of attachment they shall be enclosed and protected. . . . Every portion of any service line which is outside a building, but is within 7 feet from the building, shall be completely enclosed in stout indiarubber tubing.

When an aerial line crosses a street, the angle between the line and the direction of the street shall not be less than 60 deg., and the spans shall be as short as possible.

Where an aerial line crosses or is in proximity to any metallic substance, precautions shall be taken by the undertakers against the possibility of the line coming into contact with the metallic substance, or of the metallic substance coming into contact with the line by breakage or otherwise.

Every high-pressure aerial line shall be efficiently suspended by means of insulating ligaments to suspending wires, so that the weight of the line does not produce any sensible stress in the direction of its length. All suspending wires, if of iron or steel, shall be galvanised.

In case of any high-pressure aerial line exceeding one half-mile in total length, means shall be provided whereby the pressure may be discharged from any portion of the line erected over or alongside of any building or buildings without loss of time in case of fire or other emergency.

Every aerial line, including its supports and all the structural parts and electrical appliances and devices belonging to or connected with the line, shall be duly and efficiently supervised and maintained as regards both electrical and mechanical conditions.

An aerial line shall not be permitted to remain erected after it has ceased to be used for the supply of energy, unless the undertakers intend within a reasonable time again to take it into use.

THE ANTIQUITIES OF BURGHCLERE.*

BURGHCLERE, or Borough Clere, has derived its name from being one of the early boroughs of Hampshire. These primitive boroughs were places so named in Saxon time from having a burh or fortification of some kind. Some of these burhs were of Saxon construction, but in places such as this, where an earlier Celtic fortification already existed, the earlier earthwork was often adopted as a defensive work in Saxon time. The burh or borough in this parish was the British camp on Beacon Hill, one of the early camps or castles of refuge, possibly of the prehistoric Iberians, certainly of the later Celtic people, in this part of Hampshire. The camps on Beacon Hill and on Ladle Hill formed together one of the most imposing systems of refuge in the county, defending, as they did, the road between the hills which formed the natural pass from the forest of the Kennet valley to the forest land of North Hampshire in the valley of the Test. There is at the present time a striking difference between these two camps. That on Beacon Hill is included in Burghclere, while that on Ladle Hill forms the northern boundary of the parish of Litchfield. Beacon Hill camp bears the marks of much later work than Ladle Hill camp, which has obviously been neglected since Celtic, and perhaps since neolithic or Iberic time. Those historians or archaeologists who are of opinion that the prehistoric people in this part of England were a sparse, uncivilised race, unacquainted with arts of life and without any organised system of defence, a few painted savages, who roamed in the woods, have in this immediate neighbourhood a striking object lesson. Whence these great earthworks, thrown up with engineering skill, of great extent, following the natural features of the hills, and apparently made strongest where the natural configuration of the hill is weakest? They could not have been made without an enormous expenditure of human labour, and that labour must have required the united efforts of a large body of men. It is extremely improbable that they were constructed by passing bodies of armed men, here to-day and gone to-morrow. They must have been thrown up by people living in this neighbourhood, working at them for many years in times of peace, to make them into castles or camps of refuge for themselves, their families, and cattle when necessity arose in time of war. As flint flakes and other remains of the Stone Age are commonly found on or near the ancient earthworks of the Hampshire hills, it is probable that the earliest defences in these hills were those of the neolithic or Iberian races, and that these were enlarged and strengthened, or reconstructed by the Celts, who followed them. When we consider that Beacon Hill Camp would require more than a thousand defenders to completely man its ramparts, and that no race of people would be at all likely to construct a castle of refuge beyond their power as regards the number of men required for its defence, we may feel sure that there was a large population living in this neighbourhood or within reach of this camp, before the Norman conquest. The great earthwork on Beacon Hill is a survival of that time, and bears on its scarfs some indications of the higher military skill of the Romans, who probably improved its defences, while the camp on the opposite hill, being unnecessary, was neglected. Roman remains have been found on Beacon Hill and in other places in this immediate neighbourhood. The use of the great earthwork thus passed from race to race until the time of the Saxons, to whom it was no doubt left by the Romans in much the same condition as that in which we now see it. It required only occasional repairs, such as were provided for by the allodial tenure of land in Anglo-Saxon time, and the allodial tax known as burh-bote for repairing local fortifications. This tax or tenure by the service of repairing the local fortifications when considered in

reference to Burghclere—a place which has derived its very name from this custom or tenure—marks it as one of the early boroughs of Hampshire, and among which none have retained the early Saxon name to the present time in so marked a way.

There can be no doubt that Burghclere is the Clere mentioned in Domesday Book as having among its inhabitants twenty-four coliberti, in addition to villeins, borderers and slaves. That these coliberti, whose name showed that they possessed borough privileges, were free men as compared with the other people on the manor is certain, and that their predecessors held their privileges for the obligation of repairing the local defences is very probable. Coliberti, similar to those of Burghclere, are mentioned in Domesday Book as living in Hampshire only in those places which had similar local defences and similar burh or primitive borough organisations. Some of the farm lands of Burghclere must be the same old lands which its Saxon freemen, or coliberti, held more than a thousand years ago. Burghclere was a good example of an early borough community. The primitive idea of a borough appears from the examples recorded or existing in Hampshire to have been a place where the inhabitants, or the most privileged of them, possessed a burh or place of refuge, and formed a community for its defence. As regards Burghclere itself, its coliberti were probably relieved in the later Saxon time from any onerous duty in this respect, for in the charter of King Edward to Bishop Frithstan, dated A.D. 909, it is stated that the Bishop's land at Clere shall henceforth be free from the three obligations of thane service, of which the repair of the local fortifications was one. Some of these primitive boroughs never grew into towns, as towns were understood in the Middle Ages, but remained stationary, or gradually dwindled in population, so that at the present time it is difficult to recognise such places as Burghclere, Bramley, Kings Somborne, Barton Stacey, Wherwell, Meonstoke, Wallop and Broughton as some of the earliest boroughs in Hampshire. These, however, were among the early Saxon boroughs of this county, and their origin as boroughs was derived from their burhs or local defences. Boroughs in England existed before cities. The "borough" is the older name, and was the older organised community. Burghclere can claim, therefore, to have had an organised existence as far back as that other primitive borough which afterwards became the city of Winchester.

One of the lesser Roman ways of Hampshire was that which connected Winchester (Venta Belgarum) with Speen. It must have followed much the same line as the present road, passing Bullington Camp, where Roman remains have been found, and Whitchurch, where sites of buildings and other traces of the Romans have of late been discovered, and so on through Burghclere. The old sunken road, now disused, near Whitway may be part of its track. Roman urns have been found a little distance north of Burghclere old church. The street names of Burghclere and Highclere, such as West Street and Highclere Street, are probably significant of their position in reference to the Roman road or street which is mentioned in a charter of Edward the Elder, dated A.D. 909 or 910. Saxon charters relating to Burghclere and Highclere exist, and the "two parishes" of Burghclere and Highclere, in which the Bishop of Winchester's (Alfsige's) land was situated, are mentioned in King Edward's charter, A.D. 910, and a parish implies a church. The church of Burghclere is mentioned in Domesday Book, and although the present church for the most part is of somewhat later date, yet it is not improbable that the building thus referred to stood on the same site, and that some of the materials at least of the Saxon building were used in the construction of the oldest part of the existing church. There is one circumstance which points to Bishop Walkelin as one of the probable builders or restorers of this church, which has a Norman doorway on its south side. It is partly constructed of Binstead stone, which could only have come from the Isle of Wight. William the Conqueror gave his kinsman, Bishop Walkelin, permission to quarry the stone at Quarr, I.W., for the Norman cathedral he built at Winchester, and some may have been sent to Burghclere at that time to be used in a church on the bishop's manor. It is certainly a long way to bring stone from the Isle of Wight to Burghclere, but Winchester is only about eighteen miles distant, and if, as is not improbable, after the cathedral was built, there was Quarr stone still left at Winchester, it is not unreasonable to conjecture that it may have been used for the doorways and other parts of a church on a manor owned by the bishop himself, to whom the stone had been granted. In any case some of the stone was there, in a church of the bishop's own, and we know that he had permission to dig it.

To the student of archaeology, groping his way in the dark and endeavouring by modern research to learn more of the dim past, any gleam of light which may possibly guide him is welcome. Such a gleam in reference to Burghclere appears to be afforded by the dedication of the church—All Hallows, or All Saints. Kingsclere Church is dedicated to St. Mary, the patron saint of Rouen Cathedral, which owned the manor. Highclere Church, on the estate of the Norman bishops, is appropriately dedicated to St. Michael, the patron saint of

* A paper read by Mr. T. W. Shore on the occasion of the visit of the Hampshire Field Club to Burghclere.

Normandy, and the saint to whom the religious houses on Mont St. Michel and St. Michael's Mount in Cornwall were dedicated—the saint of altitudes, appropriately chosen for Highclere. The dedication of Burghclere Church to All Saints appeared to have been chosen in early Saxon time on account of its special significance to the parish and of its catholicity. The Saxons who settled there found on all sides of them the remains of their more ancient predecessors, their roads, their great earthworks, and their great funeral mounds. The beginning of November, or All Hallows-tide, was the time when the Celtic races of Europe commemorated their ancestors, as indeed they still do, when all fires were extinguished, and the living conversed with the spirits of the dead. Such a custom could not fail to have been transmitted from race to race in this neighbourhood. The boundaries of this parish include both Beacon Hill and the Seven Barrows. Near it occur such partly mythological Celtic names as Sidmonton, Sidon and Sidley Wood, which, on the authority of the Professor of Celtic in the University of Oxford, must be ascribed to Sid, the fairy mounds. The neighbourhood abounds in suggestive memorials of the remote past, and he thought it probable that, after the Saxon conversion and in accordance with the instructions of Pope Gregory, Pagan festivals should be adapted to Christian uses, Burghclere Church became appropriately dedicated to All Hallows, whose vigil is the still wider commemorative festival of All Souls, a commemoration wide enough to include even the old Pagan Celts, who cremated their dead and reared the barrows over their ashes, or our own Anglo-Saxon forefathers, of whose mythology we are reminded by the names of the days of our week.

The rectory of Burghclere is one of much interest from its ancient Saxon endowment and its later historical and archaeological associations. It was a manor in itself. Its endowment is mentioned in Domesday Book, where it is stated that a cleric, a priest, held of the bishop one hide of land, together with a church, and that he had one ploughland with a borderer and two serfs, who worked on the priest's land or manor, and also an acre of meadow, which, together, in the money of that time, is stated to be worth forty shillings annually. Two hundred years later, in 1291, we come upon another entry relating to the rectory in the taxation of Pope Nicholas, which states that the church of Burghclere, with its chapel, was worth 26*l.* 13*s.* 4*d.*, while that of Highclere was worth 8*l.* The chapel was that which afterwards became the church of Newtown, a new township or parish so named in the thirteenth century, in the northern part of the parish. Fifty years later we again come across an entry relating to Burghclere church and its ancient endowment in the "Inquisitiones Nonarum," dated about 1340. The parish of Burghclere, with the exception of its tithing of Earlstone, is in the old Saxon hundred of Evingar, which is recorded in Domesday Book, and of which the prior of St. Swithun's was the lord. The Manor of Earlstone was held by a different tenure, and was included within the hundred of Kingsclere. Its name was probably derived from the earl or alderman who held the manor in early Saxon time. The alderman was the highest dignity next to the king, and their later successors in the dignity became known as earls.

There are some interesting entries relating to Burghclere in the Papal registers preserved in Rome, several volumes of which, in the form of a calendar, have lately been published by the English Records Commission. The earliest of these entries was dated 18 Kal. Septem. 1297, when a Faculty was granted by the Pope to the Bishop of Winchester empowering him to give the church of Bourchere (Burghclere), void by the death at Rome of Master William de Wellingue, to any fit person. By this it appears that the rector, Master de Wellingue, went to Rome probably on some business or suit at the Papal Court, a long and laborious journey, but a common one, and that he died while prosecuting his suit there, a not uncommon circumstance in the Middle Ages. Other entries, as well as some from the Patent Rolls, were referred to, and some interesting petitions to the Pope relating to Burghclere were read in detail. Several of the Mediæval rectors of Burghclere occupied prominent places in diocesan history. The old rectory house contains some remains of the site of these early rectors. Part of the roof of the dining hall still remains, and several walls which were part of the Mediæval building, and the Club would have an opportunity of seeing these by the kindness of Mr. Holding. It is interesting to note that the walls are built of local stone of the geological age of the upper greensand, which comes to the surface in the Kingsclere inlier. Burghclere formerly had extensive common lands, which extended, like those of Kingsclere and Sidmonton, to the Berkshire boundary. Burghclere and Highclere Commons being under the same lordship, were enclosed by the same Act of Parliament, passed in 1783. The common land of Earlstone, a separate manor, was enclosed by an Act of its own, a copy of which is in the Cope collection of Hampshire books and pamphlets in the Hartley Library at Southampton. A curious

survival in this parish until recent time was that of the old chace-privileges of the bishops of Winchester. The bishop's chace gave him the right of hunting not only in his park at Highclere, but over all the outside lands within the limits of the Chace—the manors of Highclere, including Burghclere and Etchingswell—and this right, which had descended with Highclere to the Earl of Carnarvon, having been disputed about fifty years ago, a lawsuit followed, which was decided in the earl's favour.

ENGLISH SEALS.

THE "authenticum" and "secretum" of the Frankish sovereigns were the primitive types of the Great Seal and Privy Seal introduced into England after the Conquest. It seems to be possible that seals may have been occasionally employed in Saxon times, as that people must have been cognisant of their use in France; but it could not be asserted, on the authority of one or two supposed instances, that the practice was at all general. The Saxon charters to which were pendant the broad seals of Saxon kings mentioned in some of the letters of the commissioners of Henry VIII. for the suppression of the religious houses were probably fabrications. Pendant seals, or "bullæ" as they were originally named, were of metal—gold, silver or lead; they were struck from dies in the same manner as coins, and in the earliest periods had no reverses. Thus in their nature they were more analogous to coins or medals than to seals in the present acceptation of the term. The use of metal bullæ for the authentication of very solemn and important documents prevailed among secular princes from the times of the successors of Constantine to the days of our Henry VIII. Two remarkable examples of golden bullæ are still preserved in the chapter-house at Westminster; one of the thirteenth century, pendant to the Dower Charter of Eleanor of Castile, consort of Edward I.; the other, which has been attributed to Benvenuto Cellini, is attached to the treaty of peace between Henry VIII. and Francis I. of France. The antiquity of papal bullæ has been much disputed by antiquaries; their use continued to the present time, and may probably be referred to as early a period as the tenth century. The Doges of Venice continued to use pendant metal bullæ until the suppression of that republic. The inconvenience attending the production of metal impressions must have naturally suggested the application of the die to a more plastic material, hence the employment of wax. In this country, after the Conquest, the matrices of seals were of metal—silver, brass or lead; the latter, from the facility of working it, was most commonly used in the twelfth and thirteenth centuries, and more especially by individuals of the middle class. The wax employed was of various colours and varied composition. In the earliest impressions of English seals, it is generally, though not invariably, white, and from some defect in its preparation is usually in a very friable and decayed state. Red and green then became the prevailing colours; and in the sixteenth and seventeenth centuries white was again generally used, particularly for the Great Seal and the seals of the several courts of law. During the Middle Ages antique intaglios were used as seals, particularly as secreta or privy seals. They were generally surrounded by Mediæval legends, which were often grotesquely inapplicable to the subject of the gems. As regarded the shape of Mediæval seals, the principal forms were circular or an acute oval shape (*vesica piscis*). Ecclesiastical seals were generally, though not always, of the latter form. There were, of course, numerous variations from these shapes. In the twelfth and thirteenth centuries seals were, for the most part, oval in outline. In the fourteenth and fifteenth centuries circular forms were generally used. Viewing seals as applied to documents, it was to be observed that it is perhaps from the early part of the thirteenth century that we must date the practice of impressing the seal upon the document itself instead of suspending it therefrom by silken threads or a slip of parchment. Strictly speaking the pendant seal belonged to documents intended to convey general notifications, to letters unclosed or patent, yet many anomalies are to be noticed in its use. Documents of a private nature were folded, and the seal so impressed on the folds that the contents could not be attained without breaking the impression; and it may be remarked that a curious practice grew up during the fifteenth century of surrounding seals so impressed by a twisted band of straw, doubtless with a view to their better preservation. This fashion, very prevalent during the time of Henry V., continued until the sixteenth century.

A Marble Tablet to the memory of the late Archbishop Benson has been erected in the Garrison Church at Canterbury, the dedication of which building was one of the last public acts of the kind performed by the Primate prior to his sudden death at Hawarden. Dean Farrar, in unveiling the memorial, stated that this was the first memorial ever erected by British soldiers to an Archbishop of Canterbury.

NOTES AND COMMENTS.

THE Public Health Acts would lose much of their authority if the clauses could be construed into an injunction to employ a specialty of any kind. Whatever may be its shortcomings, the British Legislature does not consider itself to be under an obligation to promote private interests, and that spirit inspires other Acts besides those for insuring public health. As a rule, corporations and local authorities generally respect the intention of Parliament, but through oversights it sometimes happens that the influence of a local authority appears to be partially exercised. Such a case has occurred at Widnes. In February 1895 the health committee of the Corporation adopted the following resolution:—"That in all future cases of nuisances requiring the reconstruction of privies and ash-pits the local authority of this borough do, as far as practicable, order that such privies and ash-pits be converted into the waste water-closet system, or into such other water-closet system as the local authority may from time to time approve, and that the highway committee be requested to take such steps for the adoption of the first-named system generally throughout the borough." It is likely that the resolution applied to a whole species of closet rather than to one particular invention and that a householder could select any waste water-closet which appeared to be sufficient. Anyhow, an owner of sixteen houses in one road neglected to obey a notice requiring him to put in waste water-closets. The Corporation therefore carried out the work and claimed the amount paid from the owner. On the application of the owner a case was stated by the justices which came before Mr. Justice LAWRENCE and Mr. Justice RIDLEY on Saturday last. The whole question turned on the meaning of the resolution of February 1895. Mr. Justice LAWRENCE said the local authority could not prescribe the use of a particular kind of closet—each case must be inquired into and the requirements of individual houses considered. The resolution was therefore invalid. Mr. Justice RIDLEY said that, although uniformity might be desirable in such cases, Parliament had not declared in favour of the principle. The appeal of the owner was therefore allowed. All that the public health demands is a "sufficient" water-closet. The local authority is a judge of the sufficiency, but cannot urge the adoption of any special kind as possessing the quality.

It is improbable that opinion will ever be unanimous about the worth of RABELAIS. All the sayings and doings of GARGANTUA and PANTAGRUEL may have an occult meaning, which interpreters can make out as signs of exquisite fancy, but the world would not be much poorer if the book had been kept in a manuscript form. RABELAIS was born in Chinon, which is in Touraine, but his life was spent elsewhere. The Touranians continue to be proud of him, and from him they have derived some of their peculiar humour. But they have ceased to remember where in Chinon he was born. Owing to the patient researches of M. HENRI GRIMAUD the site of the apothecary's or inn-keeper's house, *i.e.* the elder RABELAIS', has been determined. It was on the ground where No. 15 now stands in the Rue de la Lamproie, and was removed in the last century. In order that doubts may no longer arise, a tablet in black marble has been placed on the façade with the following inscription, "Ici s'élevait au XVI^e siècle la Maison de RABELAIS." As there was a farm belonging to the inn outside Chinon, there was a tradition that it was the birthplace of the humorist, but now that a tablet exists we suppose the Rue de la Lamproie will have a monopoly of the honour.

M. EDOUARD DETAILLE has been raised to the dignity of a commander of the Legion of Honour. The promotion was well deserved, for the painter is the most successful of all who treat military scenes. It may be said of him also that he is the only foreigner who is competent to represent the British soldier. Life-Guardsmen, Highlanders, or the ordinary rank and file linesmen, appear in his drawings with a truth to nature which is remarkable. M. DETAILLE appears more like a member of the Guards' Club, Pall Mall, than a French artist. At the present time he deserves

any honour his countrymen can bestow, for, owing mainly to his exertions, influence, and knowledge, the new museum which is devoted to the history of the French army in the Invalides is a success. For the museum M. DETAILLE has despoiled his most interesting atelier of many of his treasures. Moreover, he is a favourite at the Russian court owing to the excellence of his drawings of Russian soldiers. As becomes a pupil of MEISSONIER, there is much precision in his drawings and paintings, but they are never suggestive of laborious attention to detail or the sacrifice to it of finer qualities. Among other works of the painter which were reproduced in *The Architect* is a design for a frieze which was specially prepared for us.

THE juries of the Brussels International Exhibition have in several cases arrived at their decisions. In the Fine Arts section first-class medals have been awarded for painting to Mr. DICKSEE, R.A., Mr. HERKOMER, R.A., Mr. HOOK, R.A., Mr. GREGORY, A.R.A., Sir J. D. LINTON, Mr. WATERHOUSE, R.A., Mr. SEYMOUR LUCAS, A.R.A. and Mr. SARGENT, R.A. The medal for sculpture is obtained by Mr. ONSLOW FORD, R.A. Second-class medals for painting have been awarded to Mr. SOLOMON, A.R.A., Mr. LAVERY, Mr. MURRAY, A.R.A., Mr. NORTH, A.R.A., Mr. ORCHARDSON, R.A., Mr. AUMONIER, Mr. C. GREEN, Mrs. ALLINGHAM, Mr. OULESS, R.A., and Mr. CLAUSEN, A.R.A.; for sculpture to Mr. FRAMPTON, A.R.A., and Mr. DRURY; for engraving to Mr. CAMERON; and for architecture to Mr. PEARSON, R.A. The five gold medals in the Fine Arts section have been voted to Mr. ALMA-TADEMA, R.A., England; MM. DETAILLE and FLAMENG, France; and MM. COURTENS and LAMBEAUX, Belgium.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: THE MARTYRDOM.

TASMAN, TUFNELL PARK, N.

THIS house is now in course of erection in the Anson Road, Tufnell Park, from the designs of the estate architects, Messrs. TRUEFITT & WATSON, members of the Royal Institute of British Architects, of 5 Bloomsbury Square, W.C.

The main fronts are to be faced with red heather bricks with stone dressings. The roof will be covered with Bangor slates, and the woodwork painted white.

CRICKET PAVILION, BERKS COUNTY CRICKET CLUB, READING.

THIS pavilion has just been erected on a site recently acquired by the B.C.C.C. committee, and which formed part of the Elm Park Estate, Reading. It will be opened next week by H.R.H. Prince CHRISTIAN. The elevations are carried out in half timber, and filled in with red brickwork and white pointing. The roofs and *flèche* are covered with strawberry-tinted tiles.

The building consists of luncheon-room 40 feet by 19 feet, with open timber roof about 17 feet high to plate; a committee-room and two dressing-rooms, one for the use of members and the other for visitors, each opening into the luncheon-room, to which is attached a refreshment bar. A room for professionals is also provided. Bath-rooms, latrines, lavatories, &c., are attached to each dressing-room, also an annexe for the use of professionals.

On the first floor is the scorers' and press-room with balcony. Adjoining is a large store-room for bats, &c. for the use of the ground man.

The balcony is reached by outside staircases on either side of the building. The front enclosure, 100 feet in length, is raised in three terraces, with a portion divided off for the accommodation of professionals. The work has been carried out by G. S. LEWIS & BRO., builders, from the designs and under the superintendence of Mr. GEO. W. WEBB, F.R.I.B.A., Market Place Chambers, Reading.

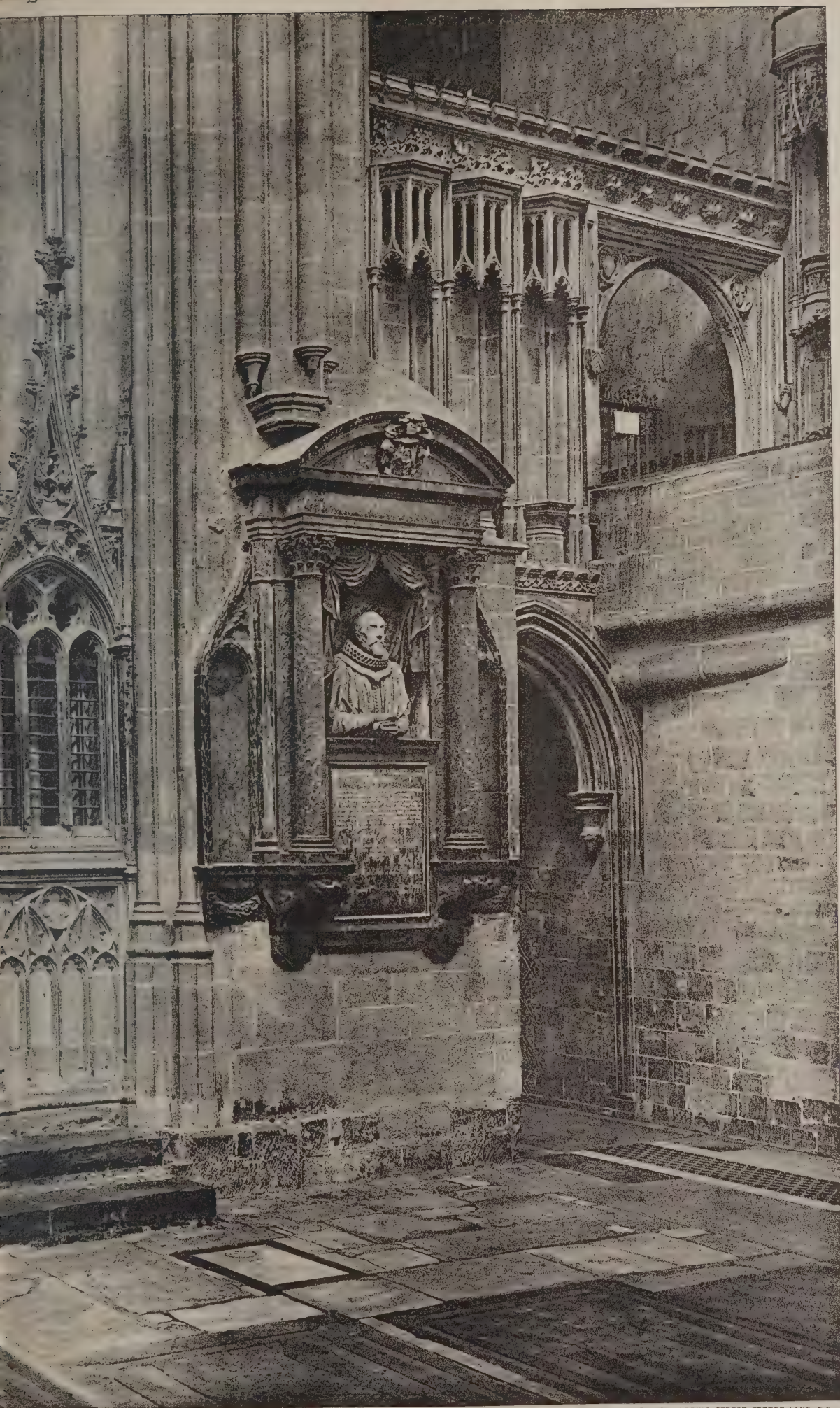
NEW PARLIAMENTARY BUILDINGS, SYDNEY, NEW SOUTH WALES.—FIRST FLOOR PLAN.—SECOND FLOOR PLAN.—GROUND FLOOR PLAN.—BASEMENT PLAN





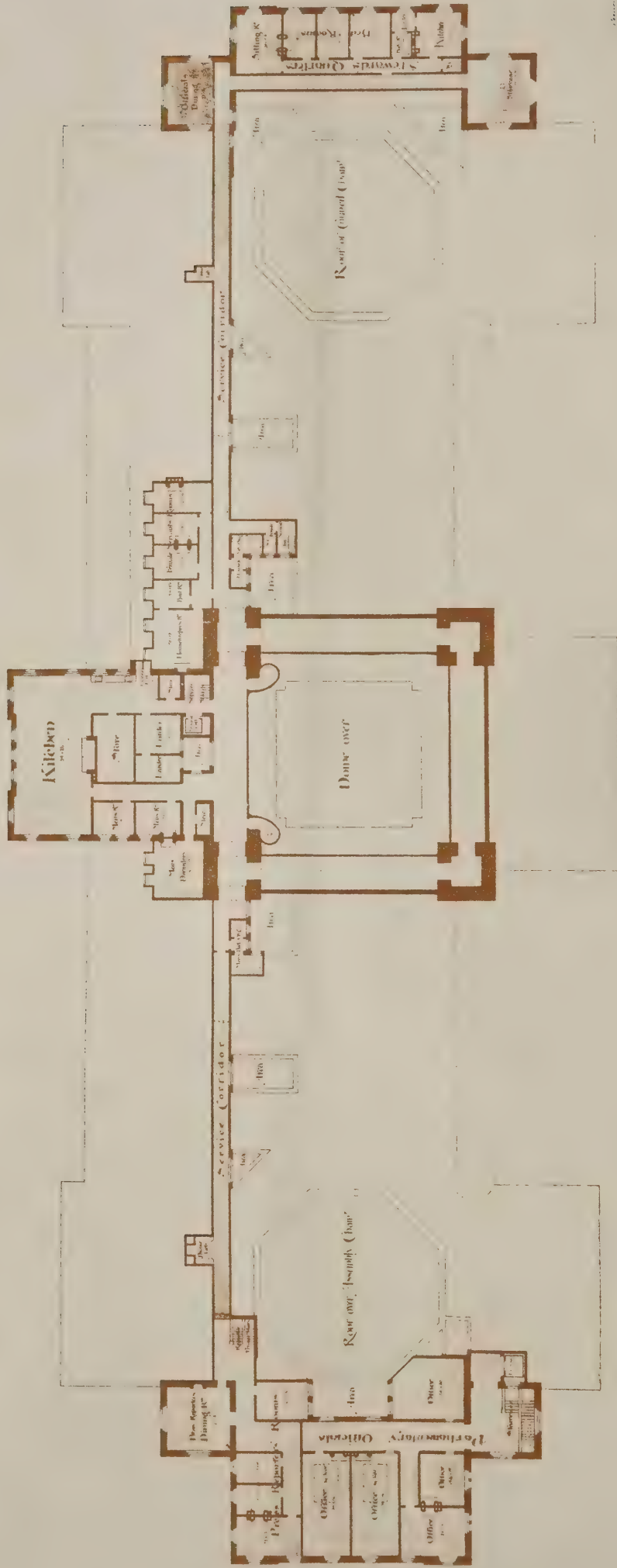
PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

July 30th 1897



INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

New Parliamentary Buildings
Sydney



Scale of 1" = 20' 0"

Second Floor Plan

INK PHOTO SPRAGUE & CO. 44 S. EAST HARDING STREET FETTER LANE, E.C.

NEW PARLIAMENTARY BUILDINGS, SYDNEY, NEW SOUTH WALES.
W. L. VERNON, F.R.I.B.A., Architect.

New Parliamentary Buildings
Sydney

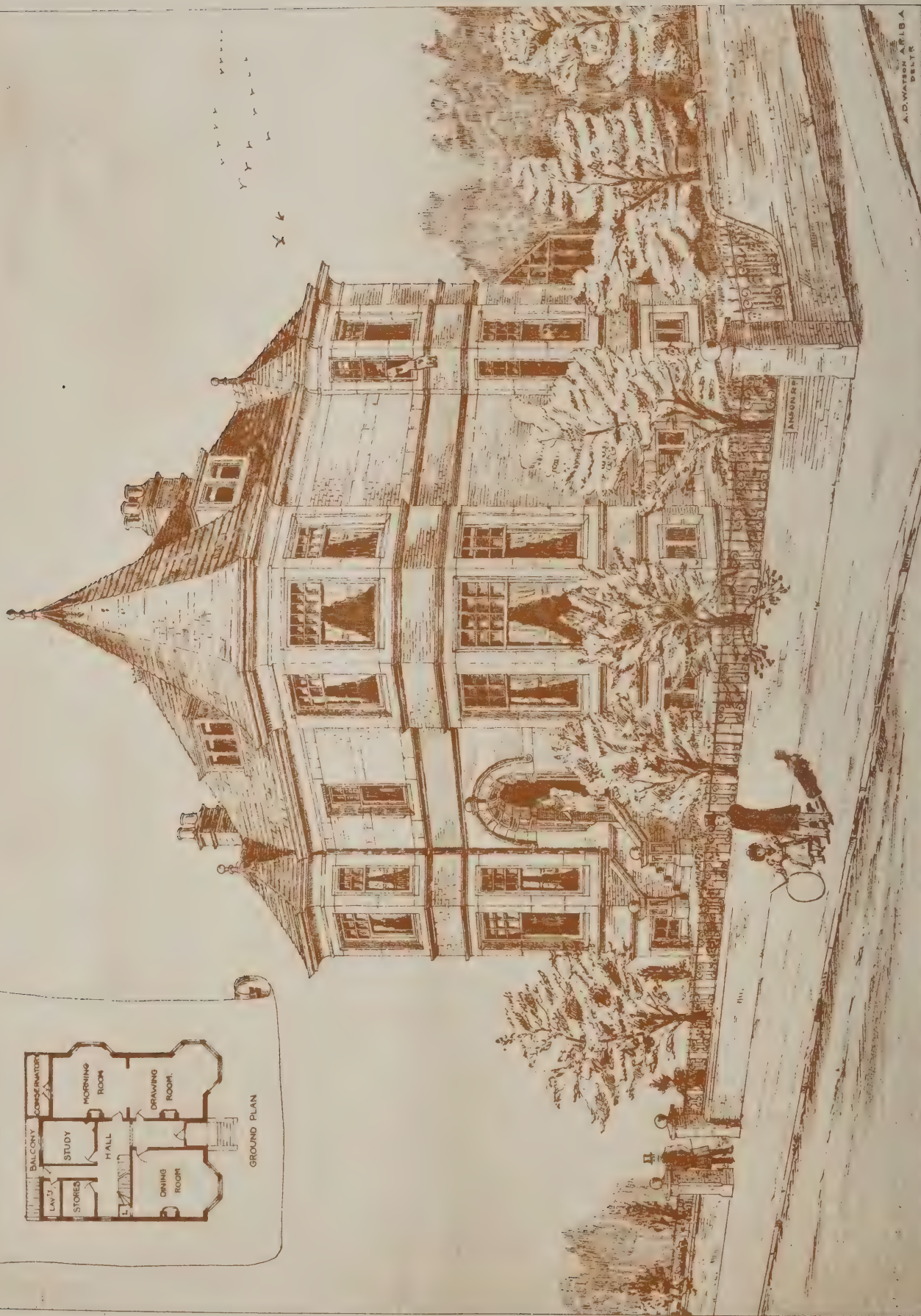


Scale of Feet 0 10 20 30 40 50 60 70 80 90 100

Ground Floor Plan

INK PHOTO, SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

NEW PARLIAMENTARY BUILDINGS, SYDNEY, NEW SOUTH WALES.
W. L. VERNON, F.R.I.B.A., Architect.



"Tasman". Tufnell Park, N. for F. E. Bailey Esq. Messrs Truefitt & Watson, Architects.



CRICKET PAVILION: BERKS COUNTY CRICKET CLUB, READING.

New Parliamentary Buildings
Sydney



Basement Plan

Scale of Feet 0 10 20 30 40 50 60 70 80 90 100

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NEW PARLIAMENTARY BUILDINGS, SYDNEY, NEW SOUTH WALES.
W. L. VERNON, F.R.I.B.A., Architect.

New Parliamentary Buildings Sydney



INK PHOTO SPRAGUE & CO. 4 & 5 EAST HARDING STREET FETTER LANE. E.C.

NEW PARLIAMENTARY BUILDINGS, SYDNEY, NEW SOUTH WALES.
W. L. VERNON, F.R.I.B.A., Architect.

TECHNICAL EDUCATION IN ARCHITECTURE AND THE BUILDING TRADES.*

IN giving this title to the short paper which follows I do so to explain its scope in current phrase. For myself, however, I must explain that I acknowledge no distinction between architecture and building. Architecture is the resultant of the association of the several building trades—it is the centre of gravity, as it were, of the crafts in combination.

While it is generally admitted that there is now no common speech and tradition in building matters, no current style of architecture; there has been much attempt to extol this architecture as something quite superior to mere common building. Fergusson, for instance, in trying to make out such a distinction, says in effect that building is mere heaping of material together, while architecture is building done with thought and arrangement. He thus gives the title of building to a wholly supposititious product which has never had any concrete existence, so that he may give the title of architecture to building as we know it historically.

It suffices to say that the building product of antiquity is never so treated. The history of the architecture of Greece is what we know of the buildings of Greece—religious, military, domestic; the architecture of the Middle Ages is the masonry and carpentry, the smithing, plumbing, and so on, brought together in the wonderful works of that age. It follows, therefore, that the endeavour of the historians of art is to get at the typical and spontaneous in the art of the past so as to reconstruct the ages by all the monuments they have left behind. Modern English architecture is truly the whole product of the current customs of building in England. The architecture of London is the mass of building from Bow to Putney and from Hoxton to New Cross; and it is in the multitude of ordinary and characteristic buildings rather than in the few and exceptional ones that what is typical of this architecture will be found. The question of education in architecture is therefore not a question of nice scholarship which might affect the more costly buildings, half-a-dozen restaurants, clubs and insurance offices; it is the question of influencing the building of mean streets and the ordinary dwellings and meeting places of men. It is not merely an academical question, but one of enormous practical importance to humanity and civilisation.

The Meaning of Style.

An explanation of the more apparent causes which led to the admitted breakdown of tradition in architecture—that is, building—in these modern days is part of a long story. Before glancing at it, it will be well to gain a clear idea of what this thing "style" has been in the past when art was, as we say, living. At such periods architecture, as we can now see, was a natural development, the outcome of the experimental building carried forward by masons and carpenters. We see the needs and aspirations of society, the materials used by the builders, and all the other conditions of climate, circumstance and thought so directly influencing their manner of building that it became a common and organic growth. This organic principle of building, the style, was a remarkable essence, a principle of growth born of the contact of mind, senses and emotions with outer conditions; this style was not an accident, not a thing to be willed or altered, it was in the nature of things spontaneous, communal, national, racial. A building was a natural product, another kind of tree, as it were, growing on the earth's surface, answering to every condition of soil and climate and responding to every breeze of thought.

Literature is but the written word, architecture is the builded word; the writer and the builder are alike nothing except so far as they crystallise some of the thought stuff behind phenomena—the ideas waiting to be born. And further, a true style can only answer to one moment in the world's history; we may speak of Hellenic or Byzantine and of the thirteenth and fourteenth century styles, but really style changed from day to day. Any mere invention, if it were possible, of new shapes, any intentional originality, would be as trivial as our copying of the styles of the past. Of course, I must be understood to speak of expressional forms, not of useful inventions.

Our modern relation to facts on the side of architectural thought is, of course, exactly represented by our current building speech. We are revealed to ourselves in the corrugated iron shed, the mean meeting-house, the restored cathedral, the sham Gothic church, the sham Renaissance town-hall, the dull workhouse, silly villa, and the general vulgarity of the streets.

All this is ourselves built large, and yet I hope that we are not so bad as we look, for we are the victims of our historic position, and if we find ourselves in a *cul-de-sac* we didn't put ourselves there. Still it is a melancholy reflection that all this time there would have been a true style of building proper to this moment alone in the world's history, if we could only have been in connection with the great governing principles of

practical building, a vital stream, instead of being choked by the scum of an outspent eddy of scholasticism.

I am going to become more practical instantly, but what becomes of the architecture never built—the architecture of 1897?

Our Historic Position.

At the beginning of the sixteenth century a vast revolution occurred all over Western Europe. The Church broke in two, traditional customs were largely replaced by statutes imitated from Roman law, the free towns were overawed and the national folk architecture withered up before a fashion for imitating Roman building seized on with avidity by all the Courts in Europe. Reformation, revolution, Renaissance, were but complementary phases in the fields of religion, politics and art of one great movement by which the guilds were dissolved, the ideal of the towns uprooted and the craftsmen who governed them taught their place. The guilds of the workmen had been inextricably bound up with religious brotherhoods and with the corporations of the towns (the municipalities or communes were, indeed, based on the guilds), so all were struck at together.

The revival of learning, as it is called, worked in perfectly with the great wave of reaction and absolutism. Roman law was ransacked for pretexts, and a scholarship of Roman art became a lever to thrust out of the way the customs of the crafts as held by the guilds. At this time a set of drawing-master designers, commercial travellers in art, came from Italy and hung about the courts of France, Germany and England, and displaced the old master masons and carpenters who held the living traditions of building art. These Italian designers were for the most part painters rather than masons, and from this time the architect became a painter or drawing-master of buildings rather than a graduate of the shops.

As the old architecture of the people was to be broken down arguments were easy to find. One of the most potent and convincing of these arguments is that which is set out by one of the earliest and ablest of the drawing-master designers of France, Philibert de l'Orme, thus:—Roman architecture was antique; Solomon's temple was built in antiquity, therefore Solomon's temple was built according to Roman architecture; but the plans for Solomon's temple were drawn in heaven, therefore Roman architecture was divine and revealed, and the ways of building followed by the Mediæval masons were of the nature of heresy. It was necessary, according to De l'Orme, to return to the "vray" architecture in its purity.

Building from this time ceased to be experimental workmanship, tradition behind and reason in front; it became an essay in "vray" architecture, and scholars in classical antiquities passed themselves off as "architects," which they could the more easily do as the old experts in building were employed to do the work while the scholars provided the pretty patterns, not according to the customs of the craft any longer, but such as might tickle the fancies of Italianised employers.

But it is easy to see that this theory could not last. Scholarship feeding on a limited field soon exhausted itself. Nothing remained to the scholarship theory of architecture when this exhaustion had become apparent but flatly to reverse the argument, and this Pugin did. Pugin arose with beautiful enthusiasm to prophesy that the old despised way of building practised in the Middle Ages which had come to be called "Gothic" or barbarous was the true Christian style after all. Then the scholarship engine was set going once more full speed astern.

This cry, in turn, exhausted itself in some sixty or seventy years; we can see, indeed, that this was in the nature of necessity. This second school of copyists were not nearly so unanimous as the former, nor were the students so self-convinced, yet it is to be noticed that both these revivals (so called) were entered on with a certain belief and fervour—the revival of antique, true or revealed architecture, and the revival of true, Christian or pointed architecture. The first entirely succeeded in suppressing "Gothic" architecture; the second only half succeeded in establishing sham Gothic architecture.

So much for the immediate past; what of to-day? These two enthusiasms having been worked through, scholarship is not equal to another act of faith, and has fallen into architectural scepticism. We don't believe in any architecture being "vray" now. So far as scholarship of design goes, there is now no attempt to work in concert except by the professors of church restoration, who follow Essex and Wyatt in rebuilding the cathedrals to taste and with despatch. This tail of the Gothic revival cannot, however, last for more than a few years. When all the real Gothic has been altered into sham Gothic, that enthusiasm also will have evaporated.

All theories of what has been called "architectural design" have entirely broken down under examination, and it has become apparent that the truer the style is, the closer is its relation to its time and environment. It has become apparent that there is no absolute architecture, but that true style and rational building can only be the outcome of the conditions of the moment in the wise satisfaction of true needs, and by the interaction of handiwork and the materials with which it deals.

* A paper read by Mr. W. R. Lethaby before the International Congress on Technical Education.

While we have been finding out this, it has become as clearly evident that any lingering remnants of the old system of workmanship preserved traditionally by the workmen are disappearing. Just as we have realised that the very basis and main substance of architecture are beautifully built walls of carefully selected materials, timber framed in a workmanlike way, deftly laid plaster, columns proportioned to material, windows and doors shaped for service and so on, and not certain patterns arbitrarily selected by a professor of design, it has become evident to us that the body of workers' skill which the earlier masters of "design" like Wren had to deal with has been continuously decaying and disappearing since the destruction of the guilds. For be it remembered that some of the methods of the guilds survived for long their official destruction. At the beginning of this century the theory of the crafts being based on due apprenticeship was still maintained. And in country towns some who called themselves masons and architects were still to be found.

We designers on the one side have lost faith in scholarship in design; on the other hand the workers are untaught, and therefore unintelligent and uninitiated.

The Guilds.

To look back again to the Middle Ages. The masons and carpenters' guilds were faculties or colleges of education in those arts, and every town was, so to say, a craft university. The folk of the Middle Ages were not so ignorant as to look on dead languages, history and statistics as the only forms of learning. Masonry, carpentry, smithing, plumbing, were media for the exercise of intelligence and aspiration. It has been well pointed out by a recent historian of the universities that they are but surviving examples of the associations of the Middle Ages—scholars' guilds.

Corporations of masons, carpenters and the like, were established in the towns for the ruling of production and the teaching of the craft. Each craft aspired to have a college hall; and a city like London was full, first of the buildings of the religious brotherhoods—the churches; then of the halls of corporations or lay brotherhoods. Guildhall was, as it were, the secular cathedral on which the smaller company halls depended, like parish churches, of trade and craft. We are usually told that "feudalism" was the social principle of the Middle Ages, as if there had been a "social contract." The truth is, society in the Middle Ages formed itself into groups, mainly in accordance with the callings of its members. The association or group, not the individual, was really the unity of society and basis of competition.

The guild, which regulated all the customs of the trade, guaranteed the relations of the apprentice and the master craftsman with whom he was placed—master, be it noticed, not in the sense of employer, but in the sense of graduate of his craft college and wearing its robes. The boy was really apprenticed to the craft as a whole and ultimately to the city, whose freedom he engaged to take up. The boy apprenticed to a mason mixed mortar, tidied the shop, and generally learnt his craft by assisting an expert during a seven-years' course. Each master might only take one or two apprentices at a time, for they learnt by working with him. At a certain stage the apprentice became a companion or bachelor of his art, and later by producing a master-work, the thesis of his craft, he was admitted a master—one of the governing body of his college, and only thus was he permitted to become an employer of labour. Then as a citizen the dignities of the city were open to him and the great things of his art. He might become the master in building some abbey or cathedral or as king's mason, one of the royal household, and the acknowledged great artist of his time in what was then called mason-craft. The buildings of the Middle Ages are indeed wonderful, but is it so wonderful after all that they were produced when the building trades were so organised? Our ideals and system are as perfectly reflected in our modern architecture of London, where a vast mass of common building, which I will not attempt to describe, is diversified here and there by a careful design done out of an architect's head after study of the real mason's art of the past, and built by farming out to a financial agent called a contractor, by gangs of men who have no say in the matter, and who for the most part have "picked up" their trade.

Some argument has been spent on the question as to whether the modern trade unions represent the ancient guilds. The question in one respect is as nice a one as that of apostolic succession in the English Church. In a broad sense, however, there is not the least doubt that guilds and unions are alike forms of those associations of the workers which are known to have existed far back in Greece, were highly systematised through the Roman and Byzantine eras, won their highest positions with the assumption of the government of the free towns by the merchants and craftsmen in the Middle Ages; and crushed and disinherited in England under Henry VIII., reappeared in the various forms of benefit clubs, wages unions, and the trivialities of freemasonry. What we all by the meaningless term Gothic architecture was the

ordinary current work sanctioned by the guild. From such considerations I have reached the conclusion that the building system of any time and country has always represented the state and activities of the guilds or unions. Now, as the organisation of scholarship is the affair of scholars, and medicine the business of doctors, only masons and carpenters can organise and develop the arts of masonry and carpentry. If ever a living style of architecture can again be made economically possible it is by the unions of the several crafts assuming guild functions, seeing to the education of its learners, setting a standard of quality in production—in a word, assuming the entire responsibility for the whole conduct of their crafts—and nothing effectual can be done without them. If the unions, stirring themselves in this way, can vitalise the building crafts, we shall get a building art once more, otherwise we shan't. The real question before the unions is not one of a halfpenny an hour more or less in wages, but the architecture of their country. They are far from realising this responsibility—we are far from having a reasonable and living style of building.

Of Schools.

The members of unions or guilds must themselves consider the matter of education. This work done for them from without would be of comparatively little good. The education itself would be of less value than the interest and goodwill which would vitalise any craft which took up its own education. Moreover, there is likely to be large waste in any system of specialised craft education organised from without. Such a system often eats up the substance; by an artificial preoccupation with the fringes of a subject, and in too carefully considering all the avenues of approach the thing itself at the centre may never be reached. Professional education generally is prone to run to grammar as in the English system of teaching languages. Literary organisers of education have a great dislike to empirical methods; but art itself is empirical, and our literary friends must not deceive themselves by their own phrases. If, as we are told, we are to be governed by experts, the things of art and craft must be organised by expert artists and craftsmen. Indeed, the modern literary view of education—that the chief end of man is to count statistics and read newspapers—must be broken with in approaching this question of craft education, for I believe we shall not get very far till we recognise that a literary education is only one of a dozen avenues leading to true but dissimilar culture. Craft excellence must once more be made an object of ambition, through which the craftsman as such may reach to some of the world's rewards, such as they are. The only reward obtainable in a craft must not be the getting out of it.

It should be a warning to craftsmen that the downfall of the crafts, brought about by the conspiracy of the Renaissance, has been confirmed in the name of science by the gentlemen who, undertaking research into the laws of production and distribution, considered only quantity, and never once thought about the quality of products. May I say here, in brackets, that the position the State, the public, democracy, or whatever we like to call it, occupies as employer of labour is a very important question indeed? At present public works tend to a base mechanism varnished over with what is thought to be ornamentation. What is the good of endeavouring to teach art if we would have none of it if it were produced?

But to return. School learning, however practical, can only form a small portion of the true education of the true craftsman. The organised crafts must further find a way by which the essentials of apprenticeship shall still be obtainable in the shops and on the works. The essential of apprenticeship is the association of a learner and craftmaster in real production, under the sanction of the guild; this also must ultimately be the affair of the unions. If we are to make architecture an experimental art once more the foundation of the whole structure will have to be a number of schools in the several building crafts. In a school of masonry for instance there would be a museum of stones and a collection of tools. Strains and crushing weights would be investigated experimentally, and the equilibrium of arches and vaults studied. Problems of setting-out and practice in actual cutting should go hand in hand. Methods now gone out of use such as axing would be tried over again. Such a school in the hands of expert masons willing to consider methods new and old on their merits, would, I think, soon alter our current procedure. In a few years I should expect to see the present method of rasping the external face of masonry all over with a drag and leaving it to the weather with the pores well laid open, given up in favour of the traditional plan of finishing the face with a sharp-cutting axe and coating it at once with whitewash, which in old times was used as a thin preservative coat of plaster. I should expect the trade taking cognisance of these tests of material and research as to methods to make known the results, so that a body of sound rules in masonry might be made available. At present masons whisper that certain large London works specified to be built of Portland stone are really often executed in Ancaster, or even Bath stone.

The old guilds appointed "viewers," "searchers," or "wardens" to keep their eyes on this sort of thing, which they would not allow for the honour and true welfare of masonry. All this is the affair of the craft, and we must charge on the union the responsibility of seeing to it.

I suppose similar schools to exist for carpentry, plastering, plumbing, all of them nearly lost arts in any high sense, design in every case being approached as an outcome of positive conditions, not as an arbitrary pattern devised by hashing up the forms truly evolved in the past by experimental workers.

Architecture is, I have said, the combination of these crafts to special ends. The architect of the past (best represented by the building foreman of the present) was a mason or carpenter, and I am convinced that ultimately the great crafts should largely reabsorb the architect. In the meantime, however, although the path must be opened out by which the able practical mason and carpenter may become directors of building, it is necessary to educate a class who are specially brought up to direct crafts they do not practise, so that they may direct them as little capriciously as may be. The youth intended for an architect should in every case pass through the elementary stages of the masonry and carpentry schools along with the masons and carpenters, and he should have the run of all the other craft schools under certain conditions. He should, moreover, in a special school of building consider the crafts in combination, and the conditions and traditions of the several types of arrangement suitable for different classes of buildings. As a return of courtesy and service this school of architecture should be open to the craftsmen who wished to know something of building as a whole. The architect's special work is to be an expert in arranging and combining. The quality and details of the masonry are necessarily mason's matters; the curls and twists of the ironwork are the blacksmith's business; plumbing, sanitary and ornamental, is plumber's work; it is a ruinous policy, which instead of throwing on the workers the responsibility in their several trades, stirs up their instinct to get the better of clerks of works and architects. The architect's essential function is not to guarantee the quality of materials and workmanship he does not fully understand; it is not to design ornament out of his head so that materials which he has never wrought with his hands may be tortured into a semblance of his intention by mechanical workmen; his true function is to arrange and contrive highly specialised buildings, to act as an intelligence department for the several crafts, and as one having a knowledge of building as a whole to advise his employers.

At the present time building should be plain, straightforward, sound, and, as far as may be, reasonable; mere plainness and even baldness do not insult us like heartless bedizenment, or the assumption of the trappings of antiquity.

Mr. Powell said the writer suggested that the unions were to take up the work of teaching building and architecture, he should like to know how he proposed to vitalise the unions and get them to take up this work. So far as he knew they were not eager to move in that direction at the present time.

Mr. Lethaby, in reply, said that was a large question, and approached the subject from above; his paper might be taken as intended to stir up the unions from beneath. It was not for him to show how everything would work. He thought the unions should get hold of funds and help wherever they could, but the types of craft education would have to be settled by the several crafts themselves.

The Chairman (Mr. J. W. Sugg) said it seemed to him that architecture was an art, and although you could train a man to a mechanical business, you could not make a man an artist by any amount of instruction.

THE FRANKS BEQUEST.

THE summary of the will of the late Sir Augustus Wollaston Franks gives some idea of the character of the collections which the nation has inherited, but only his intimate friends, says the *Times*, know the great importance of the bequest. An antiquary by instinct and education, Sir Wollaston Franks aimed at illustrating, as completely as he was able, the whole of a subject by means of the many collections that he formed during his long and useful career at the British Museum. When the variety of these collections is taken into account, as well as the fact that Sir Wollaston was not, in the modern sense of the term, a rich man, it is very remarkable how nearly he attained to his ideal. The special public by whom his pursuits were most appreciated well know the scientific value of the fine series of Oriental porcelain and pottery that he gave to the Museum some years ago, and how usefully the public money was expended in the formation of the numerous and very varied sections of his department of the Museum.

Latterly, also, the visitors to the British Museum have had the opportunity of seeing the curious collection of drinking vessels which Sir Wollaston Franks deposited on loan in the new gold ornament room. The nation has entered into its

inheritance all too soon, but the "Franks Collection" will form a monument of which any nation or any collector might well be proud. It may almost be said of Sir Wollaston Franks, as is written of Wren at St. Paul's, "*Si monumentum requiris circumspice.*" All the objects lent by Sir Wollaston to the Museum now pass to the trustees. These include, besides the more valuable articles in the ornament room, a large collection of Japanese *netsuké*, those fascinating little carvings which represent in miniature all the folklore, the daily life and the mythology of Japan, and a collection of sword guards of the same ingenious and artistic people. These two series have been brought together to show, as far as possible, the range of the subject, the artists who worked upon them, the variety of the designs, as well as the range of material employed, and although larger collections may exist, it is not probable that they illustrate the subject more fully. Almost the last work upon which Sir Wollaston was engaged was the preparation of the catalogue of a collection of Continental porcelain which he had brought together in his house in Victoria Street. A few months before his death the collection was lent to the Bethnal Green Museum, and the catalogue printed. This collection will in due course also be placed in the British Museum, where it will complete what may be called the ceramic cycle. His English pottery and porcelain, Italian majolica, German, Dutch, and other wares are already there, and this small but carefully-selected series fills the obvious gap. The Trustees of the British Museum have also made a judicious choice from the collections remaining in Sir Wollaston's house, and these are now exhibited in temporary cases in the Asiatic Saloon at the Museum. There is, however, but little of first-rate importance among these, as the choicer specimens had almost all been already removed to the Museum, either as gifts or as a loan.

The two series which will probably attract most attention when space can be found to show them are the finger-rings and the personal ornaments. Upon these Sir Wollaston spared neither money nor pains, and the result, at any rate so far as the rings are concerned, is unquestionably the finest collection in the world. Over 3,000 in number, they include rings of the greatest interest and many of historical importance. Among the Greek rings are several of the finest classical work, and of the same period is the ring of a Persian king of the fourth century B.C., whose name is inscribed upon it to be used as a seal, but the scholars have not yet settled the English form the name should take. The Roman series have several of the heavy gold rings worn by fops of Martial's time. These are of great weight, nearly two ounces in one instance, and though they are set with a stone, this is innocent of engraving, as it might then be useful as a seal, and tend to diminish the owner's pleasure in a costly and entirely useless ornament. Martial describes how these rings, being worn on the upper joint of the finger, were apt to slip into the dish when the elegant wearer was at meals. Of later times the ring of Ethelwita, the sister of Alfred the Great, is, or should be, well known, as it has been shown in the Gold Ornament Room for some time past: but as it is from the English side probably the most important ring in the collection, it should not be forgotten now. In Mediæval times rings were in great request as signets as well as for mere ornament, if not for the protection of the wearer against the attacks of sickness or of his fellow-man, or even of supernatural agencies. Rings to procure invisibility had to be engraved with the quotation, "*Jesus autem transiens per medium illorum ibat;*" others are set with a "toad stone," a gem of rare virtue, now determined by science as the palatal tooth of a fossil ray; a third variety is made of asses' hoofs, and so on through the many quaint devices adopted by Mediæval and modern credulity. In all these varieties the Franks collection is rich, and many volumes would need to be written to fully explain all the allusions to be found either in the form, material or device of this curious class of rings. Of historical rings of later period than that of Alfred the Great there are many, especially of the Stuarts. Charles I. is well represented by about half a dozen nearly contemporary portraits set in rings, and the Jacobites executed in 1746 are recorded on a minutely-enamelled ring, of which, by a strange coincidence, there is an exact duplicate already in the Museum. An object of considerable rarity, apart from its historic interest, is a cameo portrait of Madame de Maintenon on a ruby about the size of a sixpence, the stone being, moreover, of the approved "pigeon's blood" tint. It is not possible to do more than to mention the large series of posy rings, or that, nearly as numerous, of mourning rings. The custom of wearing these somewhat doleful ornaments was in great fashion in England during the whole of the last century, but as a fashion seems scarcely to have gone beyond our own island.

The collection of jewellery includes many fine pieces of the fifteenth and two following centuries, but it is somewhat difficult, if not tedious, to describe them in detail. It is to be hoped that the Museum authorities will be able to make speedy arrangements for showing them to the public, though to those who know the Museum best the task does not seem an easy one. Of all Sir Wollaston Franks's collections that which most

gratifies his archæological friends is the wonderful gold "Treasure of the Oxus," a series of objects of all kinds recovered from the bed of the river. It was his intention to give an account of these in a handsomely-illustrated volume. The artistic and antiquarian problems they bring forward would fully justify their publication on the same scale by the Government.

The British Museum can scarcely hope to find again an officer who will so freely give up his purse, in addition to very exceptional talents, to the enrichment of the collections, and the public, as well as his many friends, may justly call upon the Government, on its side, to show its appreciation of such rare liberality not only by publishing the many treasures so easily got, but by continuing and amplifying the collections so well begun.

THE MOLE ANTONELLIANA.*

THE city of Turin, Italy, possesses a structure which is, without doubt, the loftiest building in Europe, and the most venturesome piece of construction in the world. This is the "Mole Antonelliana," so-called by general consent in honour of the venerable and skilful architect who conceived the project and personally superintended every part of the construction with the greatest care and watchfulness. The peculiarity of this remarkable work consists, principally, in its light skeleton construction with common bricks and lime mortar,† whereby a small quantity of material, and that of the most common kind, is employed to enclose a large building and carry it, with safety and stability, to the unprecedented height of 538 feet above the ground. The method of construction and the novel application of brick masonry in structural forms adapted to metal or fibrous material, make this building a unique structure in differing radically from all former monuments of masonry.

A brief history of the origin, progress and changing uses of the building is as follows:—In 1862 the Israelitish University Society of Turin, in view of that city being the capital of United Italy, determined upon building an imposing structure which should serve at once as a grand synagogue, college and administration building. A competition was instituted during that year among the architects of Italy to produce plans of a building that should satisfy their various requirements. Many plans were submitted, but none were considered satisfactory for the purpose, and after much discussion Professor Antonelli, of Novara (a master of architecture and engineering, who was then over sixty-five years of age, and who had erected the lofty and notable dome over the cathedral at Novara), was employed in 1864 to plan and construct such a building as they required. Under his advice and management the present structure was commenced and carried by the Jewish Society to a height of 240 feet from the ground, or about three-quarters of the height of the great square dome.

The plan as devised for the Society consisted of a building 130 feet square, with a projection 18 feet by 36 feet on each flank, containing stairways to all the main floors, and a front portico, 16 feet by 90 feet, with steps to the principal floor. A lofty basement, all above ground, was divided into two storeys to accommodate the college and administrative department, while the grand synagogue was above. This consisted of a clear, lofty room, about 90 feet square, surrounded with columns, six on each side (counting corner columns each time); outside of these columns are the walls, distant about 15 feet, thus making an aisle or ambulatory all round. Above this ambulatory, at a height of 17 feet 6 inches, is a gallery designed for women (now changed to a grand loggia). At a still greater height, just above the first offset, was designed a beautiful exterior gallery extending all round the base of the dome, with a colonnade of graceful granite columns. As will appear later in this paper, the omission of this granite colonnade on economical grounds greatly added to the difficulties of construction of the dome. There were also three interior galleries, the highest being 80 feet above the floor of the synagogue. The dome itself was originally designed to be surmounted by a cupola about 100 feet in height, divided into three storeys.

As before stated, the building was commenced in 1864. Before the base of the dome was reached the need of retrenchment in cost was apparent and the architect was directed to omit the granite colonnade forming the exterior gallery below

the springing of the dome. Notwithstanding this was designed to produce equilibrium on the arches below, Antonelli ingeniously overcame the difficulty and proceeded with the work.

In 1869, the funds being exhausted and the Jews frightened at the greatness and unusual boldness of the project, together with the discouraging fact that Rome and not Turin was to be the capital of Italy, work was abandoned, and the unfinished and unprotected structure was left exposed, both outside and inside, to the elements. No sooner had the work ceased than reports were spread that the structure was defective and would soon crumble to dust.

The Municipality, which at the beginning had accorded a subsidy to the Jews towards its erection in proportion to that granted the Roman churches, now called a council of men, expert in art and science, to deliberate on the subject. These, after carefully examining the work, reported in writing, in March 1871 that the building was safe and sound, and needed only a "hat and shirt" to protect it from wind and rain; that it needed the termination and covering of the dome and the adornment of the drum with an exterior gallery, since "without that the edifice would appear a disproportionate heap and an intolerably ugly deformity." The cost up to this time had been about 120,000 dols., and the architect estimated that 12,000 dols. more would finish it as designed.

For some months nothing was done. The destruction of the cupola was suggested, but protested against. In 1872 the President of the Jewish Society proposed ceding it to the city, but a few days after the Jews held a meeting, at which they resolved on the finishing of the temple, provided the cupola was demolished. This the Municipality refused to permit, and after prolonged discussion the building was allowed to remain as it was for several years. In 1877 the Jews sold the building to the city of Turin for 30,000 dols.—one-quarter of its cost—to be converted into a museum and dedicated to Victor Emmanuel II., and Antonelli was authorised to prepare for its transformation and completion. In the following year work was commenced on the great dome and the granite gallery at its base.

In the meantime Antonelli, with increasing confidence and assurance in his work, had projected a loftier design, which, instead of 100 feet, should place 268 feet of cupola and spire above the great dome, and make it the highest building in Europe. The perfect stability of the work up to this point, and the assurance of the architect that this great height could be erected with safety, led those in charge to yield to his ambition, and under Antonelli's personal supervision the structure was carried up to the base of the crowning statue, when, on October 18, 1888, Antonelli died at the ripe old age of ninety years. His son, who had assisted him in the supervision of the entire work, was placed in charge of the building. The crowning statue was erected in 1889, holding a glistening star 538 feet above the pavement—the greatest height reached by any structure of masonry in Europe. The interior has hardly received its finishing touches. It will probably be dedicated for a museum in memory of Victor Emmanuel II., in 1898, at the time of the Turin Exhibition.

With this brief history of the structure we will now attempt to analyse its parts and describe some of the peculiarities of its construction. The building consists essentially of a square 130 feet each way, with piers 17 feet 8½ inches on centres, showing eight piers on each side, or twenty-eight in all; at a distance of 17 feet 8½ inches inside of these are the centres of an inner range of piers, with six on each side, or twenty in all. These forty-eight piers perform all the work of supporting the walls of the building, the great dome, and lofty cupola and spire.

There are on each flank of the structure three piers supporting projecting wings enclosing stairways, and on the main front six more piers supporting the massive granite columns of a great portico. Also in the basement and sub-basement storeys there are eight interior piers which support the floor-arches up to the great square room.

Thus there are in all sixty-eight piers supporting all parts of this interesting structure. The foundations for these piers are laid in sand 45 feet below the surface of the ground. There is a sub-basement 17 feet 8 inches deep below the basement floor or pavement level, and at this point we see the commencement of light-arched construction which is to form the principal characteristic of the building throughout. At this level the interior piers are about 4 feet by 4 feet, and the exterior piers about 4 feet by 6 feet. Instead of massive walls to resist the earth pressure and support the exterior walls, thin segment arched walls are sprung from pier to pier with convex side outward; these in turn are buttressed and strengthened by horizontal arches at mid-height of the sub-basement.

From the level of the pavement the outside walls are carried on flat arches from pier to pier, thus throwing all weights of walls, floor and contents on the piers. The three floors that intervene between the sub-basement and great temple are carried on remarkably light arches, some of them over 30 feet span and less than 3 feet rise. The loggia and gallery floors

* A paper by Mr. G. W. Percy read before the Technical Society of the Pacific Coast.

† The bricks used throughout this building are the common bricks of Northern Italy, measuring 2½ inches by 5½ inches by 9½ inches, with a crushing strength of about 100 tons to the square foot. The mortar is made from lime slaked and buried in pits for a year or more and used with a proper admixture of sharp sand; no cement whatever is used in the work. The actual load on most of the supporting members is about 15 tons per square foot, which must be largely increased at times by wind-pressure.

are also carried on very thin and light brick arches employed with the greatest freedom in every part of the work.

The external architectural features of the building consist, first, of a basement storey treated as pedestals for the pilasters and columns above; then two orders of architecture, consisting of brick pilasters over the main piers, with granite Corinthian capitals. The walls between the lower pilasters are ornamented with small granite columns in two storeys, with windows in the central spaces. The second order has a high brick screen wall with small granite columns, all open to the loggias before mentioned.

Above the cornice of the second order is the roof of the side projections and the front portico, and an offset of about 5 feet all around to the base of the great external gallery, with its fine granite colonnade around the base of the dome. Over this gallery is another sloping offset of about 5 feet to the base of the great square dome.

This portion presents five large arches on each side, with ornamental pilasters and entablature, which forms the springing line of the great dome, about 150 feet above the ground.

The great dome itself, 100 feet square on the outside and 120 feet high, has its sides falling inward about 35 feet, forming a square at the top of about 30 feet; on this is erected a combination of cupolas and spire, with granite columns and brick piers, crowned with a statue 268 feet above the dome, or 538 feet above the pavement. The architectural effect, grace or proportions of this building we do not wish to criticise or praise, but only call attention to the difficult problem presented and the skill with which it was solved.

The problem before the architect was to poise on this inner and outer square of slender supports a great square dome which should have its thrusts self-contained, be of such light construction that it should not crush the supporting columns and of sufficient strength to carry a lofty cupola and spire, and to support itself through the various stages of construction without interior centreing.

Antonelli found by experiments that bricks would lie in equilibrium on a bed of mortar at an inclination of 30 degrees with the horizontal. He therefore arranged the pitch of the dome so that the greatest inclination of the radius should not exceed 30 degrees. He allowed 6 feet for the entire thickness of the dome, and placed the inner line, or shell, directly over the inside line of columns.

The elements of the dome then become established as follows:—

Interior side	88 feet
Thickness	6 "
Exterior side	100 "
Interior radius	246 "
Exterior radius	252 "
Height of dome	120 "
Base of cupola at top of dome, inside	16 "
Base of cupola at top of dome, outside	30 "
(Small fractions of a foot omitted.)	

With the inside shell of the dome over the inner line of columns, and the thickness 6 feet, with the columns 17 feet 8½ inches on centres, it is evident that the outer shell would be about one-third of the distance to the outer line of columns, and to properly support this and place the dome in equilibrium on the two ranges of columns was the first great difficulty encountered. This might be easily accomplished with strong metal beams extending from column to column, capable of supporting the load at any point, but it was Antonelli's purpose to use brick arches everywhere to support loads, using metal very sparingly and only as ties and keys, and thus we find him preparing for this great load in the following manner:—

Over the granite capitals of the second storey of columns, and at a height of 75 feet above the ground, parabolic arches are sprung from outer to inner columns, with metal tie-rods and flat groined arches to form the ceiling of the loggia.

On these transverse parabolic arches, which it will be remembered are only the width of the columns and 17 feet 8½ inches apart on centres, are sprung two elliptical, longitudinal arches, dividing the space between columns into thirds, the inner line of these arches destined to carry the outer shell of the dome and the outer arches to support the granite exterior gallery, which we now see was designed to load the parabolic arches symmetrically quite as much as for other use or ornament.

It was after these arches were turned and the base of the gallery built that the architect was required to abandon the granite gallery to save expense. Probably no one realised, as did Antonelli, the importance of this gallery as a counterpoise to the weight thrown on the inner side of the arches, or the skill and care it would require to prevent the parabolic arches from being very unsymmetrically loaded, with resulting displacement.

We shall see, however, how ingeniously Antonelli overcame the difficulty and moved on to the construction of the great dome. Considering these arches capable of carrying a portion

of the load unequally distributed, he proceeded with the vertical supports of the dome, consisting of two orders of columns inside and square brick piers outside, with a blank wall to receive the roof of the gallery when it should be built, and over what should be the roof of the exterior gallery he turned five great semicircular arches on each side, which were to form large clerestory windows to light the interior and form architecturally the drum or base of the dome.

We have now arrived at a height of 150 feet above the ground and at the springing line of the great dome, and here a peculiar construction commences, such as one might design in iron, but which few would think of executing in brick and lime-mortar.

It was necessary that in order to place such a lofty structure as was designed on such slender supports, it should be as light as possible, elastic and strong. In metal or timber this would not be a difficult thing to do, but in masonry it required a departure from all former efforts, and to accomplish which consummate skill in design, exactness in calculations of forces and stress, and the greatest care in workmanship and selection of materials were required.

It will be remembered that the entire thickness allowed for the dome was 6 feet; an inner shell was necessary to form a ceiling surface, and an outer shell on which to lay the roof covering. These the architect made as thin as possible—only one-half a brick, or about 5 inches each. The real supporting members consist of vertical ribs placed directly over the main supporting columns, 17 feet 8½ inches on centres. These ribs consist of an outer and inner member, about 10 inches by 15 inches each, connected at intervals of about 12 feet with cross arches, upright and inverted, with an iron tie-rod through each connection.

At each of the four corners are somewhat larger ribs or spines placed diagonally on the plan, constructed in a similar manner to the vertical ribs, and destined to carry the entire weight of the cupola and spire. The vertical ribs all join the corner spines in pairs, and their principal duty is to support the square dome, the two middle ribs on each side joining the angle spine at the top, where the base of the cupola rests. The distance between the vertical ribs is divided into three parts by smaller ribs one brick square, through which iron rods pass about 5 feet apart, to secure the granite ribs on the outside of the stone covering.

The inside shell is also strengthened by similar small ribs projecting into the space between the shells, and further supported, while the entire structure is braced by curved ribs projecting with two offsets about 10 inches on the inside of the dome. These curved ribs are struck with the same radius as the inside shell of the dome, and branch each way over every one of the interior columns, intersecting each other at acute angles and abutting, two by two, at the corners, thus dividing the interior surface of the dome into symmetrical panels with curved lines, and serving to distribute any weight or force acting on any of the spines to the several columns.

In building these curved ribs some interior support may have been obtained by struts and braces from the timber scaffold which was erected inside the dome, but no complete system of centreing was employed.

The large panels between these curved ribs, only half a brick thick, are built slightly concave or sail-like, to prevent their falling inward while the mortar was still fresh. This concavity, however, is so slight it cannot be perceived from below. At five different stages in the height of the dome horizontal arches are sprung from rib to rib, with thin arched floors spanning the space between shells and forming so many ambulatories around the entire dome, and making rigid connections of the various parts.

At the same time wrought-iron ties are placed near these floors to resist any possible tensile strain that might come from the outward thrust or from the tendency to fall inward during construction.

Thus it will be seen the entire composition of this dome is a complicated piece of framing and trussing, with all the members in brick carefully proportioned to the work they have to perform, while iron ties are inserted only where tensile strain may be encountered.

As if the difficulties of carrying out this design were not sufficient, the necessity of omitting the external gallery required some device to throw more of the weight of the external shell on the inner columns than was first proposed, and thereby relieve the parabolic arches before described. This was accomplished by carrying the inner member of the principal ribs in a vertical line, and inserting granite blocks extending entirely through the dome, and by vertical piers above the granite, throwing the weight of the outer shell to the inside line. This device proved successful, and no movement was apparent in the unequally loaded arches below. Stone stairs are built into the space between the two shells of the dome, thus giving easy access to the cupola above.

This stage of the work was reached in 1880, and before proceeding further the granite gallery so often referred to, and so

much needed both to give symmetry to the building and equilibrium to the parabolic arches, was constructed; also the covering tiles were placed on the great dome. These consist of slabs of dense flagstone, about 2 inches thick and nearly 6 feet long, extending from centre to centre of the small brick ribs, while the vertical joints were covered and the whole secured with granite ribs carefully fitted to the slabs and held in place with iron bolts extending through granite and brickwork and keyed-up on the inside.

A notable feature in all the iron connections throughout is that they are made in the old method of keys and wedges, instead of the more modern thread and nut. These bolts, placed at regular intervals and in horizontal rows about 5 feet apart, are formed with eyes on the outside, by which scaffolding may be secured.

One would suppose that when the top of the dome was reached, 275 feet from the ground, most architects would consider it desirable to finish the work with a cupola or lantern of moderate height: but not so with Antonelli. Not satisfied even with a three-storey cupola, 100 feet high, which was first designed, he proposed an astonishing combination of cupolas and spire, and which required a further height of 268 feet and a superimposed weight of about 550 tons.

By this time we should be prepared for any venture the bold architect might make, and while we may be amazed at the slender construction placed at this great height and poised on such delicate supports, we shall find nothing more surprising than that we have examined.

As before stated, the converging ribs and spines meet at the top of the dome in such a manner that when connected with strong arches and iron ties they form a platform 30 feet square on the outside, with an opening 16 feet square in the centre, and the arches so constructed that all weight placed on this platform will be conveyed to the angle spines and distributed by the straight and curved ribs to all the columns below.

The base of the cupola, about 10 feet high, is formed with six bracket-like piers on each side placed over the outside arches, and four piers on each side over the inside arches. The brackets on the outside support a granite balcony, from which a superb view of the city and surrounding country is obtained. Above this base are high pedestals, and two storeys of granite columns on the outside line and brick pilasters with windows on the inside, with all connecting arches of brick.

This lower section of the cupola terminates with stone pediments on each of the four sides and a conical-shaped roof above falling in about 5 feet, and consisting of a thin shell one half-brick in thickness, stiffened with ribs and girts of a whole brick on the inside.

The top of this conical roof carries us 75 feet above the dome, and here the structure assumes a circular plan, with an outer and inner row of small granite columns, and inside of these another circle of very small brick columns, between which and the inner circle of stone columns are double flights of winding stairs of stone.

The outer circle of columns is but one storey high, and supports another outside balcony, crowned in the design with eight angels, presumably blowing the last trump.

The stone columns of the inner circle now become the outer ones, and extend two storeys higher, with the stairs and inner columns as before described. And now, at a height of 135 feet above the dome, a slender spire is built for a height of 65 feet, consisting of eight brick piers, about 10 inches by 10 inches, forming the angles and connected with the stone roofing slabs, held with stone ribs on the outside, bolted through the angle piers, and braced on the inside by the stone stairs. The inner circle of brick columns has now become very small, with only about 16 inches of a well-hole in the centre. The stone stairs, now reduced to a single flight, continue to wind around the central shaft of brickwork, and reach another stone balcony 205 feet above the top of the dome, or 475 feet above the pavement, the highest point to which the public is admitted.

Again we are treated to a storey of stone columns, tied together with iron bands, the central hollow shaft of brick, and the stone winding stairs to the last open balcony that may be reached by stairs.

As the exterior diameter is here reduced to 6 feet, the stairs are no longer practicable, and those who would reach the higher balcony must ascend an iron ladder on the outside of the slender spire.

The final and crowning statue is still elongated, as if determined to get as far as possible from the earth, and the whole is very appropriately surmounted with a star, which we hope will remain a fixed star for many years.

New Roman Catholic Day Schools, erected at a cost of 4,000 $\frac{1}{2}$., have been opened at Batley by the Right Rev. W. Gordon, Bishop of Leeds, who was formerly priest-in-charge of St. Mary's Church, Batley, where his brother, Father Charles Gordon, is at present pastor.

YORKSHIRE ARCHÆOLOGICAL SOCIETY.

THE second excursion organised by this Society took place on the 22nd inst. The members and friends, meeting at Milford Junction and taking carriages, proceeded to Steeton Hall, which, according to a pedigree of Reygate, in Foster's "Yorkshire Pedigrees," was held by the Reygates from the time of Henry III. down to 1375, when John de Reygate, the last male representative of the family, died. The numerous shields were carefully examined, and the vaulted room and other fragments of Mediæval work were a source of interest to the visitors. Ledsham Church, which was given to Pontefract Priory by Robert de Lacy, was next visited, and Monkfryston, so called because the Benedictine monks of Selby were the owners of the place, proved to archæologists worthy of consideration. Passing on to Birkin, the church of that place was surrounded with many items fascinating to strangers, the principal feature being that it is one of the most perfect examples of a small Norman church to be found in Yorkshire. With the exception of the addition of an aisle, it was found that it had been very little altered. Brayton was the last place visited, and there the church was gone through. The earliest part of the present structure is of about the same date as the Norman work of the church at Birkin, and represents a church built under the same influence, but on a larger scale. The tomb of George, Lord d'Arcy (1558) and the arms thereon were matters which proved exceptionally interesting.

Mr. William Brown, the secretary, gave historical notes on each church visited, and Mr. J. Bilston submitted the architectural descriptions. The company then drove on to Selby.

TESSERÆ.

Romanesque and Gothic.

THE principal quality which we may find invariably vindicated by Romanesque architects or those who connected the traditions of classical art through various types with Mediæval art consisted in a knowledge of the effect of vastness produced by the multiplication of regular subdivided parts, equally subdivided themselves in their turn. The long rows of columns which decorated the early Christian churches, the arcadings, which ultimately formed one of the principal characteristics of the style, all exhibited excellent ideas of general effect cast into often uncouth and eccentric detail. Yet in all this uncouthness and these eccentricities there may be perceived vigour and life indicative of the state of germination, a casting off, as it were, of an old skin to put on a new one, and after the throes of labour to give birth to an entirely new creation. As otherwise than an entirely new creation it is impossible to regard Mediæval architecture. If it should be necessary in a single word to state what appears to be its dominant sentiment, it is possible that the word "aspiration" might, better than any other, convey that elevation of sentiment which induced men to lift their structures as they lifted up their hearts towards the Supreme Power which reigned over them. Men's mind and men's architecture rose together upwards, and as the old predominance of horizontalism had shown men thinking of themselves and running parallel with the soil, "of the earth, earthy," rather than breaking away from it, so the vertical tendency of the Mediæval architecture seemed to be expressive of a springing from the world to a something higher and purer.

Early Bricks in St. Albans Abbey.

The brick is mostly of one size, namely 16 by 12 by 1 $\frac{1}{2}$ inches, and no less regard was paid to lapping the courses or preserving the bond than could have been in the construction of masonry. Hence we observe the influence that the material exercised over the design; the retreating members on the angles of the piers and arches, and on the pilasters standing in advance of the walls, are in proportion to the measure of the slabs. Brick of a still larger superficial dimension than that just named appears occasionally, particularly in the staircases, but in point of substance it generally varies; this inequality, however, was unimportant, the concrete mortar was used with an unsparing hand and with a confidence which showed perfect reliance upon its temper for duration; and in cases of disparity an approach to a level line in laying the courses was obtained by giving more or less substance to the joints. The bricks vary in shape and durability in proportion to their exposure to the fire in the process of burning. Many are vitrified and warped by excessive heat, and but few are observed to have yielded to the action of the weather upon the exterior of the building. The earth of which they were made was evidently prepared with great care; their texture is close and fine, and the hardness such that they seem as durable as the flint with which they have been so admirably combined in the walls. They are mostly of a deep red colour, but many in the interior of the belfry are of white earth.

The Fortifications of Messene.

The gate of Messene is the most beautiful and the most massive defensive structure which has come down to us from the historical period of Greek antiquity. It is in excellent preservation, and where there may chance to be a defect it is scarcely perceptible. The whole gate is magnificently hung with dense shrubbery and a profusion of creeping plants. It seems, as Curtius remarks in his description of Messene, as if we were entering a city forsaken only a short time before. We stand before a ring of massive masonry. Two square towers flank the entrance, protecting a doorway about 15 feet in breadth. Through this we pass into the inner court, which is a perfect circle, with a diameter of 62 feet. The wall forming its circumference is in good preservation to the height of nine courses of stones; these are clean, well-smoothed blocks, laid with great care and skill. Below there is first a belt of stones, in length double their own height; then comes a layer in which the height preponderates considerably over the length, then another belt corresponding exactly in form and height to the first; after that uniform courses of blocks, so finely cut and so firmly joined without cement, that they look as if they had grown together. A niche on each side of the entrance shows that this magnificent court did not want the adornments of statuary. A second doorway, exactly opposite the first, leads directly into the city over a broad paved way. The huge lintel, 18 feet in length, rests with one end upon the ground. Green ivy clusters all around it. The city walls, after ascending Ithome and Evan, return again into the valley and meet on the east in a second gate, little of which is preserved, and which probably never equalled the west gate in grandeur. These walls are of the most imposing character. Square towers, and, at sudden bends, round ones, break their continuity at determinate, though not always regular, intervals. Pausanias says of these walls:—"The Babylonian walls, or the Memnonian walls at Susa in Persia, I have not seen, nor have I spoken with anyone who has seen them; but this I know, that the Messenian walls are stronger than the walls of Amphyres in Phocis, of Byzantium and of Rhodes, which are reckoned the most strongly fortified places." Our astonishment increases when we learn that these gigantic defences were erected in a very short time; Diodorus says in the space of eighty-five days. What a tough, practical vigour in political matters Greece manifested even in her decay.

Thirteenth-Century Plans.

Everywhere the ground plans of the twelfth century owed their origin to Byzantine influence, as in such churches as St. Mark's at Venice, or to Romanesque influence, as in the Roman basilica, converted into a church, and then copied in spite of its history. The former plan was symbolical, with a central dome and a cruciform arrangement of nave, transepts and choir, whilst the latter was simply practical and useful, and a good meeting place for people for religious as well as for secular purposes. The steps were many by which these two plans were gradually fused and developed into the perfect French thirteenth-century ground plan. One of the most suggestive of them is to be seen no doubt in the churches of the Puy de Dome, where with the simple nave and aisles, recalling the basilica, we see the Byzantine central lantern, the transepts, and finally the apsidal east end, with its surrounding aisle, and a range of chapels projecting from the latter. Here everything is simple and austere; the round arch only is used, and it requires some consideration to detect in it what one may nevertheless pronounce to be the first type of the very best French Gothic. Go from these early churches of the Puy de Dome to Bourges, and so to Paris, Chartres or Rouen, and you will find the same general scheme translated, so to speak, into Gothic; clusters of columns take the place of simple shafts, their capitals are exuberantly sculptured, the roofs are vaulted with pointed vaults of stone, the windows are delicately designed with geometrical traceries, and the arrangements of all the constructive features are made with the most consummate art and care. It is well to pause on this type of plan for a time, because for some reason it was never extensively employed in England, where there was a decided prejudice against the apsidal termination to a church after the end of the twelfth century. Otherwise, in most respects, the English churches are more varied in plan than the French; and one possible reason is that from the early part of the thirteenth century the French, wherever it was possible, groined their churches in stone, whilst the English almost as invariably covered theirs with timber roofs. The former required, of course, much more careful arrangement of the plan in order to give the required points of support and the necessary buttresses; the latter led to greater variety of outline, and to a less formal and scientific style of design. The architect was able to wander at will over the whole field of art, to vary the outline of his building wherever he listed, and to make changes in his disposition of the piers and other main supports of his building, which were quite impossible when the building was to be groined in stone.

Ornamental Pavements in England.

The use of marbles or other like costly pavements was almost unknown in England, even as it would appear during the time of the Roman dominion, for few examples are found of any importance, and during the Middle Ages the porphyries brought from Rome to adorn the Chapel of the Confessor in Westminster Abbey during the reign of Henry III. might be mentioned as a solitary instance of the use of such materials. The mosaics of the Classical age were succeeded by the rich pavements now found almost exclusively in the earlier Italian churches. It is not improbable that the wealthier pilgrims on returning from Rome would endeavour to ornament the churches of their own country in some like manner, as it is recorded that they brought back from Italy paintings and sacred ornaments of various kinds, and that foreigners were engaged to visit England in order to glaze the windows of churches. No example, however, of such ornamental pavement had been recorded, nor is it known of what nature were the pavements designated by the Saxon term, *bleo-stæning*. In later times pavements were formed of square tiles called *quarrels*, composed of red clay, with ornamental designs in white clay imbedded in cavities impressed upon the surface of the quarrel and glazed. Occasionally coloured glazes were employed, or the quarrels were ornamented with impressed designs only, such as those found in Ireland, described by Professor Oldham. Decorative tiles have improperly been designated as Norman. Numerous specimens may be found in France, but a far greater variety in England, where the manufacture seems to have been practised in great perfection from the thirteenth to the sixteenth century. Higden, the chronicler of the times of Richard II., speaks especially of white and red clay to be found in England valuable for fabricating pottery and for colouring tiles, comparing it to the true "Samian." The introduction of such pavements enabled the architects of the Middle Ages to produce a more complete harmony of effect in the interior of sacred buildings, serving to maintain throughout the structure the character of rich decoration produced by painted glass, hangings, and especially by the coloured designs which covered the walls, mouldings and vaults. In the choir or chancel, more particularly, the use of ornamental pavements prevailed. Some examples remaining in England may serve to show the general rules of arrangement—as displayed in the Exchequer Chamber at Exeter. The pavement of Prior Cranden's Chapel at Ely supplies an interesting and peculiar example, combining figures with ornaments of the more ordinary kind. The most remarkable productions of this nature upon record are the sepulchral effigies designed upon flat tiles, formerly existing in the abbey church of Jumièges and at Fontenay near Caen, of which a description was given. The abbey church of Jervaulx, in Yorkshire, formerly exhibited one of the finest pavements known to have existed in this country.

Illumination of Manuscripts.

The practice of introducing ornaments, drawings, emblematical figures and even portraits into manuscripts obtained in the works of Varro, Pomponius Atticus, &c. From the fifth to the tenth century the miniature paintings which we find in Greek or Byzantine manuscripts are generally good, as are some in those of Italy, England and France. From the tenth to the middle of the fourteenth century they are commonly very bad, and demonstrate the barbarism of the age. Towards the end of the last period they improve much, and in the two succeeding centuries many excellent performances were produced, especially after the restoration of the arts and revival of ancient works. About 1546 the illuminators were in great distress for want of employ, on account of the dissolution of abbeys and the invention of printing. The last specimen was Cardinal Wolsey's lectionary at Christ Church, Oxford. Gold and azure were the favourite colours of the illuminers, and a metal pen was used. Books illuminated with superior beauty were for persons of distinction; and the works destroyed at the Reformation were chiefly such as were illuminated, because erroneous and superstitious.

Apollodorus the Architect.

It is supposed that Apollodorus was born at Damascus. He obtained the favour of the Emperor Trajan, and was engaged on the architectural and engineering works constructed during his reign. Among them were the square in Rome, with the column in Rome, a triumphal arch, a college, a theatre for musical performances, the Ulpian basilica, a library, baths, temples, roads, aqueducts, the great bridge over the Danube. His Forum of Trajan excited the envy of Hadrian, and in consequence the architect was driven into exile on some frivolous pretext. The Emperor, in order to convince Apollodorus that he could easily dispense with his services, sent him a design for the Temple of Venus and Rome, and his opinion on it was asked. It had been prepared by Hadrian. Apollodorus answered that the emperor should have made it more lofty, and have introduced accommodation below the ground for the reception, whenever occasion required, of the machinery of the

adjoining amphitheatre, and have imparted to the façade of the temple towards the Via Sacra a more imposing aspect. The statues, which were represented as seated, were said to be so disproportionate, that if the goddesses desired to stand up and walk they would not be able. As might be imagined, the artist paid for the freedom of his criticism with his life.



Paris International Fire Prevention Congress, 1897.

SIR,—As British Secretary of the above Congress, I have been asked to hand you the enclosed letter from the President of the Paris committee, invoking your kind and valuable assistance to the project. After the ample remarks of the President I have little to add, but simply that I think France requires in this matter to get assistance outside her own country, and nowhere, I venture to assert, can she get it better than in England. If you can see your way clear to ventilate the matter in your valuable journal you will be rendering an everlasting service to humanity. Before doing so, if you wish for any further explanation from me in person I shall be pleased to wait upon you or meet one of your representatives here at any time by appointment.

On my own part, I enclose you copy of the committee, showing the great influence at work in Paris, to which I shall feel honoured if you will permit me to add your name.—Believe me to remain, yours faithfully,

FREDK. HOARE.

Sir,—We have the honour to inform you that, in the hope of preventing a return of the horrible catastrophe of the Charity Bazaar fire of Paris in May last, which has so painfully affected the world, we propose to call together an International Congress to discuss all means to prevent and minimise fire in theatres, concert-halls and places of public resort, the date of which will be very shortly announced. We therefore appeal to the Press, to French, English and foreign architects, engineers and scientific men generally, who are interested in this grave question.

In conjunction with the Congress is also being organised an international exhibition of all engines, inventions, products and plans for the prevention of fire, and fire-extinguishing appliances and materials. We therefore invite all manufacturers, engineers and inventors to exhibit their machines and inventions there, for which purpose a vast building will be placed at their disposal next to the Congress. In this way all scientific discussion will be strengthened by practical demonstration.

To prove the importance of the Congress 150 members of the Senate, deputies, municipal councillors of Paris and scientific men of the Government have already joined the committee.

We sincerely hope, Mr. Editor, that you will kindly favour us with the help and support of your important paper to carry our appeal to the knowledge of your numerous readers, thereby rendering a lasting service to our committee.

We have appointed as our British secretary Mr. Frederick Hoare, of College Chambers, 249½ High Holborn, who will be pleased to receive on our behalf all expressions of sympathy with the movement, and gladly welcome in the name of the committee any data or useful information bearing upon the business of Congress.—Yours faithfully,

MARECHAL,

Vice-president of Committee.

Liskeard Church Tower.

SIR,—As usually happens in a weak case, the letter from Mr. Norris in your issue of July 23 inclines more to personal attack than to honest argument. Because, as the result of Mr. Norris's invitation for *bonâ fide* criticism and his statements in public, letters not agreeable to his view appear in some of the local architectural papers, the subject has become "nauseous" in his eyes, and he attributes wholly unworthy motives for my opposition to his scheme of destruction.

Now, sir, although I adhere to the opinion expressed in my report in every detail, I am not going to occupy your valuable space or waste time in defending the suggestions it contained. My only desire is to do all in my power to save the old tower from wanton destruction, and if means better than mine are suggested, no one would welcome them more than myself, if the final result is the same.

But, to confine myself to the subject of discussion, what new reasons does Mr. Norris give for the demolition of the tower?

1. There is a somewhat amusing description of the tower as at present—a description that is in a measure true, in that the tower certainly shows the results of both disgraceful neglect and ignorant and unsightly repair. But the evils

from the former cause can even at this late hour be remedied, while the objectionable slate and stucco surface can easily be removed.

2. A curious statement that "the rebuilding scheme of this tower is not the dream of a night, but the dream of 400 years." What a nightmare. How on earth could Mr. Norris have arrived at this conclusion? Do records establish the curious fact that the Liskeard community have been wanting a new tower since the fifteenth century, and have been unable to raise the funds in 400 years?

If such is the case, it is unique in the history of church building.

3. A still more curious statement as to the intention of "the gentlemen of the fifteenth century who nobly built this large Perpendicular nave—"would have erected a tower worthy of their new nave had their cash been sufficient."

Again I ask, how is this marvellous insight obtained as to the intentions and impecuniosity of the gentlemen of the fifteenth century? It is, of course, purely imaginary, like the dream, and surely in the absence of documentary evidence to the contrary, we can but deal with facts, and accept the explanation taught by numerous other examples, that such ancient work was always valued and generally retained where possible.

4. The last question brought forward as an argument is almost comic in its very simplicity. "Why did they not rebuild a Norman nave?" Why were repairs in 1627 not carried out in the Norman style?

Who ever heard of the fifteenth or seventeenth century architects building or rebuilding in the Norman style? No, sir, the simple fact probably is that more accommodation was necessary, and therefore a larger nave was built, of course, in the style of the period in which it was built. A new tower was not necessary, therefore they, of course, retained the old one.

The doorway added in 1627 simply goes to prove that they meant to keep the old tower.

One other point. Mr. Norris objects to the photo of the tower published in your issue of July 9, and insinuates that it was cleverly arranged so as to hide some of the most conspicuous defects in the tower. This photograph was most kindly taken for me, and sent to me previously to my report, by one of the gentlemen of the committee who himself supports the rebuilding scheme.

In conclusion, I can only add that, whilst I am sorry to be in antagonism with Mr. Norris and the committee, I feel that now, if ever, is the time to speak, so as to hinder or prevent, if possible, this unnecessary destruction of Liskeard's most ancient and interesting building.—I am, yours faithfully,

GEO. H. FELLOWES PRYNNE.

6 Queen Anne's Gate, Westminster, S.W. :
July 28, 1897.

GENERAL.

The Select Committee of the House of Commons on the Administration of the Museums of the Science and Art Department have agreed on their report. It describes the evidence which has been taken, and emphasises their interim report with regard to the urgency of making better provision against fire at the South Kensington Museum. The committee recommend their reappointment next session, in order that they may then continue and complete the work entrusted to them.

The Theatre Royal, Worthing, which has been reconstructed from the designs of Mr. A.T. Cooke, was formally opened on Monday evening by the Mayoress.

A Portrait of Sir John Stanley, by Romney, has been purchased for the Louvre.

The London County Council agreed on Tuesday to expend 100l. on printing a register of buildings of historic or architectural interest in London, on condition that the particulars, plans and drawings which would form the register were presented to, and became the property of, the Council. The particulars for the register have been completed, so far as the parishes of Bow, Poplar and Bromley are concerned, by the Committee for the Survey and Registration of the Old Memorials of Greater London. It is understood that the registers, plans and drawings will be presented to the Council free of cost.

The Price offered for the materials of the Palace of the Liberal Arts in the Champ de Mars on Tuesday was 308,000 francs. The contractor is to take down the structure.

During the Excavations at the Limescastell "Alteburg," near Holzhausen, in the Wiesbaden district, an inscription was unearthed at one of the gates, consisting of gilt bronze letters fixed to a slab of limestone by means of silver rivets. The inscription, dating from 213 A.D., contains five lines, and seems to be dedicated to the Emperor Caracalla in honour of his victory over the Alemanni, a victory in consequence of which he assumed the surname of "Alemannicus."

The Architect.

THE WEEK.

It is an unwise course for a builder to act in defiance of local by-laws. Courts of all kinds generally support the latter, and when a decision is given in favour of a builder the advantage is rarely worth the expense. A case has just been heard in Plymouth in which a builder announced that he intended to establish a test case, and an ambition of the kind is sure to be expensive. He was summoned for erecting small houses at the rear of other houses without leaving the 15 feet of open space between the houses and the boundary wall required by the local by-laws. His defence was that he had substantially complied with the by-laws, of which the object was to secure an open space of not less than 150 square feet. But the space was obtained by an increased width, although the length was diminished by about a foot. The defendant was fined 2*l.* and costs in each of the five cases, but what is worse, the Corporation can insist on the removal of the buildings or on the infliction of an additional penalty. So far the course of the law is not favourable to the contention of the contractor, and it is doubtful if the case be brought into a higher court whether a different decision would be obtained.

At the last meeting of the Cardiff County Council some alterations were made in the requirements which will have to be satisfied in the designs for the new municipal buildings. The site has been extended, as it will not be necessary to be hampered by the law courts which will be erected, as the courts will not be placed in the position first proposed. The journalists of South Wales drew attention to the absence of accommodation for the Press. It was pointed out that care would have to be taken to place the Press gallery in the law courts in a position where the evidence could be heard. It was said that in Manchester the gallery was placed behind the witness-box, and in consequence the reporters were compelled to appeal to the judges that they might be placed in a more convenient position. Accordingly their lordships ordered seats to be provided underneath the bench, and in front of the barristers, prisoner and witness. The local branch of the Incorporated Law Society obtained the promise of an ante-room in connection with the law library. It was also decided to arrange for a refreshment-room, a Press-room, 20 feet by 15 feet, and a deputy mayor's parlour being also be provided. The assembly-room is to accommodate about 1,000 persons, but when necessary it and the ante-chamber and council-room can be united. The estimated cost of the building, in spite of the additions, remains at 200,000*l.*

For the first time since its revival the National Eisteddfod has been held in Newport, Monmouthshire. But according to the scribes there was another assembly of the same kind in 1350, and five centuries and a half form only a brief period in Cymric history. The pavilion which was erected for the meetings, and which will accommodate 14,500 spectators, cost 2,300*l.*, and about 2,000*l.* was spent on prizes. Once more the cosmopolitan Mr. HERKOMER, R.A., was the chief judge for works of art. He declared there was an improvement visible in the quality of the work submitted. Much was produced which was not worth a place in the exhibition. He suggested that a permanent art committee should be formed, as it was difficult to improvise one. The following were the principal awards in painting and sculpture:—Oil-painting.—(1) 40*l.*, E. H. THOMAS, Cardiff, "Intellectual Blindness following Old Thoughts;" (2) 10*l.*, Miss EDWARDS, "Babes in the Wood;" commended, CHRIS. WILLIAMS, Maesteg, "The Hendre Farm," and T. PRYDDERCH, Wroxeter, "Ruins of Theatre and Mount Etna." Landscape.—(1) 25*l.* (including an extra 5*l.*, as the scene depicted is in Monmouthshire), PARKER HAGARTY, B.C.A., Cardiff, "On the Road to St. Bride's, near Newport;" commended, A. NETHERWOOD, Llandudno, "Summer," and W. J. CORAH, Conway, "Llangostein Old Hall." Water-colour drawing.—(1)

30*l.*, C. COCKRAN, B.C.A., Anglesea, "A Still Salt Pool, locked in with Bars of Sand;" (2) 10*l.*, S. TOWERS, Conway, "A Welsh Hamlet;" extra prize (8*l.*), N. STEPHENSON, Deganwy; commended, B. A. PUGH, Aberystwyth, "The Nurse," and T. PRYDDERCH, Wroxeter; and B. A. LEWIS, Carmarthen, "Ceracle Fisher of the Towy." Portrait bust from nature.—15*l.*, H. PRICE, West Kensington; extra prize (8*l.*), FRED. THOMAS, Cheltenham; commended, ETHEL HURRY and FRED THOMAS. Carved oak bardic chair.—Silver medal and 15*l.*, THOMAS HUMPHRIES, Carnarvon. Carved section.—Mantelpiece, 10*l.*, H. S. WHITE, Swansea. "Glastonbury" chair in oak, 3*l.*, F. E. KERS, Newport. Mahogany or walnut stair newel, 3*l.*, W. GLEESON, Cardiff. Carved oak picture frame with gold margin, 3*l.*, F. E. KERS, Newport. Original pen-and-ink series of six sketches in Wales.—(1) 6*l.*, B. A. PRICE, Carmarthen; (2) 3*l.*, T. PRYDDERCH, Wroxeter. "Pictorial" poster advertisement illustrative of the National Eisteddfod.—Medal and 5*l.*, B. C. EVANS, South Hampstead. Mr. A. B. PITE examined the architectural drawings, but his awards were not announced.

In the will of the late Lady WALLACE, her pictures, porcelain, bronzes, artistic furniture, armour, miniatures, snuff-boxes and works of art, on the ground and first floors and in the galleries of Hertford House, as well as the LOUIS XIV. balustrade, are bequeathed to the British nation. The bequest does not include personal and modern jewellery, trinkets and effects, nor ordinary modern furniture and chattels. The Government in return are to give a site in a central part of London, and build a special museum for the collection. It is also stipulated that Mr. JOHN MURRAY SCOTT is to be one of the trustees of the collection. The other trustees appointed by the Treasury are the Earl of ROSEBURY, Sir EDWARD B. MALET, Sir JOHN STIRLING-MAXWELL, Major-General Sir ARTHUR E. A. ELLIS, Mr. A. B. FREEMAN MITFORD and Mr. ALFRED C. DE ROTHSCHILD. Mr. CLAUDE PHILLIPS has been appointed keeper of the collection. The committee appointed to consider how the collection should be housed having recommended the purchase of the interests in Hertford House and its adaptation to a museum, a sum of 80,000*l.* will be obtained for that purpose. No arrangement could be more satisfactory. The character of the Wallace collection would suffer if placed in a new building of a severe character like the National Portrait Gallery. The pictures were specially selected to adorn a private mansion, and it would be difficult to erect one better adapted for their display than the house in Manchester Square. Mr. WATERHOUSE acknowledged that at first he was not in favour of keeping the collection there, but on considering the decoration of the rooms and their matchless chimneypieces, he came to the conclusion that if the bequest were taken away from its present surroundings it could never be shown to such advantage.

ACCORDING to ROUSSEAU the French have no respect for ancient monuments, and he was acquainted with too much destruction to be in doubt on the subject. But such devotion to antiquity as was exhibited by AUGUSTIN CARISTIE, the architect, in dealing with the triumphal arch and theatre at Orange, was almost enough to compensate for high-handed proceedings elsewhere. He was born in 1783, and from 1805 until 1856 he was connected with Orange. He lived amidst the ruins, and in order to give an example of reverence he worked as one of the labourers. After his removal to Paris, where he died in 1862, the restoration of the Roman theatre was neglected. M. DAUMET was appointed as successor to CARISTIE, but either from want of money or from doubts about the advisability of operations in such a place little progress was made. Under M. FORMIGÉ, who has charge of the ruins, more energy is now exhibited, but he is as reverential as M. DAUMET, and his aim has been to stay destruction rather than to attempt restoration in the French sense of the word. He has, however, made the seating safe, and now 10,000 spectators are able to enjoy the appearance of the actors of the Théâtre Français in plays founded on classic subjects.

SIR EDWARD POYNTER, P.R.A., ON ART.*

WE are glad to see another edition of Sir EDWARD POYNTER's lectures. It shows how well they are appreciated by students, for to that class of readers they are mainly addressed. The production of lectures on art entails more of a sacrifice on the part of the author than is necessary in most classes of bookmaking. For an artist to set up as a public teacher is to impose rigorous laws on himself, unless he has the tact to keep clear of the branch of art which he practises. REYNOLDS was aware of that fact, and hence all he said about the power of MICHEL ANGELO or the admirable qualities of the CARRACCIS left his portraits unaffected. The late Lord LEIGHTON used to survey so vast a field of history it was difficult to follow him, and it would need unusual power on the part of a critic to find anything which could be applied in testing the *Daphnephoria* or the *Andromache*. LESLIE preferred to treat of Dutch pictures, but as he could not be said to have employed them for models, he also avoided the setting up a standard by which all could measure his delightful works. With Sir E. J. POYNTER, on the contrary, it is easy to see that, although he is not obtrusive of himself, he is constantly referring to his own practice and experience. Take one instance. As becomes an architect's son he loves architecture, and introduces it freely and accurately in his paintings. In his lectures students are advised to study the art earnestly. In one place he says:—"When we think of what infinite value architecture is in the composition of figures, it seems a shame that all painters should not possess a sufficient knowledge of it to draw it at least correctly, even if they do not aspire to designing it for themselves; as it is, I doubt if there be half a dozen figure painters in England at the present time who could introduce correctly a background of Classic or Gothic architecture into their pictures, much less design one. Therefore, I cannot indeed imagine a better preparation for a student of painting than that he should have been in an architect's office." When a painter has expressed an opinion so definitely, he is bound to be most careful in acting on it. The President is therefore precluded from introducing an architectural background unless it is as true in detail as an architect's drawing. If there is no example existing that will afford him evidence, he will have to labour at a creation until he arrives at something which will satisfy archaeologists. We may give another example of the self-imposed liens of the President. Occasionally he attempts landscape, and although opinions may differ about the degree in which nature is recalled in his drawings, it is generally agreed that the artist was painfully anxious to attain accuracy. No doubt Sir EDWARD POYNTER is an admirer of scenery, but, since he has lectured on art, he must testify by his examples that because he is a figure painter he is more qualified for landscape than those who make it a specialty. The best landscape painters of to-day are, he says, found among the figure painters, and he continues:—"A youth desirous of becoming a landscape painter cannot do better than study the drawing, painting and composition of figures; it will give him a power of drawing to be attained in no other way, besides cultivating his taste, his style, and his feeling for beauty of arrangement. The mere introduction which it gives him to the works of the great figure painters will be suggestive of a higher order of landscape than that which is gained by trivial and photographic studies of nature which pass for pictures among the younger school of landscape painters. . . . There is no such thing as teaching landscape painting. I cannot consent to consider it a separate art; teach a student to draw, and he will paint landscape or figures according as his inclination to one or the other dictates." We need not discuss how far the President's theory is correct. In France, where he was trained, young landscapists do not hesitate to work under figure painters. What we now contend for is that, as a supporter of the theory, the President is handicapped whenever he has an inclination towards landscape composition. Although he may only be occasionally moved to experiment, he is bound to demon-

strate his superiority to the specialists. It is no wonder critics observe, or imagine so, that Sir EDWARD POYNTER's later works exhibit too much self-consciousness, as if the artist were afraid of laying on his canvas a stroke that could be interpreted as spontaneous, or as not in accordance with the canons of art which can be derived from his lectures.

As he works under restrictions of his own making, the President has to be guarded in the view he takes of art as a whole. Sir EDWARD POYNTER objects to Mr. RUSKIN's theory of the close connection between morals and art, but, on the other hand, he does not appear to support the idea that art is one of the means devised by man to give himself pleasure. JAN STEEN is at the opposite pole to MICHEL ANGELO, but both subserve the same end. The works of each artist have admirers who find enjoyment before them. Neither the Dutchman nor the Florentine are satisfactory to Mr. RUSKIN, and many amateurs in the past as in the present would agree with him. It may be a proof of more refined taste to be able to appreciate the Sixtine figures, but educated men who are delighted with the homely village scenes of JAN STEEN do not as their knowledge increases grow disgusted with him and yield themselves to the supremacy of the painted Titans. But why should it be imperative to confine our admiration to either artist's works? It is surely allowable to consider the earth as more deserving of consideration than the men upon it, and if so representations of a part of the earth are no less justified than figure pieces as sources of pleasure. But, as we have said, the affording of pleasure seems to be an insufficient reason for the existence of a work of art with Sir EDWARD POYNTER, and accordingly he is severe on such innocent subjects as landscapes and flowers, as MICHEL ANGELO would have been.

That artist is brought forward in the lectures as a moralist as well as an artist. Sir EDWARD POYNTER says that one of the ways in which MICHEL ANGELO should be followed is by never condescending to catch applause by wilfully falsifying for fear that truth should be misunderstood. That suggestion inspires what is said about the economy of art. It is generally supposed to be the duty of a prominent artist to promote the sale of works by his contemporaries. The President would put restrictions on patronage. "No amount of what I may call almsgiving to art in the form of buying pictures (no matter how high the prices given) will ever change the poverty-stricken condition in which the larger portion of our community finds itself with regard to art." Elsewhere he says:—"It is well known that what some suppose to be an increasing love of art in this country, as shown by the high prices given for paintings, is now nothing more than a speculation in pictures; that the majority of buyers will not purchase unless they can 'buy safe,' as the saying is, which means that they do not buy pictures for the enjoyment to be derived from them, but in order to sell them again. If a certain pleasure in their acquisition enters into their calculations, it is just as likely to be a spirit of emulation in outdoing some other buyer as real pleasure derived from art; and even in this case they will not buy till they feel sure that they will not ultimately lose." It shows courage in an Academician to reveal that he does not wish to make a friend of Mammon, but there is still more courage needed in a President who dares to reprint words which run counter to the policy that was always followed in the Academy.

Yet it cannot be objected that the words are out of place. There is scarcely a subject which can be properly considered in relation to our time (religion, art, literature and politics are not exceptions) if the financial aspects are neglected. The practical character of the lectures is shown by what is affirmed concerning money as in other was. When Sir EDWARD POYNTER remarks, *à propos* of the showy vulgarities which pass for art, "It is, indeed, the dread of appearing not to be able to afford handsome things which is at the bottom of the general decline of good work which we find surrounding us on all sides; it is, combined with the desire of rapidly making fortunes, the root of all that is bad and sham in art about us," he points out the causes of evils which can be traced in most things. So general, indeed, is the prevalence of sham that many a designation in business, which at one time was honourable is fast becoming a synonym for an untruthful man, a suc-

* *Lectures on Art.* By Sir Edward J. Poynter, P.R.A., Director of the National Gallery; late Director for Art, Science and Art Department; late Slade Professor, University College. Fourth and enlarged edition. (Chapman & Hall, Limited.)

cessful deceiver. It is easy, therefore, to understand the laboriousness of Sir EDWARD POYNTER in treating the subjects of his pictures. To him apparently dexterity, sleight of hand and striking effects are allied to the evils which he denounces.

From his doctrine we must expect more or less austerity in the system of training which Sir EDWARD POYNTER proposes. His own style does not correspond with FORD MADOX BROWN's, but in what he says about the wall-paintings in the Manchester Town Hall we have a sort of abstract of what a student of painting who is sincere should aim at, and of what a zealous teacher should enforce. He says:—"I cannot conceive a finer lesson to students, young and old, than is conveyed by these paintings, whether we look to the thoughtfulness of the conception—going to the very heart of the subject in every case—to the fulness and variety of incident—to the vivid realisation of the treatment, or the care and interest shown in every part of the execution, or the originality of the decorative effect." No mention is made of beauty, but probably the ideals of the artist and his judge in this case would not correspond. By what process are the possession of qualities like those of the Manchester paintings to be attained? Sir EDWARD POYNTER is not afraid to recommend to beginners the copying of drawings in outline like those in DYCE's books, but as soon as possible outlines from solid objects should be attempted. Certainty and rapidity should mark all lines, and the use of indiarubber as leading to a bad habit should be avoided. The study of the figure must not be delayed, but at first casts of heads, hands and feet are preferable to full-length antique figures. Outlines are inadequate to express form in a thorough way, for, being deficient in light and shade, they can only give a conventional representation of an object. Next comes the study of tone, which, according to the President, generally is one of the weakest points of English pictures. He points out that "the perception of tone, in its extended sense, means the perception of that harmonious unity of effect, under every circumstance, which necessarily pervades all objects and scenes in nature, and the right application of those laws to compositions of form and colour; and it is impossible, unless a student is constantly directed to the acquisition of that perception, from the time when he begins by shading to give relief to his drawings, that he should ever afterwards be able to impart it to his pictures." One of the causes of the general deficiency in tone is said to be "the common habit of laborious work with the chalk point," and the stump is preferable. When drawing from life Sir EDWARD POYNTER recommends expedition, the French artists being exemplars of the skill and accuracy which are insured by never exceeding a prescribed time for their work. He would not have the student take up anatomy and colour too soon, and estimates that at least two years' regular work will be required before a student can draw the figure well enough to be unhampered by difficulties of proportion and construction. As regards colour, the President believes the first efforts of the student should be confined to the training which will enable him to see promptly and accurately the tones and colours of his model, for "if he is always painting colours which he does not see, with a view of correcting them afterwards by glazes and other methods, what probability is there that he will ever see colour truly?" The monochrome painting from casts in which the tone of the casts is disregarded, as practised in Government schools, is described as the most dangerous part of the Department's system. Insufficient as is our abstract it may help to suggest that in Sir EDWARD POYNTER's teaching veracity comes first, and a student who trusts his senses rather than his fancy, and who is industrious and painstaking, should have confidence of success. Of course natural ability is stipulated, for the present President does not anywhere adopt REYNOLDS's dictum that well directed labour is by itself ample to attain the highest elevations in art.

The book is so full of honesty, experience and insight, it cannot be too widely spread among schools of painting. It is also recommended for use in departmental schools, for Sir EDWARD POYNTER was probably the first artist who endeavoured to apply an effectual remedy to the evils of the system there followed. A great many artists accepted examinerships and other offices, but their tolerance only confirmed the principles which the permanent officials had

laid down. Sir EDWARD POYNTER, before he accepted office, protested against the malpractices, and when in office he insisted on the adoption of some remedies. That he was not able to do more testifies to the strength of departmental conservatism.

CONCILIATION AND STRIKES.

WHENEVER strikes become inconvenient to the public complaints are raised by would-be economists because "Conseils de Prud'hommes" are not comprised among English institutions. The history of some of the late strikes in France has demonstrated that there are contests between employers and employed in which the Conseils are about as effective in settling differences as would be a troop of babies from a *crèche*. The latter might appeal to the emotions of strikers, whilst the Prud'hommes would be considered in the way, especially if trade interests had been conjoined with political rancour. There are cases in which the Conseils become useful, but probably they will not be as successful for many years as they were half a century ago. Although unknown in Paris until 1844 the institution has existed since 1806, when it was organised in Lyons—a city that was long familiar with labour disputes. The duties of the members are not confined to the settlement of differences by conciliatory speech. Recalcitrant apprentices can be fined or sent to prison for three days by a Conseil, workmen who disturb ateliers can also be punished, and there is power for dealing with trade marks within prescribed limits. The establishment of the tribunals was, however, a concession to the French workman. Prior to the Revolution he could hardly be considered as entirely a free labourer. LOUIS XIV., when he resolved to set up Dr. PERRAULT's colonnade at the Louvre, put forth an edict prohibiting the employment of masons and stone-cutters in Paris until the royal superintendents had selected a sufficient number for the works, and any workman who asserted his liberty by withdrawing was liable to be sent to the galleys. His Majesty was always gracious to his nobles and was ready to share his privileges with them, so there would probably be little difficulty in compelling a number of men to abide near a château or one of its dependencies until the completion of the works. Instead of summary punishment, the Conseils de Prud'hommes used persuasion, and, what was more important, some of the judges were workmen and could exhibit a fellow-feeling with one of the parties in the dispute without much risk to their impartiality.

The Conciliation Act, which became law in England a year ago (August 7, 1896), has introduced a principle which is analogous to that of the French Conseils. It is intended to encourage and extend the work of voluntary conciliation boards, and to settle, under certain conditions, actual disputes between employers and workmen. The Board of Trade is the chief agent in carrying out the conditions of the Act. It has power to inquire into the cause of any difference which may arise among different classes of workmen or between employers and employés. Arrangements can also be made by the Board for a meeting between the disputants or their representatives under the presidency of a selected chairman. The Board can likewise, on application of the parties, appoint a conciliator or board of conciliation and also an arbitrator. In most of these arrangements the initiative does not belong to the Board of Trade, and it cannot be objected, therefore, that Government is eager to meddle with private affairs and has passed the Act to obtain facilities.

So many social experiments which are sanctioned by Acts of Parliament and directed from Government offices have been slowly accomplished, it is not to be expected that the industrial world will at once accept conciliation boards as the most effectual remedy to cure the troubles of trade. For a time practical people will necessarily be sceptical about the advantage of any machinery which circumlocutionism has created. But it must be allowed that the first year's experiments with the Act have been more encouraging than was anticipated. Thirty-five cases have gone through the official process. In four of them the Board did not seek permission to act, but in the remaining cases the parties concerned were desirous to be subjected to treatment. Out of the thirty-five only four were

found to be too refractory for a settlement, and the result in one case was not determined. There is no doubt that if the failures are few it is owing to the tact shown by Sir COURTENAY BOYLE. The part taken by him in the correspondence with Lord PENRHYN respecting the slate quarries was not that usually adopted by a high Government official. He did not appear to suggest that the Whitehall lightning was controlled by him, and that he could be dangerous. Sir COURTENAY BOYLE preferred to appeal to his lordship's humanity, and if the three thousand unfortunate quarrymen are still in misery the responsibility does not rest with the Board of Trade. It may be said, in passing, that no trade dispute presented a more ridiculous side, for it will be remembered that after a long course of diplomacy the negotiations collapsed because there was not a quarryman who was a competent shorthand writer. The incident will, of course, be utilised by advocates of the new systems of education. It is right to "find quarrel in a straw where honour's at the stake," but to inflict suffering on a crowd of unoffending women and children because none of their relatives is a stenographer is one of the strange actions which make foreigners believe that "the insane root which takes the reason prisoner" is a favourite article of diet in England. After the Welsh experience, who can any longer doubt the impossible tasks set by the terrible giants of the nursery legends?

Among the thirty-five disputes seven belong to "building and kindred trades." In one the Board declined to interfere. Two were settled by conciliation and one by arbitration. In two cases there was no settlement effected, and one is pending. The official mind must be disturbed by the exhibition of perversity which is occasionally offered. The master painters in Middlesbrough, for example, agreed to the Board's terms of arbitration, but the men declined. Then the men changed their resolve, but the masters had also changed, and were not to be moved to share in a conference. As long as a game of see-saw of that sort gives satisfaction there is not much chance for conciliating. The bricklayers and plasterers of Newcastle spent about four months in a similar game, then private mediation brought it to a close. The combined efforts of Mr. W. E. WILLINK and a Board of Trade officer succeeded in ending a dispute of the Prescott carpenters and joiners. In the Potteries the case was somewhat complicated, but Sir WILLIAM MARKBY was enabled to arrive at an agreement. The carpenters and joiners asked for an advance from 8*d.* to 9*d.* an hour. The employers claimed a reduction from 8*d.* to 7*d.*, and also sought for a change in the form of indentures, on the ground that, while bound to retain their apprentices when work is slack and journeymen are discharged, the relative proportion of the two classes becomes altered, and the employers can be charged with a breach of the working rules. The men agreed to add to the rule the following addition:—"Any builder having more apprentices than are authorised owing to the dismissal of journeymen through slackness of trade, will not be allowed to take on any more apprentices until the number has been reduced below the standard set forth." The men's demand for an increase of wages was arranged by giving them 8½*d.* an hour, and it was held there was no ground for the masters' proposed reduction. An arbitrator in such cases requires to be firm as well as discreet, and, above all, he must have a reputation for impartiality. As Sir COURTENAY BOYLE says, the Board of Trade will have to rely more and more on the aid of such gentlemen as Sir WILLIAM MARKBY, Sir DAVID DALE, Sir HORATIO LLOYD, Captain WILSON, Mr. THOMAS BELL, Mr. WILLINK, Mr. BAILLIE DUN in completing negotiations which in the preliminary stages were conducted by officers of the Board of Trade.

The attempts which were successful were mostly in contests where the parties engaged were not numerous. The Penrhyn dispute remains unsettled. But a still greater struggle is now in progress. The engineering strike, in which from 40,000 to 50,000 men are engaged, affords a test of the efficacy of the Conciliation Act which we trust will not often be equalled and never surpassed. So wealthy a trades society as the Amalgamated Engineers at first may not be disposed to listen to the counsels of the representatives of the Board of Trade; but every one who has any concern for British prosperity must wish that reason, although appearing in an official guise, will sooner or later succeed.

DANGERS CONNECTED WITH THE SUPPLY OF ELECTRICITY.

THE committee appointed by the Home Office have recently presented their report on this matter, having inspected twenty-six generating and sub-stations in various parts of the United Kingdom. Owing to the technical nature of the matter the committee have had the assistance of several experts. In the report it is stated that the committee have been in consultation with the Board of Trade in order that there should be no division of authority between that Department and the Home Office.

The report commences by describing the different systems of generating and distributing electrical energy from supply works. The uses of some of the apparatus are mentioned, and the dangers of working are then gone into, some of which it may be well to mention here.

In connection with accumulators there is a risk in their use in consequence of the evolution of an explosive mixture of gases when the plates are overcharged. Where the ventilation is very imperfect the quantity of gas may accumulate sufficiently to take fire or explode on contact with a spark or flame.

The danger peculiar to electrical generating works is the liability to shock, which is often fatal if, by accident or carelessness, anyone comes into contact with the conductors when charged to a high pressure. The contact need neither be very perfect nor direct, provided two parts of the body are made to touch conducting materials which themselves differ in pressure by 1,000 volts or more, or even by much less; if the contact with the flesh is very good, a dangerous and possibly fatal shock will result.

In connection with this, it may be noted that of the fourteen fatal accidents which have occurred in the last five years, in not one case was the pressure below 1,000 volts.

The metal which is highly charged, and which would be liable to be touched if not properly protected, is to be found in the dynamo machines, the switchboard and its metal connections, the high-pressure mains and the transformers, and, in the case of series arc lighting, in the lamps themselves.

In the case of high-pressure alternators or dynamos it should be impossible for the attendant whilst oiling the bearings or cleaning the frame to make contact with any live metal. Efficient guards should be arranged over the collectors or commutators, terminals and leads for this purpose. Oil-cans with insulating handles, we think, are not commendable, as the fingers may be placed thoughtlessly on the metal portion to steady it, and if all live metal is well guarded and the frame earthed an insulated oil can is unnecessary. It is the custom now in well-designed high-tension switchboards to so protect the live metal-work in the front that it is impossible for the attendant's hands to come into contact therewith when operating the switches.

The switchboard should be easily and quickly accessible on the front, where all the ordinary operations of connecting and disconnecting the various dynamo machines and cables are effected. The back should be inaccessible except to those skilled persons who have the right and means of entry.

This latter is a very necessary precaution, as it is often possible to touch live portions of metal and iron supports or stays which are practically earthed, and a person who is not fully aware of such danger should have no access to such places.

There is no necessity for any metal directly connected with the high-pressure mains of dynamos to be exposed on the front or working face of the switchboard to accidental contact.

High-pressure main conductors may be erected as overhead wires, but are almost universally laid under ground. Bare overhead high-pressure conductors may lead to accident in case of breakage or by swinging into contact with buildings, &c., under the action of the wind, or by earthing at the points of support in consequence of damage to the insulators. High-pressure overhead wires, even if insulated over their entire length, can never be considered as entirely free from risk. In underground cables the insulation which is employed to prevent loss of current will, when it is perfect, *i.e.* undamaged, amply protect anyone touching it from any dangerous pressure from the metal within, but an injury which would not be sufficient to be

detected in ordinary working might nevertheless allow of the escape of sufficient current to produce instantaneous death.

Arc lights, when supplied with current from a central station, are usually arranged in series, *i.e.* the same current is sent through a number of lamps. As an arc lamp requires an electrical pressure of from 40 to 50 volts, dangerous pressure becomes necessary when several lamps are arranged in series, for the electrical pressure is the sum of the electrical pressures of all the lamps separately. In consequence of the fact that these lamps can in many cases only be reached by means of a ladder, a shock, harmless in itself, may cause a man to lose his hold and be seriously injured.

The following are abstracts of some of the recommendations contained in the report. A station where the direct current generated is at or above 700 volts, or where the alternating current is at or above 350 volts, shall be considered a "high-pressure station." We fail to see any reason for such a difference between alternating and continuous current.

The floors of all places where it would be possible to make connection with metals at high pressure shall be covered with an insulating mat of suitable material, and kept in a state of efficient insulation. In switch-rooms and on the front of switchboards, the main switches, main fuses, main terminals, omnibus bars and all other metallic parts shall be insulated or arranged in such manner as to render it impossible for any person by accident or inadvertence to touch them.

The backs of all switchboards shall be kept closed, except for the purpose of alterations and repairs. When such work has to be carried on either at the back or at the front of switchboards the following regulations shall apply:—

(a) No person except a skilled electrician or a workman under his personal and immediate supervision shall be employed when any part is at high pressure.

(b) No extensive or serious repairs shall be executed upon metal which is at high pressure.

(c) Where the alterations or repairs are not of an extensive or serious character, all metallic parts at high pressure shall be covered by an insulating cap or protected by some form of insulating covering, only one part, or several at the same pressure, to be exposed at any one time.

All switchboards erected after the application of these rules shall have at the back a clear space of at least 4 feet. This space shall not be utilised as a store-room or lumber-room, or be obstructed in any manner. This latter precaution is very necessary, as such places are frequently kept in a very bad condition, being often filled with old timber, repairing material, or left in an unfinished condition.

Any person at work upon a cable or portion of the mains under high pressure shall wear indiarubber gloves on both hands.

All aerial high-pressure conductors in factories or workshops shall either be insulated over their entire length, and supported at such frequent intervals that, in the event of breakage, they shall not come within reach at places where persons are liable to pass or to be employed, or shall be so placed and arranged as to comply with requirements relating to such wires in streets, enjoined by the Board of Trade.

No examinations, repairs or alterations necessitating the handling of mains, wires, machines or other apparatus shall be carried on except in cases of urgent necessity while such parts are under high pressure, and all such work shall be done under the personal supervision of an electrical engineer or competent manager or foreman. This is a rule that may sometimes be found irksome, but is highly necessary on high-pressure installations.

Switches that can be conveniently operated from the outside for cutting off both the high and low-pressure connections of the transformers shall be fitted in all transformer chambers erected after the application of these rules, and in all existing chambers, unless it is proved to the satisfaction of Her Majesty's Chief Inspector of Factories that such an arrangement would be attended by special difficulty.

This will apply to existing transformer chambers, and will be an important additional safeguard in places where live portions of metal are situate near the inlet to the chamber.

Each post or support where series arc lighting is employed shall be provided with means for completely disconnecting the arc lamps from the mains without disturbing the action of the other lamps.

This would entirely obviate the danger before mentioned, where a ladder is used for attending to the lamps, and it should be made compulsory for the men to use these switches whether the mains be alive or not, as there would then be less liability of their forgetting them.

The majority of the committee's recommendations are practical and necessary, and will accord with the ideas of those who have the control of central stations, but if adopted as they stand will greatly increase the responsibility of the chief officials in such works. For instance, for the manager to see that rubber gloves are worn by workmen when employed on high-pressure mains would be practically impossible. Also for all persons employed in the works to be made acquainted with the dangerous parts of machinery, &c. seems unnecessary, as the men connected with the boiler-house should not have access to the engine or switch-room.

Most of the accidents which have occurred in electric supply undertakings have been due to carelessness or breach of the regulations. There are dangers with all machinery if reasonable care is not taken, and not only with machinery in connection with electric supply.

THE CHANTREY BEQUEST.

THE following letter, signed "L. G. R.," on the administration of the National Gallery of British Art, especially in dealing with the pictures purchased under the Chantrey bequest, appeared in the *Times* on Monday:—

The Tate Gallery having now been formally opened and handed over to that vague entity "the nation," it is of importance to know the actual position of the various bodies officially represented at the inaugural ceremony. Mr. Tate, in his short speech, stated "the Government had promised to maintain the gallery, and the trustees of the National Gallery have undertaken the management of it." The direct appointment of the keeper, Mr. Charles Holroyd, by the Treasury—as officially announced—would seem to suggest that the rôle of the trustees is somewhat effaced. On the other hand, what are we to understand by the maintenance of the Tate Gallery? The keeper and his subordinates will need to be paid, and provision for their salaries must be made by Parliament. As the completion of the Tate Gallery during the present summer could have been well foreseen, the amount required might have been included in the ordinary estimates for the year, whereas now it will be hurriedly voted in the supplementary estimates just presented, which in all probability will be pushed through without discussion.

This is to be regretted, for the public really need to hear a good deal more about the Tate Gallery than has yet been revealed. All that is known is that a private benefactor has, at a large expense, erected a gallery far in excess of the requirements of his special gift, and that in the building thus obtained at no outlay of public money certain pictures belonging to the nation and others are hung. For many years, as is well known, the Trustees of the National Gallery have been clamouring (in a minor key) for more space and for an extension of their present building. To these appeals the Treasury has turned a deaf ear, vouchsafing no explanation of its policy. Suddenly we are told that Mr. Tate's Gallery is to receive from Trafalgar Square the pictures (with a few exceptions) by British artists born since 1790, and Mr. Tate himself tells us that he proposes to "utilise the remainder of the land granted by the Government" for an extension of the present gallery. This can only mean that there will sooner or later be a further removal of pictures by British artists from the National Gallery and the South Kensington Museum, and that by this means the demands of the trustees of the former for further space will be indirectly satisfied out of Mr. Tate's pocket. Since the completion of that monument of national meanness (and private generosity), the National Portrait Gallery, the attitude of the State towards art has never been displayed in clearer colours.

With the Watts pictures it is scarcely necessary to deal, the donor being still alive and able to make such conditions as he may consider expedient. It is very different with the Chantrey pictures, and the appearance of the Royal Academicians in a quasi-official character at the opening of the Tate Gallery was at least strange. Without having the exact wording of the bequest before one it would be dangerous to speak too positively, but no one who has read Sir Francis Chantrey's biography or his letters, as published after his death, can doubt that his double intention in providing the means for purchasing the best

29. Waiting-room for the public, connected with the reception hall above specified.

30. Room for pages near that of the serjeant-at-arms.
 31. Hall of Sessions of the Chamber of Senators for fifty members. Attention should be paid to the directions which have already been given in relation to the Chamber of Deputies concerning the required rooms, their arrangement, lighting and ventilation, modifying the proportions according to the difference in capacity of the two Chambers.
 32. Private study of the President of the Senate, with reception-room and toilet.
 33. Workroom for four stenographers, with ready access to the Hall of Sessions.
 34. Cloak-room for the senators.
 35. Room where the senators can write.
 36. Wash-room and water-closets.
 37. Office for the serjeant-at-arms of the Senate.
 38. Waiting-room for the public, connecting with the general reception hall, previously specified.
 39. Room for pages, near that of the serjeant-at-arms.
 40. Offices of the Supreme Court (Contaduria Mayor de Hacienda), comprising private office for the chief clerk, room for sixty employés, office for the sheriff or marshal, room for utensils, toilet-room and water-closets.
 41. Office of the director of the Journal of the Debates.
 42. Office of the treasurer of the Congress.
 43. Office of the chief secretary of the Chamber of Deputies. This room must be in direct communication with the room for employés, and must be preceded by an ante-room.
 44. Workroom for thirty employés of the secretary's office.
 45. Fireproof storage-room for the archives of the Chamber, communicating with the room just mentioned.
 46. Four rooms for the Commission of the Chamber of Deputies (five persons), two larger rooms for joint commissions (twelve persons), and a room for the grand jury (thirty persons).
 47. Library and reading-room for the deputies and senators.
 48. Office of the librarian.
 49. Room for office utensils for the Chamber of Deputies.
 50. Room for the sorting and distribution of documents.
 51. Workroom for journalists in direct communication with their gallery.
 52. Office of the chief secretary of the Chamber of Senators, to have ante-room, and to be in direct communication with the room for employés.
 53. Workroom for twenty employés of the secretary's office.
 54. Three rooms for commissions of the Senate; one for joint commissions; a room for the grand jury.
 55. Fireproof-room for the archives of the Chamber, communicating with the secretary's offices.
 56. Room for utensils and materials for the Senate.
 57. Room for sorting and distributing documents.
 58. Toilet-rooms and water-closets at such places as may be deemed necessary.
 59. Restaurant for the two Chambers, with smoking-room and reading-room for periodicals.
- Besides the rooms specified above, candidates may add such as their study of the subject suggests as useful or necessary to the purposes of the edifice. The communications between the rooms pertaining to the two Chambers must be convenient, and corridors and stairs must be spacious and well lighted.

Drawings and Specifications.

The following drawings must be presented :—

Plans of the foundations, with indications of the various loads.

Plans of each storey, with indication of the purpose of rooms comprised in it.

Elevation of each front, with a profile, to show the projections.

Sections suitably chosen to give an idea of the interior proportions of the building in its principal parts.

All these drawings must be prepared at the scale of 1:200.

Detailed drawings of the two Halls of Session, showing the arrangement of the seats, must also be presented, as well as detailed drawings of the grand vestibule and the main reception hall. These drawings must be at a scale of 1:50.

A perspective view may also be sent, and detailed drawings of the ornamentation. The detailed drawings may be simply sketched, but in such a way as to show clearly the ideas of the author. A list of the drawings sent must accompany them.

The drawings must be accompanied by an explanatory specification, written in Spanish, French or English, and comprising a general description, as well as an account of the arrangement of the building, a specification of the materials to be employed in each of its parts and an estimate of the cost, as closely approximate as possible, using as far as may be the list of prices annexed to this programme. The total cost must not exceed 1,500,000 dollars, without counting the cost of the foundations to the level of the street.

In order that the designs may be fairly judged it is absolutely necessary that the candidates should conform to the conditions above specified.

The drawings and specification must bear a mark, which is to be repeated on the outside of a sealed envelope, in which is to be found a paper containing the name of the author of the design, his address and other information sufficient to establish his identity. Meanwhile, candidates should give an address

which will permit of making known to them the decisions which may be taken in regard to the competition.

The designs must be sent by the candidates to the Ministry of Communications and Public Works, either directly or through the diplomatic or consular representatives of Mexico in foreign countries, on or before November 30, 1897. After that date no design will be admitted to the competition.

Jury.

The designs will be submitted to the examination of a jury, which will make the awards. This jury will be composed of seven architects or civil engineers, appointed, one by the Chamber of Deputies, one by the Senate, one by the Ministry of Communications and Public Works, and four by the candidates, by means of a written ballot, from among ten experts proposed by the Ministry of Public Works. They must not be participants in the competition and will be chosen by the absolute majority of ballots.

For this purpose the candidates must send with their drawings and specification a list containing the four names of the persons whom they choose as members of the jury. Before the making of the award, the *Official Journal* of the Government of the Mexican Republic will publish the result of the ballot held for the formation of the jury, over which the Minister of Public Works or his representative will preside.

Prizes.

The author of the design placed first will be entitled to a prize of 15,000 dols. in Mexican silver, of which he will receive one-half at once, and must complete his design, furnishing all the detailed plans for execution, in such a manner that his ideas may be faithfully interpreted.

As soon as he delivers these plans he will receive the other half of the prize above specified. The designs classed second and third will receive together a prize of 6,000 Mexican dollars, divided in a proportion which will be determined by the Jury of Award. Finally, the designs classed fourth and fifth will receive respectively a gold and a silver medal, with a diploma of which the form and the inscriptions will be determined by the jury, and, in addition, 500 Mexican dollars each, as a contribution to the cost of making them. The designs classed first, second and third will become the property of the Mexican Government.

The designs submitted in competition will be exhibited for ten days after the award is made, at such place as may be designated by the Ministry of Communications and Public Works.

The decision of the Jury of Award will be published in the *Official Journal* of the Federal Government.

Four months after the publication of the result of the competition the designs not awarded prizes must be withdrawn; and if they are not so withdrawn they shall become the property of the Mexican Government.

No candidate shall make known his name in advance, under penalty of exclusion from the competition.

The sealed envelopes relating to designs not accepted will not be opened, and will be returned to their authors, with the drawings and specifications to which they belong, on presentation of the receipt given for them.

THE BROOK HOSPITAL.

AT the meeting of the Metropolitan Asylums Board on July 31 the Brook Hospital committee presented a statement of the final accounts submitted by the architect of the cost of the erection of the Brook Hospital. These showed the total cost, including purchase of site, equipment, &c., to be approximately 319,241*l.* 16*s.* 3*d.* The expenditure on the buildings was 268,623*l.* 4*s.*, which sum exceeded by 64,000*l.* the amount of the estimates presented to the Board, and was in excess of the actual amounts of the various contracts entered into by the sum of 50,000*l.* The committee recommended that the final accounts and reports of the architect be referred to the clerk to the Board to report to the managers upon their legal position in regard to a paragraph entitled "claims" in the architect's first report, with power to the clerk to employ legal assistance; and, further, that application should be made to the Local Government Board for an order authorising a further expenditure on loan in respect of the erection, equipment, &c., of the Brook Hospital of the sum of 100,000*l.*, in lieu of the sum of 75,000*l.* applied for in October, 1896. Mr. J. Brown, chairman of the committee, in moving the adoption of the report, pointed out that a very large amount of additional work had been executed, and that the three building contractors had each made extra claims, amounting to 9,850*l.*, beyond the ordinary accounts, principally in respect of the delay caused by the alteration of the drainage outfall, which practically stopped all useful progress of the works for over six months. On the motion of Mr. G. S. Elliott, the debate was adjourned until October 30. In the meantime it was resolved to apply to the Local Government Board for an order authorising the additional expenditure

NOTES AND COMMENTS.

THE Council of the Whitworth Institute, Manchester, have expended the whole of the large donation of the guarantors of the Jubilee Exhibition of 1887, with the exception of the small sum of 14 os. 8d. At such a juncture it has been fortunate to receive from Mr. DARBISHIRE 10,500 shares in Sir W. G. ARMSTRONG, WHITWORTH & CO., LIMITED, which are now worth 27,000*l.*, and from which satisfactory dividends are expected. The Council being therefore more secure about the future have decided to erect a third gallery, corresponding in position and dimensions with the North Gallery, and, like it, accessible from the Central Gallery, with an extension of the temporary corridor alongside of the old house. As this new gallery will front the park, it is proposed to construct, with material removed from the new foundations, a handsome terrace, which will at once add dignity to the edifice and provide a fine promenade walk overlooking the park towards the south. The erection of the new building will be carried out, as have been the existing galleries, under the direction of Mr. J. W. BEAUMONT, by Messrs. NEILL & SONS. During the past year the Council were presented with the following oil-paintings:—*Interior of the Prison of Chillon* (an early work of CLARKSON STANFIELD, R.A.), given by the executors of the late Mrs. B. LIEBERT; *Temple of Jupiter* (J. M. W. TURNER, R.A.); *Springtime and Autumn Sunset* (J. T. LINNELL), given by Miss HEAVEN; and *View of Rome from the Barbarini Gardens* (D. ROBERTS, R.A.); *Cittara, Gulf of Salerno, and Oude Scheld, Texel Island* (C. STANFIELD, R.A.); and *The Emigrants and A Roadside Nibble* (JOHN LINNELL), given by Mr. DARBISHIRE "in memory of the late Sir JOSEPH WHITWORTH," out of funds bequeathed by him.

THE late ERNEST RENAN was born at Tréguier, in Brittany, and many of his most delightful pages are inspired by the primitive place and its inhabitants. It is only right that some memorial of so eminent a man should appear in his birthplace. Originally intended for the priesthood, he was led by his devotion to the study of Hebrew and other Semitic literature to abandon a belief in Christianity. But, unlike most perverts, he always wrote in affectionate terms about the faith in which he was instructed by his mother, and he once went so far as to say that if his condition of mind were realised, the proper place for his tomb would be in a cloister attached to the old church of Tréguier. That suggestion is now utilised by the local authorities as a means to obtain possession of the cloister. As a part of the church, it is supposed to be ill adapted for a memorial or monument of RENAN, but as a secular structure it would, they say, be most suitable. The Municipality do not, however, propose to go to the expense of a monument. It is not considered that RENAN was no vandal, and if he could have anticipated the move of the councillors he would have expressed opposition to their proposal.

THERE was lately issued from the Foreign Office a report on iron and steel bridges in Egypt, in which the practice of British contractors was contrasted with German practice, and the latter was extolled. It is not to be expected that Lord CROMER, the author of the report, should be acquainted with the designing and construction of bridges, but a little knowledge would have given another character to his lordship's report. In 1894 some very prominent firms, viz. HEAD, WRIGHTSON & CO. (LIMITED), the HORSELEY COMPANY (LIMITED), JOSEPH WESTWOOD & CO. (LIMITED), the HORSEHAY COMPANY (LIMITED), ANDREW HANDYSIDE & CO. (LIMITED), P. & W. MACLELLAN (LIMITED) and Sir W. ARROL & CO. (LIMITED) were compelled to protest against the system adopted by the Egyptian Railway Administration. Practically neither drawings nor specifications are supplied which are sufficient to enable a contractor to tender in a legitimate way. The drawings for two larger bridges across the Nile were described as simply sketches showing the positions of the proposed bridges, giving no information beyond the total length of the bridge, the number of spans, the rail level, the position of the swing openings and the bed of the river; whilst the specifications gave but the barest details of the requirements of the Board, such as gauge of road, width of trainway,

footpaths, rolling load, breaking strains of iron or steel used and other very general elementary particulars. It therefore followed that contractors have not only to submit prices, but have also to prepare and submit designs. An English contractor from his innate honesty and fidelity to procedure hesitates to prepare designs, because with us the engineer is considered to be the sole judge of the amount of material which it is necessary to use and its disposition. Out of eagerness to secure work there is a risk that a go-ahead contractor will reduce the margin of safety to a minimum, and apparently there are bridges in Egypt which may be pointed to as victories of Italian, French and German contractors over Englishmen, but how long they will endure is not certain. All the English contractors desired was that competitors, of whatever nationality, should be placed on the same footing by the Egyptian Government, having the whole design in detail prepared by its own or some independent engineer, with full and proper specifications, as is done by the Indian, Colonial and other Governments, also by English and foreign railways and other public and private bodies. Great as is Lord CROMER's influence in Egypt, it was either not exercised or was not successful in attaining that end. As long as the Egyptian Railway Administration is satisfied with evading the responsibility which is usual, it is more creditable to British contractors to allow work to escape from them than to have their names associated with unstable bridges.

ILLUSTRATIONS.

THE NATIONAL GALLERY OF BRITISH ART, MILLBANK, S.W.
VIEW FROM SOUTH CORNER.—VIEW LOOKING ACROSS DOME.

THE new gallery at Millbank will be opened to the public on the 16th inst. The appearance of the place suggests a new settlement in the wilderness of London, but when the approaches are completed, the new bridge over the river constructed and workmen's houses set up, the site will present a different sort of aspect. Mr. SIDNEY SMITH has provided an octagonal gallery for sculpture, but we cannot expect to see it adorned with statuary until some years elapse. There are seven picture galleries, three being 59 feet by 32 feet, and a long gallery of 93 feet by 32 feet. There are also two special octagon galleries, one of them being occupied with several of the works of Mr. G. F. WATTS. The two at his desire are painted red, the other picture galleries are more of a plum colour. The following inscription is found on one of the pillars in the central hall:—"This gallery and sixty-five pictures were presented to the nation by HENRY TATE for the encouragement and development of British art, and as a thankoffering for a prosperous business career of sixty years."

CATHEDRAL SERIES.—CANTERBURY: SECTION OF NAVE & AISLES AT THE WEST END, WITH ELEVATION OF THE TWO TOWERS.—SECTION OF SOUTH TRANSEPT AND PART OF TOWER.—ELEVATION OF NORTH TRANSEPT AND PART OF TOWER.—SECTION OF NORTH SMALL TRANSEPT.—ELEVATION OF THE WEST SIDE OF SOUTH TRANSEPT, ETC.—SECTION OF CRYPTS, TRINITY CHAPEL, BECKET'S CROWN, ETC.

THE sections by TAYLOR & CRESY, which we reproduce, were praised by Professor WILLIS for their accuracy. The difficulty of measuring so large a building is manifest. The drawings are also a record of the state of the building about 1820. For example, the north-western tower is shown in its original form when it exemplified the Norman style alone. The sections do not need further explanation, with the exception of one through the crypts and eastern part, where the following explanation of the letters of reference will be useful:—

a. Section of the small column in the centre of the crypt, with a profile of its capital *a* and base *d*; *b*. Larger column, with profile of the capital; *c*. Profile of base of ditto; *e*. Small column in the middle part of the crypt, with its arch mouldings and great pier beyond; *f*. Screen and entrance doorway to the Virgin Chapel; *g*. Upper part, or parapet, of Becket's Crown; *h*. North end of eastern transept, with timber-work of roof; *i*. A vaulted room between the floor of the west end of the Trinity Chapel and the circular aisle of the large crypt. Two compartments of the screen on the north side of the altar, between that and the aisle, are shown.



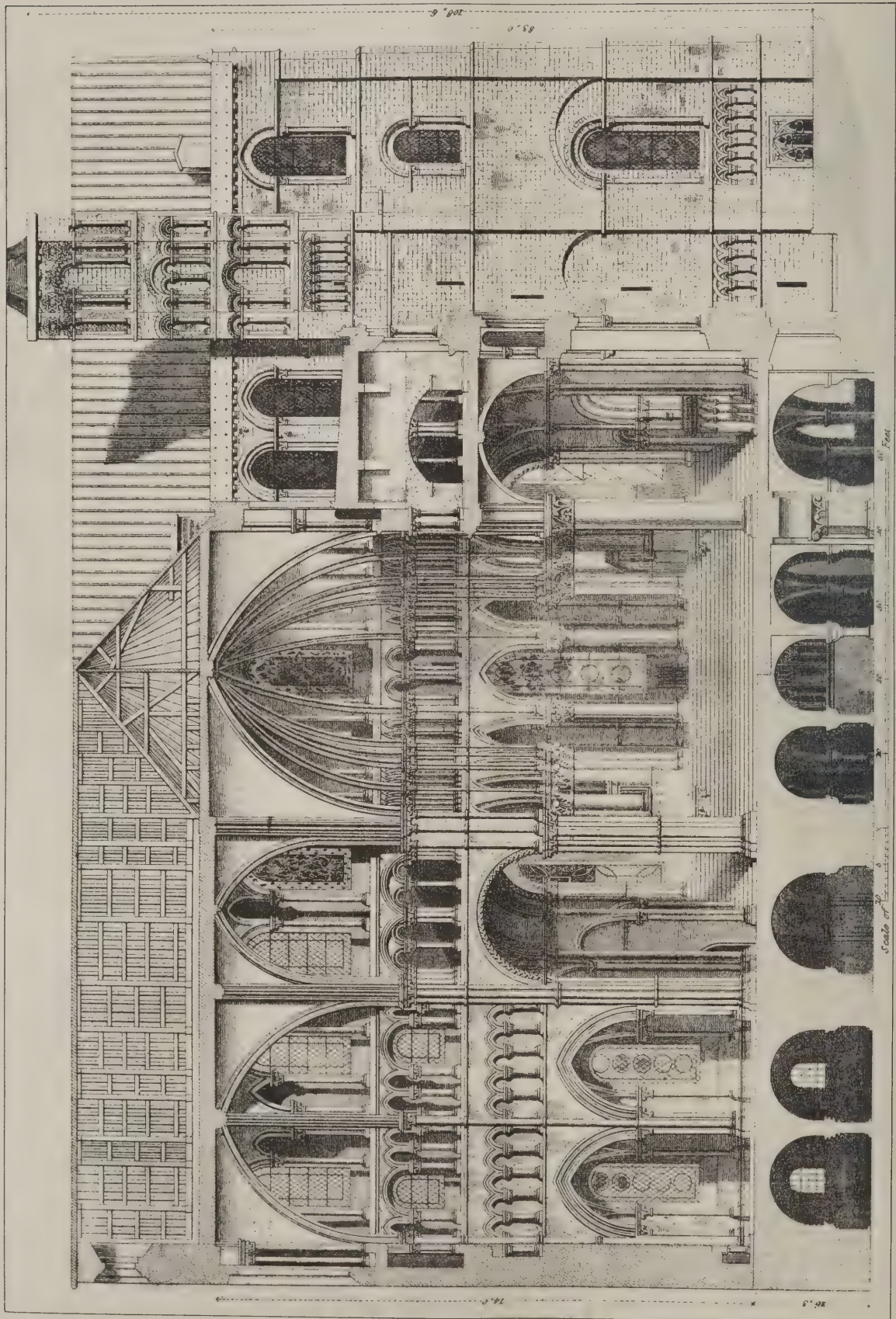
PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

Aug. 6th 1897.



INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

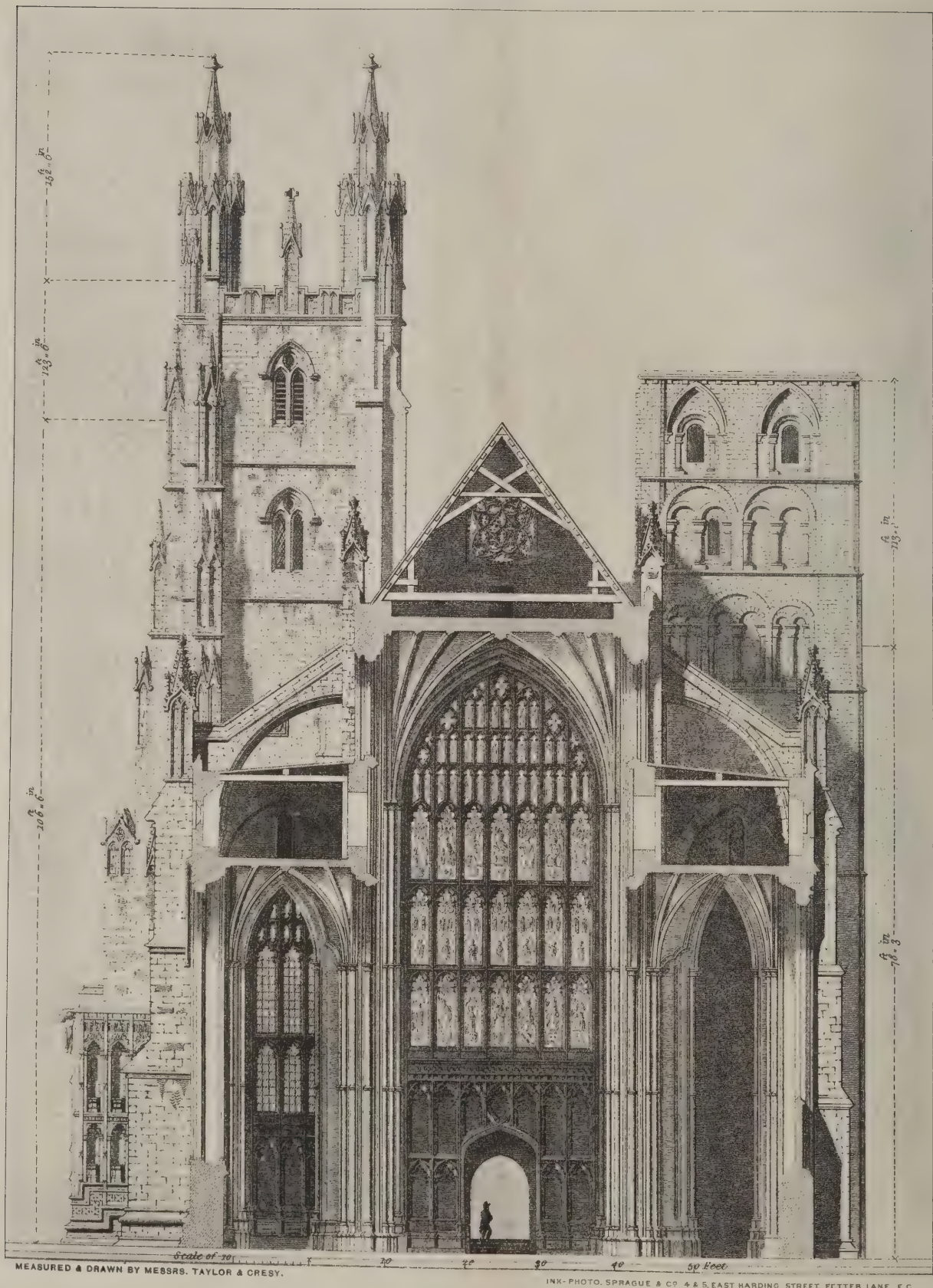
MILLBANK, S.W.: VIEW FROM SOUTH CORNER.



MEASURED & DRAWN BY MESSRS. TAYLOR & CRESY. INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

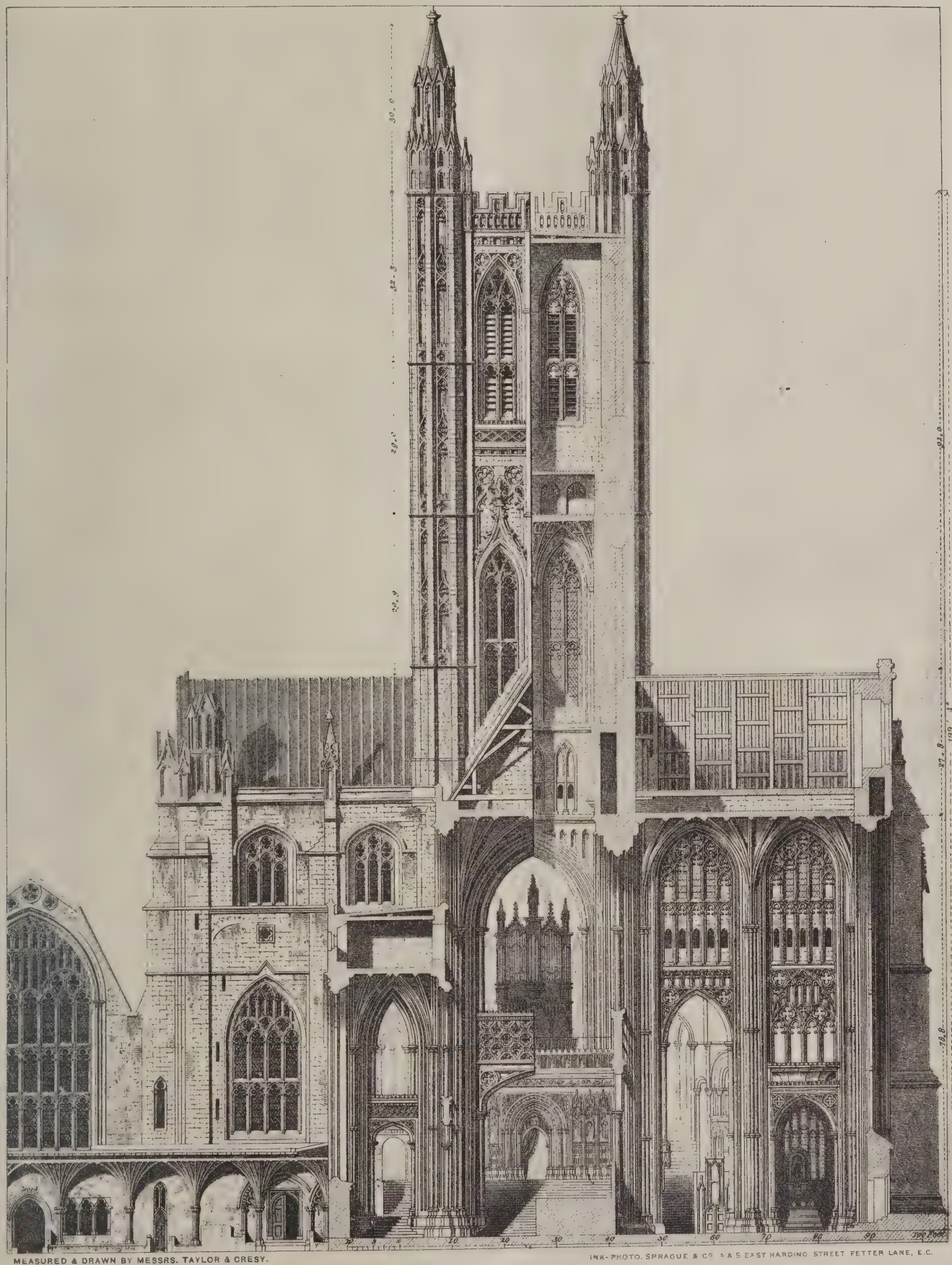
CATHEDRAL SERIES, No. 63.—CANTERBURY:
SECTION OF NORTH SMALL TRANSEPT.
ELEVATION OF THE WEST SIDE OF SOUTH TRANSEPT, &c.

The Architect, Aug. 6th 1897.



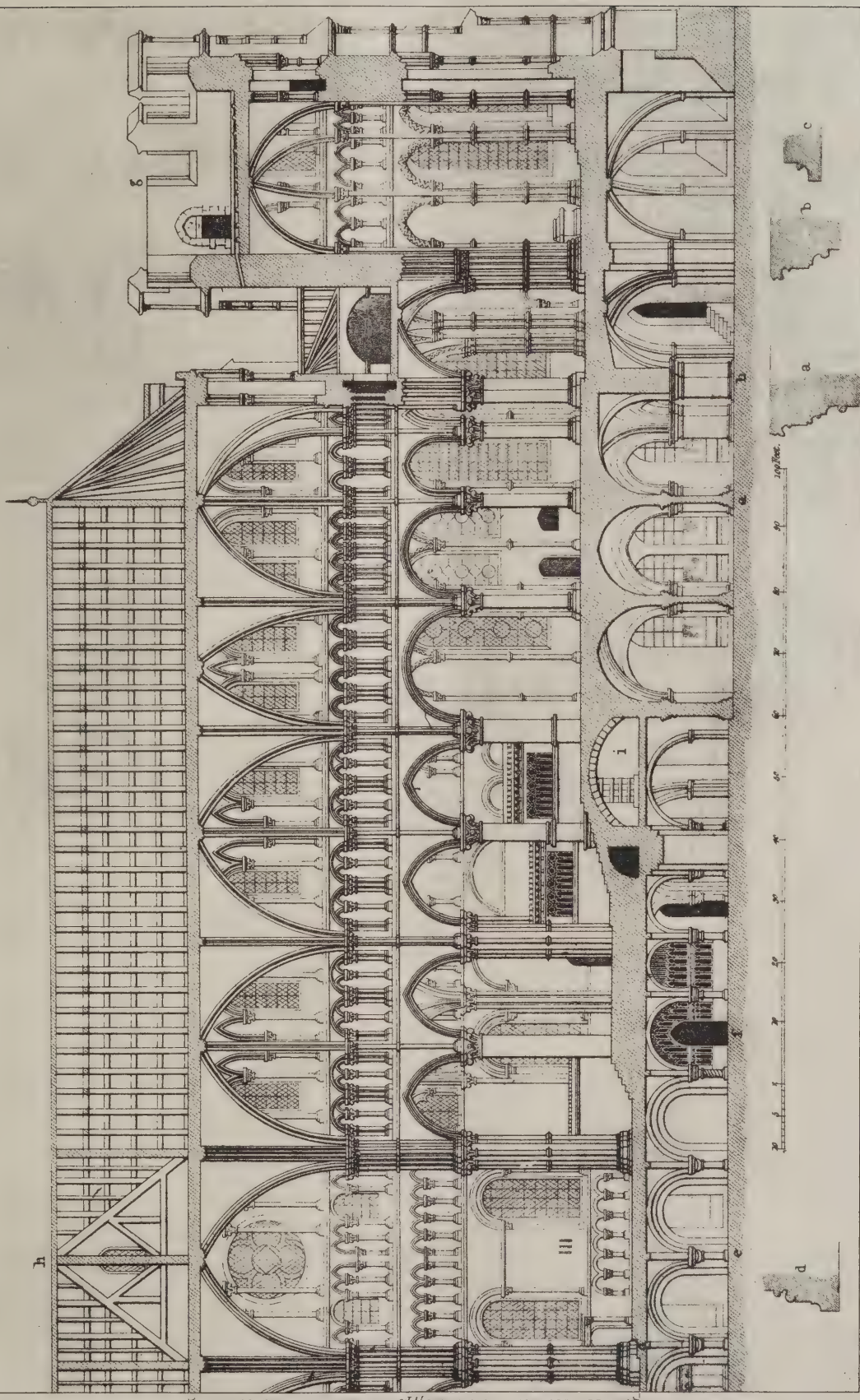
CATHEDRAL SERIES, No. 61.—CANTERBURY:

SECTION OF NAVE & AISLES AT THE WEST END; WITH ELEVATION OF THE TWO TOWERS.



CATHEDRAL SERIES, No. 62.—CANTERBURY:

SECTION OF SOUTH TRANSEPT AND PART OF TOWER.
ELEVATION OF NORTH TRANSEPT AND PART OF TOWER.



INK-PHOTO. SPRAGUE & CO. 44, 45, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 64.—CANTERBURY:

SECTION OF CRYPTS, TRINITY CHAPEL, BECKET'S CROWN, &c.

MEASURED & DRAWN BY MESSRS. TAYLOR & GRESY.





PHOTOGRAPHED BY S. B. DOLAS & CO. 11, LUDGATE HILL, E.C.

THE NATIONAL GALLERY OF BRITISH ART, MI
(THE GIFT OF M



INK PHOTO SPRAGUE & 4 & 5 EAST HARDING STREET FETTER LANE, E.C.

ANK, S.W.: VIEW LOOKING ACROSS DOME.

ENRY TATE.)

THE WALLACE COLLECTION.

BY a Treasury minute, dated May 3, 1897, it was recommended that a small committee should be appointed to inquire and report where, in what manner and at what probable cost provision may best be made for the housing and exhibition of the art collection recently bequeathed to the nation by Lady Wallace, and to make any recommendations that may seem fit to them as to the constitution of the trust in which the collection should be vested.

It was also suggested that the constitution of the committee should be as follows:—

The Right Hon. the Marquis of Lansdowne, K.G., G.C.M.G., C.G.S.I. (chairman), the Right Hon. Sir William G. Vernon Harcourt, M.P., Sir Edward J. Poynter, P.R.A., Mr. Algernon Bertram Freeman Mitford, C.B., Sir Francis Mowatt, K.C.B., Mr. Walter Armstrong, director of the National Gallery of Ireland, Mr. Alfred de Rothschild, Mr. Alfred Waterhouse, R.A., LL.D., with Mr. Charles G. E. Welby as secretary.

The following report is submitted by them:—

The committee appointed under the Treasury minute of May 3, 1897, to inquire "where, in what manner and at what probable cost provision may best be made for the housing and exhibition of the art collection recently bequeathed to the nation by Lady Wallace, and to make any recommendations that may seem fit to them as to the constitution of the trust in which the collection should be vested," beg to submit the following report:—

1. The conditions upon which the Hertford House collection was bequeathed to the nation by the late Lady Wallace are as follows:—

a. That Her Majesty's Government shall agree to give a site and build thereon a special museum.

b. That this site shall be in a central part of London.

c. That the museum shall be a "special museum," and that the collection "shall always be kept together, unmixed with other objects of art."

2. The following proposals for disposing of the collection were considered by us:—

(i.) To retain it at Hertford House.

(ii.) To remove it to a building adjoining, or in the neighbourhood of, the National Gallery.

(iii.) To remove it to a new building to be erected upon an independent and suitable site.

(iv.) To remove it to South Kensington.

We consider ourselves bound to make no recommendations but such as shall amply comply not only with the letter but with the spirit of the bequest.

We are of opinion that (iv.) would not be in accordance with the conditions of the bequest, and must therefore be dismissed from consideration, that both (i.) and (ii.) would comply with the provisions of the bequest in regard to centrality, and that although the retention of the collection at Hertford House might not involve the actual construction of a special museum, it would nevertheless sufficiently comply with the terms of the bequest, and be strictly in accordance with the intention of the testatrix. The opinion of the law officers of the Crown and the evidence of Mr. Murray Scott are distinct upon these points.

We now proceed to express our views on the merits of the three alternatives before us.

Hertford House.

3. So long as the Wallace collection was private property it could probably not have been exhibited in a more attractive or appropriate manner than that in which it has been dealt with at Hertford House. The combination of admirable pictures with objects of art of many different kinds, all of the highest order of excellence, and the arrangement of these throughout the different apartments and reception-rooms, as well as in the exhibition galleries, have been carried out with the greatest skill and taste. It would have been impossible to display the collection in a manner more calculated to illustrate the knowledge and discrimination of those by whom it was brought together.

Of the pictures hung in the reception-rooms and private apartments, some no doubt pay the penalty to which works of art belonging to private collections are often subject and are indifferently lit. The picture galleries, on the contrary, are lit from the top, and the pictures are seen to advantage, although it would be possible even here to improve the lighting.

The whole collection, however, suffers from overcrowding. This is the case even in the picture galleries, where the space between one picture and another is insufficient for their proper display. The china, miniatures, snuff-boxes and other articles of *virtu* require more space before they can be seen properly. The large quantity of furniture now in the house would also interfere to some extent with the convenience of visitors if the premises were used as they stand for the purposes of public exhibition.

4. These drawbacks could, however, be overcome.

It is in the first place to be borne in mind that, under the terms of the bequest, "personal and modern jewellery, trinkets and effects," as well as "ordinary modern furniture and chattels," do not pass to the nation. Whatever interpretation may be given to these words, it is clear that a large number of pieces of furniture, many of them very bulky (*e.g.* beds, sofas, fauteuils, a billiard table, &c.), would not remain in Hertford House should it be acquired by the public. The relief thus afforded to the remainder of the collection would be material, and the removal of some of the larger pieces of furniture which now encroach on the wall space would add considerably to the space available for the display of pictures.

5. The evidence we have received goes to show that, were Hertford House made use of as a museum instead of for residential purposes, the amount of space available for the display of the collections could be further increased, and could be made amply sufficient for the purpose.

It has been suggested to us that with this object the space on the ground floor to the north and west of the courtyard, now occupied by stables, coach-houses, &c., could be appropriated for new exhibition galleries. These would not have any top light, but could be well lit from both sides by windows opening into George Street, into Manchester Street, and into the central courtyard. They would largely increase the available space, and would be well suited for the exhibition of objects of art of all kinds. Mr. Taylor, in his evidence, estimates that this alteration would increase the floor space available for exhibition purposes by about 7,000 square feet, thus increasing the total available floor space from some 18,000 to some 25,000 square feet.

It has also been suggested that the length of the picture galleries on the first floor could be increased by extending the skylights, thus converting the first floors of the eastern and western wings of the main building into exhibition galleries lit from above. This would involve the removal of those rooms on the second floor which are immediately above the rooms in question.

It would be for consideration whether the armour should not be removed from the top-lighted galleries which it now occupies upon the first floor, its place being taken by a part of the collection of pictures.

We believe that the adoption of these suggestions, or some of them, together with minor alterations which we do not think it necessary to specify in detail, would enable the collection to be worthily exhibited, and would afford ample room for ordinary visitors, although it is possible that when the collection is first thrown open an exceptional number of visitors might be attracted, in which case special restrictions would have to be imposed for a time. Should it be thought necessary to provide means of egress other than those afforded by the main entrance in Manchester Square, additional exits could, without difficulty, be contrived on the eastern and western as well as the northern sides of the block occupied by the house and offices.

6. We have endeavoured to ascertain the cost at which it would be possible to acquire Hertford House for the nation and to adapt it for the purposes of a public exhibition. There is reason to hope that the leasehold and the freehold interest may be obtained for between 60,000*l.* and 70,000*l.*, and the cost of the above alterations would, according to Mr. Taylor's estimate, amount to about 24,000*l.*, making a total cost of some 90,000*l.*

But Mr. Taylor's estimate was, it must be observed, only approximate; nor does it include electric or other lighting, a question which will have to be faced by the trustees. It was, moreover, made upon the assumption that the alterations would be carried out in such a manner as to make the new galleries harmonise with the existing galleries rather than with the reception-rooms, which are decorated with more elaboration and in a more costly style than would be requisite in the case of galleries intended for purposes of exhibition only. We are, however, strongly of opinion that, in any alterations or additions which may be found necessary, the general character of the existing decorations should be maintained.

7. We may here mention that the complete isolation of the Hertford House block, which is bounded on one side by Manchester Square and on the other three sides by George and Manchester Streets and Spanish Place, renders it specially safe from danger of fire from adjoining properties.

The National Gallery Proposal.

8. We have now to consider the proposal that the Wallace collection should be removed from Hertford House, and should be accommodated in the immediate proximity of the National Gallery. It is argued in support of this that the Wallace collection should be made as much a part of the National Gallery as the terms of the bequest permit, that the juxtaposition of these collections will be a gain to each, and that it will be convenient for persons interested in the fine arts to pass freely from one collection to the other. It is urged, and not without force, that these considerations are entitled to special weight owing to the fact that in the Wallace collection of

pictures certain schools, which are badly represented or almost unrepresented in the National Gallery, are represented by a number of extremely fine examples.

It must, on the other hand, be borne in mind that the terms of the bequest absolutely forbid anything which could properly be described as a mixture of the two collections. The precise amount of separation which is necessary in order to comply with the directions of the testatrix may be fair matter for discussion, but we hold strongly that it must be real and effectual.

9. It is, however, when we come to consider how the necessary space might be provided in the neighbourhood of the National Gallery that we are confronted by the most formidable difficulties. For many years past the attention of the trustees, and of successive Governments, has been directed to the necessity of providing for and anticipating the natural expansion of the National Gallery. During the last twenty years 246 pictures have been purchased by the nation, and 218 pictures have been presented or left to the Gallery. There is every reason to hope that this growth will be maintained, partly owing to the generosity of private donors, and partly by judicious acquisitions at the expense of the public.

In 1878 and in 1887 extensions to the rear of the eastern and central portions of the main building were carried out, and an understanding has been come to between the trustees on the one hand and the Treasury and the War Department on the other, that a further extension to the rear of the western wing is to be carried out before long. This extension is to occupy a part of the space now occupied by St. George's Barracks, a portion of the troops being with this object removed from those barracks to new barracks at Millbank.

The War Office has always insisted on the necessity of retaining behind the National Gallery an amount of barrack accommodation sufficient at least to provide for one company of infantry and the recruiting depôt, and also sufficient open space for parading troops. It is no part of our duty to express an opinion upon this point, but it is evident that, if this view is to prevail, there can be no room for any extension of the National Gallery upon adjoining land at present the property of the State, except that referred to above. This being so, we hold that it would be most inexpedient to appropriate for any other purpose an area which is specially relied on to meet the normal growth of the national collection of pictures.

It is true that the trustees have lately decided to remove about 100 pictures from the National Gallery to the new Gallery of British Art at Millbank, and the transfer of these will no doubt place a certain amount of additional space at the disposal of the director and the trustees. It must, on the other hand, be borne in mind that parts of the Gallery are already inconveniently crowded, and we call attention to the evidence of Sir Edward Poynter as to the state of the rooms containing the Spanish and earlier Flemish pictures, for both of which additional space is urgently required.

10. Even, however, if it were possible to appropriate, for the exhibition of the Wallace collection, the whole of the space now intended to be given for the extension of the National Gallery, that space would, in our opinion, not be adequate for the purpose. The evidence points to the conclusion that it would certainly not be sufficient unless the ground floor were brought into use. The ground floor of the National Gallery compares, however, unfavourably with that of Hertford House in regard to light, and it is not at present the practice of the National Gallery authorities to use it for purposes of exhibition.

A further objection to this site is to be found in the fact that it could be approached only by means of a somewhat undignified entrance from Trafalgar Square, passing through the basement of the National Gallery buildings or from an entrance to the rear of the Gallery and opening upon Orange Street, a thoroughfare very unsuitable for the purpose.

11. It is therefore, in our opinion, beyond question that were it decided to bring the Wallace collection and the National Gallery together it would be necessary to acquire a site for that purpose adjoining the latter. That to which our attention has been specially directed lies to the west of the Gallery buildings, and may be described as the block bounded on the south by Pall Mall East, on the west by Hedge Lane, on the north by a narrow street running towards St. Martin's Lane, and on the east by the National Gallery buildings and the barracks. The area of this site, which is mainly occupied by the business premises of Messrs. Hampton, is about 33,000 feet. In the opinion of Mr. Taylor it could not be acquired at a less cost than 300,000*l.* or 350,000*l.* To this amount would have to be added the cost of a suitable building, in a style of architecture appropriate to its position and to the importance of its contents. The cost of such a building is estimated by the same witness at about 125,000*l.* or more.

The intrinsic merits of this site are, we think, obvious, and its acquisition by the State would have the additional advantage of giving to the National Gallery increased security from the risk of fire. The cost no doubt would be very large, but we should not consider ourselves precluded from recommending

this solution of the problem merely on the grounds of its expense if it appeared to us that its superiority over every other was decided and incontestable.

12. It was suggested to us that an equally suitable site might be obtained to the south of Leicester Square upon a block bounded on the north by Spur Street, and lying south and west of Leicester Square. The cost of purchasing this block would, in the opinion of Mr. Taylor, be between 250,000*l.* and 300,000*l.*, whilst the cost of building upon it would, owing to its greater extent, slightly exceed his estimate of building upon the Hampton site. We are of opinion that the purchase of this site, while possessing no advantages over those of the Hampton site, would in other ways be much less desirable, and we have not pursued the question further.

13. In regard to both the above alternatives, the evidence of Mr. Taylor shows that it would take from five to six years to obtain possession of any site already occupied by business premises in the neighbourhood of Trafalgar Square, and to construct the necessary buildings upon it. The long delay which would thus arise would, in our opinion, be regrettable, especially as it is provided that the Wallace collections may not remain, as a temporary arrangement, for more than four years at Hertford House, during which period they could not, without great difficulty, be thrown open to the public.

An Independent Site.

14. The alternative of acquiring and erecting suitable buildings on an independent site in a central position is open to the same objections as to cost and time which appear so strong in the case of the National Gallery proposals; and, on the other hand, is without many of the advantages which are claimed for those proposals. We have, therefore, not considered it necessary to examine this alternative in detail.

Conclusion.

15. In view of the above considerations, we are of opinion that Her Majesty's Government would be well advised if they were to arrange that the collection recently bequeathed to the nation by Lady Wallace should be allowed to remain at Hertford House, the premises being suitably altered for the purpose; and we end by recapitulating briefly the reasons which lead us to that conclusion:—

(i.) Such an arrangement would be in accordance with the terms of the bequest, and would, in the view of the executors, give effect to the wishes of the testatrix.

(ii.) It would, more than any other arrangement, preserve the distinctive character of the collection, and would retain it within the building in which its owners had placed it, and which they had adapted for its reception.

(iii.) It would be much the less costly of the alternatives suggested.

(iv.) It would avoid the risks inseparable from the removal and rearrangement of the collection.

(v.) It would provide a museum which, owing to its complete detachment from other buildings, would be specially free from risk of fire.

(vi.) It would avoid delay and afford the public an opportunity of entering into the enjoyment of this priceless assemblage of works of art within a few months of the present time instead of five or six years hence.

Constitution of the Trust.

16. There remains the question of the constitution of the trust in which the collection should be vested. We understand that, under the terms of the will, a trust must be created, of which Mr. Murray Scott, the residuary legatee, must be a member.

In considering this question it must be borne in mind that although it is desirable to retain as far as possible the arrangement of the collection made by Sir Richard Wallace himself, yet, even if it be decided to retain the collection at Hertford House, there will be of necessity, for reasons given in the earlier part of this report, certain structural alterations to be effected, and as a consequence to some extent a redistribution of the contents of the galleries. It follows that the trustees will at first have before them a very laborious task. When once the collection shall have been housed and rearranged there will be little for them to do, for in this case there can be no expansion by purchase, no diminution by weeding out or removal.

In appointing the first trustees the Government will, in our judgment, do well if they select representatives of the trustees of two great national collections, viz. the National Gallery and the British Museum, say two from the former and one from the latter, together with other gentlemen of experience and leisure, some of whom might be willing to act as a sub-committee of their co-trustees in superintending the structural alterations in the first place, and in the second the redistribution, so far as may be necessary, of the collections.

We think that the trustees should not exceed seven in number, *i.e.* Mr. Murray Scott, two trustees of the National Gallery, one of the British Museum, and three others.

17. It will be necessary to appoint a paid curator, whose duty it will be to catalogue the collection, carry on such correspondence as may arise and have control of the staff under the trustees. The work of cataloguing is one which should be proceeded with at once, inasmuch as there appears to be no complete inventory of the collection in existence. This will be a long and difficult work, and in some cases—as, for instance, in that of the armour—special experts will have to be consulted. Upon the immediate importance of beginning the catalogue we cannot lay too great stress.

The following separate report is by Sir E. J. Poynter, P.R.A. :—

1. I am in full agreement with the main report in all its conclusions as to the adaptation of Hertford House, if it be decided to retain the Wallace collection on that site; but as I do not agree with the conclusion in paragraph 15, I have thought it better not to sign the report.

2. I also agree that the proposed extension of the National Gallery to the north of the western wing is required for the normal growth of the national collections.

3. But I think that the immense advantage to the public in having the two collections, each of which supplements the other in its weak points, in close proximity, is not sufficiently dwelt upon in the report. An opportunity is presented for making what would certainly be the most completely representative picture gallery in the world, affording unrivalled opportunities for study in every school of painting, and the whole forming a collection of unequalled magnificence which any nation would be proud to possess.

This opportunity would be afforded by constructing a museum, as suggested in paragraph 11 of the report, on the site to the west of the Trafalgar Square Galleries, at present occupied by Messrs. Hampton's and other premises. This scheme is, doubtless, far more costly than the proposed purchase and alteration of Hertford House; but it is quite certain that with the growing impatience of the public at the risk of injury by fire to the National Gallery, incurred by the immediate proximity of the furniture shops and warehouses, the expense of acquiring this site must sooner or later be incurred. The danger is a real one and cannot be shirked. The expense therefore of building a museum for the Wallace Collection on this site may be said to be that of providing the building, roughly estimated at 125,000*l.*, as against 90,000*l.*, the estimated cost of purchasing and altering Hertford House.

4. In any such proposal, however, the question as to what constitutes a separate site has to be considered. In providing that the Wallace collection shall not be mixed with any other, or have any part of another collection mixed with it, the intention of the testatrix appears to be the very natural one that due honour should remain attached to the founders of so exceptional a collection and to the munificence of the bequest. I do not understand such a provision to mean that it is never to be brought into relation with any other collection. In my opinion, if the scheme suggested above were adopted, and a museum were built adjoining the National Gallery with a separate entrance, the Wallace collection being kept as a separate entity within its four walls, internal communication might be established with the rooms of the National Gallery to the great advantage of both collections, and the Wallace bequest would be no less a separate collection because the public could pass between the two collections without having to go out into the street; such a separation would be "real and effectual" (paragraph 8 of the Report).

5. There is another point in connection with the Hertford House scheme on which I touched in my evidence. The arguments put forward in favour of this scheme are to the effect that by retaining the collections in Hertford House we should preserve for the public an example of a splendid private house, or rather palace, enriched with treasures of art, collected with judgment, and displayed and arranged with the great skill and taste of a distinguished connoisseur. But it is precisely this palatial display and this skilful arrangement which it is proposed to destroy. When reception-rooms richly furnished and hung with pictures are converted into top-lighted galleries; when the armouries arranged with so much care and with the assistance of a specialist are removed from the galleries built specially for them and placed in a totally different part of the building; when furniture, instead of appropriately decorating the rooms, is disposed so as to allow of the free circulation of the public, what becomes of Sir Richard Wallace's arrangement? When, in fact, the palace is converted into a museum, what becomes of the palatial residence?

6. Under these circumstances I am of opinion that, seeing that Hertford House, if purchased, must be converted into a museum providing for the free circulation of the public (a vital point in any scheme), it would be better for the collection and more to the public advantage that a special museum should be built on a site (which must some day be acquired) where it would be more centrally situated and with the immense advantage of ranging the collection in contact with the present national collection in Trafalgar Square.

As regards the question of delay, it will not be argued that, in view of an arrangement which, if adopted, would be adopted for all time, the impatience engendered by the delay of a few years could be taken into serious consideration; especially as means could no doubt be devised of admitting the public, under certain restrictions, to Hertford House while the new building was being carried on, in which case the house could really be seen for a time almost as Sir Richard Wallace left it.

THE INFLUENCE OF EXAMINATIONS ON TECHNICAL EDUCATION.*

SCHMES of examination influence the education of a nation mainly in three ways: in the first place, they serve to mark out lines of study by the syllabuses they set forth; in the second, they fix standards of attainment by the amount of knowledge they require for various grades of success; and lastly, they offer incentives to students and teachers in the shape of the distinctions and prizes which reward conspicuous success. The influence of any particular scheme of examination on the progress of education is good or bad, just in so far as its syllabuses are wisely chosen, its standards of success fixed neither too high nor too low, and its distinctions and prizes so awarded as to offer a premium for intelligent work rather than for mere "cramming" of facts and theories.

It is proposed in this paper to consider to what extent the principal examinations, for which students of commercial and technical subjects enter, have exercised a beneficial influence on the progress of education in England, and to suggest certain directions in which alterations may be desirable.

The examinations which will be reviewed are those of:—

- (1) The Department of Science and Art;
- (2) The City and Guilds of London Institute for the advancement of technical education;
- (3) The Society for the Encouragement of Arts, Manufactures, and Commerce;
- (4) The Universities of Oxford, Cambridge and London; and
- (5) The London Chamber of Commerce.

It will be seen that the list makes no pretence to be exhaustive, though it is believed to be thoroughly representative.

I.—Examinations of the Department of Science and Art.

No examinations have exerted a more widespread influence on the progress of technical education than those of the Department of Science and Art, and those who are best acquainted with the facts will be prepared to admit that, though the examinations in question may have done not a little harm, their influence has, on the whole, been beneficial, and that steady improvement has been made in the Department's syllabuses and modes of action.

In the earlier periods of the Department's existence it was driven to adopt bad methods, first, by the lack of competent teachers; secondly, by the almost entire absence of facilities for practical work in connection with the subjects of scientific instruction which it endeavoured to foster; and lastly, by the fact that the clerical division of the Department's staff far exceeded both in numbers and apparently in influence that portion of its officers which had some knowledge of science, art and technology, and understood the difficulties of the teachers and the requirements of the students. All this has been and still is steadily changing; the number of competent teachers is rapidly increasing; well-equipped laboratories of all kinds are springing up all over the country, and the expert side of the Department's staff has been greatly strengthened. The appointment as Director for Science of a former inspector and distinguished scientist, Captain Abney, has already led to great improvements, and creates a hope that still better things may be in store.

Within the last few years the Department has taken steps to recognise practical work, not only in chemistry and metallurgy, but also in physics and biology. It is to be hoped that in a short time it will not merely recognise but will require this, and that it will take steps to encourage practical work in connection with other subjects such as mechanics and the theory of the steam-engine.

The recent establishment of separate day and evening examinations encourages the belief that the Department may, in time, see its way to draw up separate syllabuses suitable respectively for the pupils in the day schools connected with it and for the adult artisan pupils of its evening classes.

* A paper by Professor J. Wertheimer, principal of the Merchant Venturers' Technical College, Bristol, and hon. secretary of the Association of Technical Institutions, read at the International Congress on Technical Education at the Society of Arts.

II.—Examinations of the City and Guilds of London Institute.

While the Department of Science and Art owes its origin and the funds it distributes to the action of Parliament, the City and Guilds of London Institute is maintained by the ancient trades' corporations of the Metropolis.

The examinations of the Institute have undoubtedly exercised a beneficial influence on the teaching of technology; but there is still room for improvement in the syllabuses of the examinations, and it is very desirable that the Institute should insist more largely on evidence of practical skill.

The professional element on the examination board is at present entirely drawn from the staffs of the two colleges which the Institute controls, and while every one must be pleased to see these eminent teachers on the Board, it is greatly to be desired that the Institute should associate with the professors in its own colleges representatives of the professors and teachers in the leading provincial technical schools and colleges.

At present the examinations of the Institute in many subjects are quite beyond the reach of the majority of young artisans. This is unfortunate, and a great impetus to apprentices to study would be given by the subdivision of the work required for the ordinary grades into two or even more parts, which might be taken in different years. It would also tend to popularise the examinations and the classes preparing for them if, in place of the present certificates, a "journeyman's" and a "foreman's" certificate respectively were issued to artisans who produced evidence of the necessary training in the workshops of an approved firm, and who subsequently passed the Institute's theoretical and practical examinations. The honours grade certificate might then be made still more difficult of attainment than at present, and would be suitable for those desirous of becoming captains of industry. It is only necessary to point to the fact that in mechanical engineering only 481, in boot and shoe manufacture only 208, and in calico printing only 31 candidates sat for examination in 1896, in order to convince all concerned that the Institute still covers only a small part of the field which is open to it.

III.—Examinations of the Society of Arts.

The Society of Arts (to give it the title by which it is best known) does for commerce what the City and Guilds of London Institute does for technology. Meeting, as this Congress does, in the rooms of the Society, it is but proper that it should note specially the deep obligations of the business world for the care with which the Society has fostered training in commercial subjects. Its examinations are steadily increasing in favour, and its certificates are with justice highly valued. Probably for financial reasons there is, however, in the examinations in modern languages no provision made for testing and giving credit for a candidate's ability to speak these; it is to be hoped that a way may be found to remedy this defect, and thus indirectly to help British merchants who may wish to find commercial travellers able to meet, on approximately equal terms, those whom our German cousins send out so well prepared and in such abundance. It would also be an improvement if the Society were to issue both "Junior Clerks'" and "Senior Clerks'" certificates to students who gave evidence of satisfactory service for, say, three and six years respectively in houses of business approved by the Local Chamber of Commerce, and who subsequently passed certain of the Society's examinations; certificates of this kind would soon come to possess a very high value in the commercial world.

IV.—Examinations of the Universities of Oxford, Cambridge and London.

These universities influence technical and commercial education in two ways. They grant degrees to those about to become teachers, and by the local examinations of the ancient universities, together with the matriculation examination of the University of London, provide tests of the completion of the substratum of general education which students should possess before they enter upon a course of higher technical or commercial training. As regards Oxford and Cambridge, enormous strides have been made of late years in the provision of laboratories and apparatus, and their distinguished students of electricity, for example, are no longer indebted to text-books alone for their knowledge of dynamos.

Oxford and Cambridge, unfortunately, do little to encourage undergraduates to obtain a conversational knowledge of modern languages. Of course a university student should require a thorough literary knowledge of a modern language, but it is difficult to understand why, e.g. in the Modern Languages Tripos at Cambridge, no marks are assigned for ability to speak the languages chosen, though candidates who can do this have their names distinguished by an asterisk.

The University of London has greatly helped technical education by requiring for its degrees in science an adequate amount of practical work, in addition to severe theoretical examinations. As a result, many of the most important teach-

ing posts in technical schools and colleges are filled by graduates of this university.

The local examinations of the universities of Oxford and Cambridge have lately been greatly improved by the introduction of a new, though unfortunately optional syllabus for elementary science, which involves something more than the mere book-knowledge still sufficient for success under the alternative schemes. It is to be hoped that practical work in science may soon be included in the matriculation examinations of the University of London.

V.—Examinations of the London Chamber of Commerce.

The London Chamber of Commerce has put forth certain schemes for commercial education and has held examinations thereon, but so far these examinations have not been very generally accepted. A very important point in the syllabus of the Chamber is that in modern languages conversational knowledge is required. The multiplication of examining bodies is, however, in every way undesirable, and it is difficult to see why arrangements could not be made by this Chamber—or better still by the Association of Chambers of Commerce of the United Kingdom—and the Society of Arts for an amalgamation of their forces in order to secure one set of examinations for commercial certificates for the whole country.

General Observations.

It behoves us to watch closely any attempt to establish new examinations. The technical instruction committees of some county councils are already instituting examinations of their own; in a very few cases these may be necessary to meet special local requirements. But as a rule they are not needed, and it would be wiser to endeavour to modify existing examinations, if necessary, rather than to establish new ones.

In fact there are not a few of us who would be prepared to make the establishment of a new examination a misdemeanour at the least, unless the examination took the place of one or more already in existence.

As another instance of unnecessary examinations, that conducted by the Worshipful Company of Plumbers may be mentioned. The examinations of the City and Guilds of London Institute in plumber's work are at the least as well arranged, and it is to be hoped that the Company may soon see its way to accept the Institute's examinations and withdraw its own.

In the important subject of cookery we suffer at present from the too great energy of the rival examining bodies. It would be matter for congratulation if they would consent to hand over their examining functions to some external body such as the City and Guilds of London Institute; the certificates issued would then have the same value all over the country, and their validity would not be confined to certain comparatively limited areas as at present.

In conclusion, it is, however, gratifying to note that in the departments of technology and commerce we do not find that multiplication of examinations which is so great a misfortune in the region of general secondary education.

THE PANTHEON, PARIS.

THE church of St. Geneviève, which is once more the Panthéon, was built by Soufflot for Louis XV., who allotted to the erection an additional four sous on every ticket in the lotteries. The annual produce of this was valued at 364,000 livres, nor does it appear that the amount fell short, but in the beginning the directors anticipated their revenues in the purchase of the ground, and perhaps also in the conduct of the edifice; and various other expenses and some considerable buildings were saddled on the funds, so that in 1780, after the death of Soufflot, and twenty-five years after the commencement of the building, the works were at a stand for want of money. In 1784 a precise estimate was formed of the sums yet required, and it was found that, to complete the building according to Soufflot's plan, it would require 5,340,000 livres, and 1,203,000 for the square round it and for the avenues; while the amount of the funds appropriated, after paying the interest of the sums borrowed, was 193,500 livres per annum, so that it would have required thirty-four years to terminate the work, and ten years and a half more to repay the debts. M. Rondelet, in his "Mémoire Historique," enters into an explanation of the proposed mode of raising money for the purpose of carrying on the works. But the income seems to jump from 193,000 to 278,000 without any cause; they were to borrow 400,000 livres per year, and to repay 100,000 of the old debt, which seems just the same as borrowing 300,000. For the loan they were to pay interest at five per cent., and by this method it was calculated that they should raise enough to complete the building and surrounding improvements in twelve years. In fourteen years afterwards, supposing the funds to remain untouched and no further expenses to intervene, the creditors might be paid, but if by any accident the works should be prolonged a

few years more than was contemplated in this estimate, the interest of money borrowed would exceed the funds. For five years, *i.e.* 1785-89, the works seem to have gone on with spirit, and near 2,500,000 livres were expended. At this time all the solid work of the edifice was completed, and it appears that about the end of 1789 the first serious alarm was excited, although some cracks had been observed as early as 1776. In 1789 a stone broke in one of the pillars of the dome, and in replacing it the faulty construction was betrayed.

It is doubtless very interesting to an architect to understand the construction of those buildings where any difficulty was to be overcome in which the efforts of the artist have perfectly succeeded. It is, perhaps, still more instructive to trace the causes of failure in those which have exhibited some considerable defect. The true maxim of an architect is to spare nothing necessary to make the building perfectly firm and durable, but at the same time to admit nothing superfluous; a building which stands secure might perhaps have been equally secure with a portion of materials, and consequently of expense, considerably smaller; a building which fails we are sure was not strong enough, and if it do not begin to fail till after it has received its full weight it becomes particularly worthy of attention as an elucidation of the minimum which may be employed, or rather, which must be avoided, for the evil on one side is so incomparably greater than that on the other that it would be a folly not to err systematically in some degree by giving more strength than is absolutely necessary. The piers of the dome of St. Geneviève did not so decidedly yield to the pressure as to stop the progress of the building till nearly two years after the dome was completed and the centres removed. It was not till 1795, when, in order to adapt the edifice to its republican destination, some masses of hard stone intended to receive the ornaments were cut away, that any considerable defects became sensible. The slight motion given by the repeated jarring of this operation was sufficient to destroy the equilibrium of the forces.

The soil on which this church was built had been found on an examination previous to laying the foundations to be full of pits, some as much as 80 feet in depth, which had been dug to procure an earth for a sort of coarse pottery, a circumstance which does not give us a favourable idea of any part of the foundation. These pits were very carefully filled up, and the foundations and erection of the vaults carried on so as to give a perfectly firm basis for the superstructure. This operation has completely succeeded, and does not exhibit the slightest trace of failure or settlement. These works were begun in 1755; in 1764 Louis XV. placed the first stone of one of the pillars of the dome, an honour which is supposed to have excited some jealousy against the architect. Great clamour was raised against the price paid for cutting the stones, and the cautious and scientific method of proceeding at first adopted was abandoned exactly at the point when care and nicety were most necessary. The piers, consequently, instead of being built of stones perfectly squared with true beds, were composed of such as presented merely an even face, whilst frequently the internal mass was very defective.

Soufflot himself seems to have directed the beds of the stones to have been wrought smooth for a depth of 4 or 5 inches from the external face, and the remainder to have been roughly sunk three or four lines in order to receive the mortar; a method bad in itself, as it evidently throws the principal weight to the face of the pier, *i.e.* to the weakest part, instead of spreading it equally over the whole surface, or with rather a tendency to the centre. Even these directions had not been attended to; but the builder, content to make the outside of his work fair, had used stones in many instances which were wedge-shaped; and joints which only presented a thickness of one or two lines externally were 2 inches or 2½ inches wide on the inside; the filling-in stones by no means fitted their places, and the interstices thus left were so little filled with mortar that in one place, on examination, the work admitted several pailfuls of grout. In order to obviate any immediate ill effect from the unequal beds of the stone, *calles*, or little bits, generally, as it appears, of wood, were inserted in order to support each block to its level. Above the piers of the dome the work was better executed, both in principle and practice, and the internal surfaces were merely picked to hold the mortar, without any sinking, under the direction of Rondelet; yet even in this part the want of large stones has made it necessary to introduce a prodigious quantity of iron-work to support arches where the construction required a single stone.

The first appearance of weakness, as already observed, was in 1776, when on removing the centres of the great arches some few pieces flanced off, but they were of little consequence. In 1779, while they were continuing the drum of the dome, new appearances of the same sort occurred, and Soufflot employed workmen to "sawker" the joints in order that the weight might bear more upon the solid mass of the pier; and during this operation the *calles* were taken out wherever they came within reach. At the death of Soufflot, which happened

in 1780, an examination of the cracks and flanchings was undertaken, but it was not till 1788 that they began to replace the broken stones. Nevertheless, in 1797, when Rondelet first published his work, there were in one of these pillars 367 cracks, of which 138 formed *lezards*; 283 flanchings; 64 points where the stone had been crushed by the incumbent weight; 54 separations of the upright joints; 344 pieces renewed, 37 of which had been renewed a second time.

It is marvellous that under such circumstances they should have continued the work, since it was evident from the pieces twice supplied that the progress of the settlement was going on sufficiently to make itself sensible, even while the centering of the dome remained; yet it does not appear that any immediate mischief followed the striking of those centres, and it was not till 1796 that the ultimate stability of the edifice was considered doubtful. At that time a commission of architects was appointed to examine the state of the building, and report on the best means of proceeding. These gentlemen examined the piers and completely ascertained the defective mode of workmanship; and they found that the piers and columns under the dome had settled irregularly in consequence of it. One pier had sunk 5 inches and two lines, French measure, the whole of which must have taken place in the height of the columns (37 feet 8 inches), as everything above and below was firm. Such defects in the workmanship seemed sufficient to account for the failure of the construction; but it was necessary to know whether, if perfect, the piers would have had sufficient solidity, and whether there was any defect necessary to be attended to in the disposition of the weight above. Soufflot made some experiments to ascertain the pressure which the stone "du fond de Bagneux" used in these pillars would support; but it appeared probable that the instrument he used was defective. Rondelet therefore repeated the experiments, both with Soufflot's machine and with one of his own contrivance. According to the first, each pier would support a weight of 70,362,720 lbs., supposing it to be a single block of stone; according to the last, of 27,329,222; a tremendous difference, and yet the estimate is still probably too high, as even in Rondelet's machine some power is lost by friction. As however it is probable that from the bad construction of the piers the weight was not supported by more than a fourth part of the superficies, their strength, calculated on Rondelet's machine, would not exceed 6,832,305 lbs., while the weight of a quarter of the dome was ascertained to be 7,449,980. We must, however, be careful how we make use of these combinations of experiment and calculation, since it would appear from them that the piers of the bridge of Neuilly to support arches of 120 feet span, instead of 13 feet thick as they actually are, need only have been about 4 inches, and the walls of a house five storeys high require only three lines and a half in thickness at the bottom. As for the distribution of weight the commissioners condemned the method adopted, owing to a change in the plan during the progress of the work, of making the drum of the dome pass a little on the *outside* of the line of the uprights; but they contented themselves with recommending the establishment of centering to relieve the weight, while the broken stones were removed and replaced with such an incrustation carefully worked as would be sufficient to sustain the whole building.

All the principal architects before Soufflot have given their domes a strong tendency towards the centre, but it does not appear that this is necessary, nor even in most cases expedient; nor was that of St. Geneviève faulty from the adoption of a different maxim any further than as it tended to throw a larger portion of the weight on the three-quarter columns at the acute angles of the piers.

The centres for this method of restoration were already ordered when, at the solicitation of the builder, another examination by the inspectors of the Ponts et Chaussées was ordered by the minister. In France the architects and engineers never agree; and, therefore, in order to have an opinion of their own, these inspectors, although they could not help finding the same causes of failure, yet voted the centering proposed by the architects unnecessary; stating that the defective construction of the piers, and the consequent danger of the building had been much exaggerated, and that the incrustation recommended was insufficient and injurious to the beauty of the architecture; and instead of this they advised the insertion of angular flying buttresses. This would have added to the load without increasing the strength of the edifice, since the direct pressure and not any lateral thrust was the source of the evil.

The architects and engineers continued debating while the evil was increasing. Two mathematicians were appointed to examine the reasons on both sides, but they declined pronouncing which was right, and it was agreed that the architects, the inspectors and mathematicians should each report separately to the minister of the interior. Other commissioners were appointed in 1798 who were frightened at the progress of settlement which had taken place in the two years preceding, and requested the immediate erection of the centres proposed by the architects; but unfortunately they desired that Rondelet,

Gauthier, inspector general of Ponts et Chaussées, and Patté, who had published in an early stage of the work some observations on the insufficiency of the piers, should be joined with them. The indulgence of this request produced new difficulties and new debates. At last in 1799 a commission of the members of the Institute recommended the completion of the erection of the centres, and this appears to have been executed; but nothing further was done till 1806, when it was decided to restore the building to its original destination as a church. The pillars were rebuilt under the direction of Rondelet on the principle at first recommended by the architects. The whole now seems perfectly firm, and the appearance of the building not at all injured.

It is certainly a beautiful edifice; the general proportions are good and there is much grace and elegance in the outline, but there are also many defects. The columns of the portico are too wide apart, there ought to have been eight instead of six in the front row. The two columns forming a projection on each side beyond the line of the portico are great blemishes, very injurious to the general effect, and the more so because they are palpably placed there for no other purpose than to enhance it, and the four internal columns on each side are most awkwardly doubled against the external columns and the pilasters. If instead of these eighteen columns there were sixteen, disposed like those of the Pantheon at Rome, this part would have been incomparably finer. The body of the building is too plain for the portico; the eye requires either pilasters or something which might produce a similar effect, to be continued all round, in order to preserve the same character throughout the edifice, or at least some returns at the north and south entrances of the magnificence of the western front. It is as necessary in architecture as in painting to avoid everything which makes an unconnected spot in the composition. The breaks which exist as apologies for the want of pilasters have a foolish and unmeaning effect; and the uninterrupted continuance of an ornament of the height of the capital is heavy and displeasing. Above this the pedestal of the dome by its plainness and simplicity forms a relief to the more ornamented portions of the building, and affords a noble base for the upper part. The columns of the drum are well proportioned and well arranged. The attic above them is perhaps rather too high, and the flat ribs of the dome itself are objectionable, especially when distinguished as they were by being painted yellow on a gray ground. This dome is triple, and the outer is in parts of its surface only 8 inches thick. It is not a portion of a sphere, but like that of most modern churches would form a point if the summit were not cut off to receive the lantern. This is right where a dome is elevated and surmounted by another form of edifice. In a building where a dome and its direct support constitute the whole of the apparent mass, or even where the dome forms the centre of a building not very high in proportion to its extent, the portion of a sphere is better; but where the effect of height is intended the somewhat pointed form of the dome maintains the general tendency to a pyramidal form. In its light and elegant appearance the interior resembles the church of St. Stephen, Walbrook, more than any other edifice in England; and like that perhaps is rather deficient in the solemnity which ought to accompany a religious edifice. There is no heaviness in any part, but in some respects rather the contrary appearance of insufficiency. The new piers are no stronger than seems necessary to support the work above; yet the disposition of the columns forming the nave into squares, each of which is covered with a shallow dome, though giving an air of lightness produces a certain degree of confusion, and is vastly inferior in majesty and sublimity to a nave with a continued vault leading to one central dome. It is perhaps this circumstance more than any other which communicates an air of gaiety, one might also say of levity, to the interior. The four square pillars over the columns which advance at the angles to support the smaller domes are preposterously little. There are other defects in the details of the building, but in spite of them all one cannot refuse it the rank of one of the most beautiful edifices in Europe.

GOVERNMENT COMPETITIONS IN AMERICA.

THE following regulations for competitions for Government buildings have been prepared for the enforcement of the Tarnsey Bill by Mr. Kemper, acting supervising architect, under the direction of Secretary Gage:—

By virtue of the authority contained in the Act of Congress, approved February 20, 1893, entitled "An Act authorising the Secretary of the Treasury to obtain plans and specifications for public buildings to be erected under the supervision of the Treasury Department, and providing for local supervision of the construction of the same," the Secretary of the Treasury hereby declares his purpose to enforce said Act with reference to such buildings as may be hereafter selected by him, subject to the following regulations:—

1. At least five architects of good professional standing, who are citizens of the United States, shall be invited by the Secretary of the Treasury to submit plans, drawings and specifications in accordance with the conditions set forth in these regulations; and such plans, drawings and specifications shall be passed upon as to merit by the commission herein provided for.

2. A commission shall be appointed by the Secretary of the Treasury, consisting of the supervising architect of the Treasury Department and two architects or experts in the construction of buildings, whose duty it shall be to judge and report to him as to the relative merit of the designs and plans submitted.

3. The office of the supervising architect will furnish full data and information as to cost and the general requirements of the buildings placed in competition under these regulations, and the successful architect will be awarded a commission to prepare complete plans, drawings and specifications and to locally supervise the buildings won in any competition.

4. The architect to whom said commission is awarded will receive in compensation for his full professional services, including local supervision of said building, a fee computed at the rate of 5 per cent. upon all sums up to 500,000 dols., $3\frac{1}{2}$ per cent. upon the next 500,000 dols. or any part thereof, and $2\frac{1}{2}$ per cent. upon any excess beyond 1,000,000 dols.

5. It must be understood that no claim shall be made upon the United States by any successful competitor for any fee, percentage or payment whatever, or any expense incident to, or growing out of, his participation in this competition.

6. The Department agrees to make selection from the designs submitted if in its opinion one suitable in all respects as to design, detail and cost be submitted, but expressly reserves the right to reject any and all plans, designs and specifications submitted, and to reopen the competition if, in the opinion of the commission herein referred to, or of the Secretary of the Treasury, no design suitable in all respects has been submitted.

7. Each competitor must submit with his plans a detailed estimate of cost.

8. It must be understood that a competitor will forfeit all privileges under these regulations who shall violate any of the conditions governing this competition, or who shall seek in any way, directly or indirectly, to gain advantage by influencing in his favour any of the commission.

9. No member of the commission herein referred to shall have any interest whatever, direct or indirect, in any design submitted in this competition, or any association with or employment by any of the competitors, and no employé of the Treasury Department shall be allowed to enter the competition herein provided for.

10. Each set of drawings, with its accompanying description, must be securely wrapped and sealed and addressed to the "Secretary of the Treasury, Washington, D.C.," plainly and conspicuously marked with the name of the building under competition, and without any distinguishing mark or device which might disclose the identity of the competitor.

11. There must be enclosed with each set of drawings, &c., a plain white opaque envelope, within which the competitor will place a card bearing his name and address. The envelope must be securely sealed with a plain wax seal, having no impression, legend, device or mark upon it which might disclose the identity of the competitor.

12. Upon opening the packages containing the drawings the commission will number the envelope containing the name and address of the competitor, and will place the same number upon each drawing, plan, specification, &c., submitted by him, and will preserve unopened the envelope containing such name and address until final selection shall be made.

13. The commission shall place out of competition any set of drawings as to which the conditions of these regulations have not been observed, and examine those remaining, giving to each the rank to which, in their judgment, its merits entitle it, and submit their findings to the Secretary of the Treasury.

14. The selection of one of the designs by the Secretary of the Treasury, and its subsequent approval by him, the Postmaster-General and the Secretary of Interior shall be final and conclusive.

15. In the event that the architect to whom the commission is awarded should prove to be an incompetent or improper person, the Secretary of the Treasury expressly reserves the right to remove him, to revoke the commission awarded him and to annul the contract entered into with him; but such architect shall receive equitable compensation for the work properly performed by him up to the time of his removal, to be fixed by the Secretary of the Treasury.

16. The architect to whom the commission is awarded shall revise his competitive drawings to meet the further requirements of the Secretary of the Treasury, and upon the basis of these revised preliminary drawings shall prepare full detailed working drawings and specifications for said building, and shall thereafter from time to time make such changes in the plans, drawings and specifications as may be directed by the Secretary of

the Treasury, for which just compensation shall be allowed, but no changes in the plans, drawings and specifications shall be made without written authority from the Secretary of the Treasury.

17. The architect to whom the contract is awarded shall, at his own cost and expense, when required to do so by the Secretary of the Treasury, make such revision and alteration in the working drawings and specifications of said building as may be necessary to insure its proper construction and completion within the limit of cost as furnished by the office of the supervising architect.

18. The sum upon which the architect's commission is to be computed shall be the sum of money expended for the actual construction cost of the building, as ascertained by contracts awarded, not including furniture, gas and electric light fixtures and electric light plants.

19. The compensation herein stipulated to be paid to said architect shall be in full payment of all charges for his full services, inclusive of all travelling and other expenses.

20. The architect's commission shall be paid as the work progresses in the following order:—

One-fifth of fee when preliminary drawings are completed and approved in the manner herein provided; three-tenths of fee when general working drawings and specifications are completed and copies delivered to the supervising architect, and balance of percentage monthly, upon the basis of vouchers issued in payments for work performed.

21. Until the actual cost of the building can be determined the fee of the architect will be based upon the proposed cost of the work, as above indicated, and will be paid as instalments of the entire fee, which will be finally based upon the actual construction cost of the building when completed.

22. The Department will provide a competent superintendent of construction, whose qualifications shall be passed upon by the architect, but the selection must be made from a list of not exceeding six names proposed by the Secretary of the Treasury.

23. The architect is to provide for the use of the Treasury Department one set of tracings of all working drawings and of revised competitive drawings, two copies of specifications and one copy of detailed estimate of cost of entire building, all of which will remain in the custody of the Department, and to be and remain the property of the United States and not of the architect, but such drawings and specifications shall not be used for any other building. And the office of the supervising architect will furnish for the use of intending bidders all necessary photographic duplications of plans and copies of the specifications.

24. Upon the award of the contract to the architect all designs of unsuccessful competitors will be returned to them, and no use will be made of any of the drawings not accepted, or of any part that may be original, without consent of the author thereof.

25. Payments upon the work of construction under contract will be made monthly, at the rate of 90 per cent. of the value of the work actually executed and in place, upon vouchers certified by the architect in charge and countersigned by the superintendent of construction representing the United States Government, which will be paid by a disbursing officer appointed by the Secretary of the Treasury.

26. The supervising architect of the Treasury Department will receive the proposals for contracts to be awarded, and shall likewise determine the manner in which the various branches of the work are to be contracted for.

27. All contracts, except for exigency expenditure, shall be properly advertised for thirty days, and shall be awarded by the supervising architect, with the approval of the Secretary of the Treasury, to the lowest responsible bidder.

28. All further details necessary properly to carry out these regulations may be arranged by the supervising architect from time to time, provided they do not conflict herewith.

29. The foregoing regulations shall be subject to modification and change at the pleasure of the Secretary of the Treasury.

ROYAL ARCHÆOLOGICAL INSTITUTE.

THE annual summer meeting of the Royal Archæological Institute was opened at Dorchester on Tuesday last, and will continue during the week. There was a large attendance of members, who were officially welcomed at the town hall by the Mayor and local committee, consisting of prominent members of the Dorset Antiquarian Society. The secretary of the meeting is Mr. Mill Stephenson, and the local secretary is Mr. H. J. Moule, curator of the Dorset County Museum. The president for the year, General Pitt Rivers, delivered his presidential address, dealing chiefly with his excavations at Rushmore and his discovery of flints in Egypt. Among those present were Sir H. Howorth, Professor Boyd Dawkins, Professor Clarke, the Rev. Sir T. Baker and other well-known

archæologists. After the reception the members visited various objects of interest in the town, under the guidance of Mr. Moule, including the Royal Amphitheatre and the County Museum. In the evening the antiquarian section was opened by Professor Boyd Dawkins. The arrangements for the week include visits to Sherborne, Wareham and Corfe Castle.

TESSERÆ.

Wolsey and Architecture.

WOLSEY'S taste and knowledge of architecture must have been great. Who can see the tower of Magdalen College and doubt it? And Christ Church and Hampton Court, though mutilated, bear sufficient testimony to his knowledge and love of that excellent art of architecture which none but superior minds should venture to meddle with, for if it makes greatness and wisdom conspicuous to the world, it makes folly so too, and therefore the more contemptible. Architecture is the natural constructive instinct of a great mind, the throwing off into palpable form of high thoughts. It is a part of that noble constructiveness which would build up institutions, the practical language of a governing mind. It is an empire in itself, in which genius loves to reign and be supreme. It was highly characteristic of Wolsey. We believe all really great men love architecture. A man who builds to himself a notable palace or house, and by his arrangements adequately shows forth and appropriates a fine estate, makes to himself at least a centre of the world, to which all things come or seem to come, and from which all thoughts radiate by enclosing apparently so much of the world's wilderness as he wants; all within his eye's reach is his real, and all without his imaginary domain. He creates the happiest delusion of space, regulates it by his own ideas, making it what he would have it and ornaments it to charm him. In a fair and noble mansion a man must, in some degree, feel himself a king, for his will has sway and room to move in. It has a tendency to elevate, to give him character, decision and that dignity which ever arises from repose within one's self; that need not be shoved and hustled from meditation and reflection by the too near proximity of ill-assorted things and persons. We look upon the taste for architecture as a national good. It is the means of raising families to a visible responsibility, giving them something to keep up and to hand down to others, greater than the littleness of uncultivated, unadorned republican man. The other arts require it, and all arts thus assisting each other, build up and constitute all that is beautiful in the world, visible and moral. How hard is it to give up anything we make and call our own. Now in nothing was Wolsey's superior greatness more shown than in the readiness of so large a sacrifice as Hampton Court. Had he pride, he had enthroned it here, but his pride was a part of him. Driven out forcibly from one palace, it had a sure refuge in himself. Nothing, no outward act of malice or tyranny, could rob the world's history of Wolsey. He knew it, and even in his fall was greatest. This noble fabric of Hampton Court was, however, readily resigned by Wolsey into the king's hands, who subsequently seized, too, his palace afterwards called Whitehall. It is a curious fact, and one that marks a visible retribution upon things, names and persons, whereby a sort of moral history of the world is written by a divine hand and carried on in continuance by striking incidents; it is a curious fact that these two palaces of Wolsey, as they are monuments of the rapine of royalty, so are they of the humiliation of royalty.

Da Vinci and Correggio.

The distinction betwixt the elements of art and science being kept in view, the strongest point of contrast between Leonardo da Vinci and Correggio is arrived at. In other respects they at once stand connected and opposed, but in this they belong to altogether different modes. In the instance of Leonardo it involves the essential character of his works. In respect to Correggio it is merely adventitious to that. Leonardo was mentally a seeker after truth—a scientist; Correggio was an assertor of truth—an artist. The whole endeavour and practice of Leonardo was experimental. His works are separate efforts, in many respects the one totally different from the other. Their sentiment is at times directed intellectually; on other occasions they appear to be regulated by moral impulse; and again, the expression of physical and material quality seems to constitute their intention. But in no instance can either be said to be thoroughly effected. In the method or material of their production there is consequently a corresponding variety. If there is any binding sentiment which may be considered to predominate in his pictures, it consists in a demoniac keenness in the expression of the heads, which leads away from and absorbs every other portion of them. If there is any prevalent method which may be considered at once to belong to such very differently produced works as the *Medusa* and the *Christ among the Doctors*, it

consists in a quality which was very general to the painters of the time, almost universal—their elaborately touched surface. His restless exertion attempted both the highest and lowest in art. It occupied itself with absurd and hideous caricature, and led him, after years of labour, to pronounce his picture of the *Last Supper* unfinished. He was an experimentalist, the necessary precursor to the unfolding of the discursive range of sentiment, the manifestation of which immediately followed. He is a dependent and aiding portion in the enunciation of Italian painting, and hence of that of modern Europe. Instead, therefore, of regretting the diversity of his pursuits—instead of lamenting their want of concentration—it should be seen that that which he aimed at was not compassed by any other individually; that the powers of the greatest names consisted in the enucleation of separate parts of that which his ambitious intellect yearned towards the production of as a whole; and that it was not until these separate manifestations had been made that another rose in Antonio da Correggio to take advantage of what had been done, and to attempt its union, but only to show that this was incompatible with the entirety of its different components, and that another limit—a distinct range of significance—was necessarily entered upon, less great and less worthy than those of Michel Angelo and Raphael, but although less extended and engrossing, more elevated than that of Titian.

Thirteenth-Century Windows.

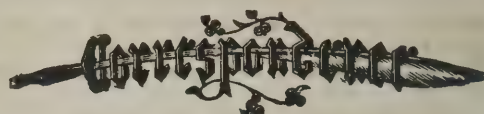
There is no feature which is more attractive than a well-designed early Pointed window. The refinement of the curves of the outlines and openings is well supported by the delicate skill with which the mouldings are divided and subordinated, some following the great enclosing arch, some the leading lines of the tracery, and others confined to the sub-cusping or foliation which fills in the spaces enclosed. Where this distinction between the mouldings fitted for serious work and those intended for enrichment only is not observed, there you may always assume pretty safely that the work, whether old or new, is not from the hand of a master of his art. One class of window, the rose or marigold, may be said to have been brought quite to perfection in the thirteenth century, not only in England, but on the Continent also, and examples of it are very numerous; the decided circular outline seems to have lent itself much more naturally to a filling in with geometrical forms than to any of the special features which marked the subdivisions of the tracery in the later styles of window tracery.

Wells in Roman Churches.

Many are the sacred wells in Roman churches whose waters the devout are eager to drink on particular festivals, and we may trace this feeling to its origin in the high idea of the baptismal rite predisposing to ascribe mysterious efficacy to the pure element. Both the reputed prisons of St. Peter and St. Paul contain such wells; another, at S. Maria in Via, derives its sacredness from a Madonna picture found floating on it in the year 1253. In the Benedictine church of St. Callisto we see, through a door beside an altar, a well of great depth and width, quite unlike those of modern formation, in which Pope Calixtus I. suffered martyrdom, being thrown from a window of the house where he had been confined and had converted a soldier, his keeper. In the adjacent church, S. Maria in Trastevere, is kept the stone said to have been fastened to the neck of St. Calixtus when he was drowned. Many large black stones of the species called *pietra del paragone*, rounded but flattened at two sides, are to be seen in Roman churches, preserved as records of martyrs; and such they may be deemed, for weights of stone used to be hung to the neck, the hands or feet when scourging was to be inflicted. It is supposed that for this purpose were employed either weights originally serving for trade, or those sometimes marked with numbers to indicate what the law allowed for securing the persons of debtors. Such objects when for trading purposes used to be dedicated to Hercules as the God of Traffic.

Gothic and Renaissance Construction.

Who can stand among the airy arches of Amiens, Cologne, Chartres, Beauvais or Westminster and not be filled with admiration at the mechanical skill and beautiful combination of form which are united in their construction? But, say the modern critics, they are only proofs and a bungling contrivance. Let us examine this. Are the revived pagan buildings constructed with such superior skill as to dispense with these supports? By no means; the clumsy vaults of St. Paul's, mere coffered semi-arches, without ribs or intersections, have their flying buttresses; but as this style of architecture does not admit of the great principle of decorating utility, these buttresses, instead of being made ornamental, are concealed by an enormous screen going entirely round the building. So that, in fact, one-half of the edifice is built to conceal the other. One of the greatest defects of St. Paul's is its fictitious dome. The dome that is seen is not the dome of the church, but a mere construction for effect. The upper part of St. Paul's is mere imposing show, constructed at a vast expense without any legitimate reason.



The Nude in Greek Art.

SIR,—On perusing the short article which appears in your issue of July 23 anent the above subject, I was struck with the unsoundness of your argument in support of the representation of nude figures.

To be brief. You say, "The sculptor should and will show us men;" but is it a *sine quâ non* to the practise of his art that he should show them to us in an absolutely nude state? I take it he does not do so from an anatomical or medical point of view, nor because there is anything particularly beautiful about it.

You also say, "He knows of no princess, no king and no king's son, he busies himself only with men." This is right so far as personality is concerned, but it does not do to apply this reasoning from a moral standpoint.

You further say, "The laws of propriety or need are not the laws of art." That is so, but should not, in the interests of morality, of refinement, of education, the laws of art be made subservient to the laws of propriety or need? or do the latter laws, in value, take a secondary place? I have always esteemed morality as the foundation of civilisation; undermine this and we might as well be savages.

"All in man that is not humanity is contingent." True, but is not our whole system of civilisation made up of a mass of contingencies? I take it that all those principles which are universally acknowledged to be good are not innate principles.

I have heard it said that if you are not an artist (alas! what a cloak this term affords for the covering up of immorality) you are not obliged to visit galleries and museums and the various places where are exhibited the figures so offending to your eye. Quite so, but are not these publicly exhibited, and because they are places designed for public entertainment and improvement, are they not the very places that distinctly invite inspection of such figures?

I am a great lover of true art, and cannot justly be accused of having "no eye for the artistic," but if art is to produce such brazen-faced apologies for girls and women as are to be seen daily sketching from the nude at the museums, &c., I think the less said about art the better.—I am, sir, your very obedient servant,

RONALD KELLY.

16 Southampton Street, Fitzroy Square, W.:
July 31, 1897.

GENERAL.

The Treasury have appointed a committee to consider and report upon the desirability of establishing a national physical laboratory for the testing and verification of instruments for physical investigation, for the construction and preservation of standards of measurement and for other scientific and industrial purposes.

The Primitive Methodists have erected during the past year sixty additional chapel at a cost of 61,736*l.*, of which amount 35,854*l.* has been raised. The Connexion appears now to possess 4,743 chapels, which have cost 3,738,257*l.*, of which sum 2,642,990*l.* has already been raised. These chapels provide sitting accommodation for 1,003,625 persons, and the number of worshippers is 588,505.

Mr. H. Partridge has presented a convalescent home to the village of Bletchingley, Surrey.

An Aisle is to be added to the chapel of Wellington College as a memorial of the late Archbishop of Canterbury, who was the first head-master appointed by the governors.

M. Ch. Girault, the architect of the "petit palais" in the Champs-Élysées, and who acts as consulting architect for the "grand palais," has been nominated a chevalier of the Legion of Honour.

The Birmingham City Council have decided to erect baths at Small Heath which will cost 25,000*l.*; a sum of 29,000*l.* is to be spent on the widening of Bull Street, and two underground lavatories will be constructed at a cost of 4,000*l.* Holly Moor Farm is to be purchased for 10,000*l.* as a site for a lunatic asylum.

Mr. George Elkington, senior member of the firm of George Elkington & Son, died in Worthing a few days ago. He practised in the City as architect and surveyor for about half a century.

The Monument of the late Lord Arthur Hervey, Bishop of Bath and Wells, was unveiled in Wells Cathedral on Wednesday. The tomb was designed by Mr. Pearson, R.A., and the figure of the bishop is by Mr. Brock, R.A.

The Architect.

THE WEEK.

ONE of the difficulties of a London architect when working outside the Metropolis is so to deal with patronage as to give satisfaction to local expectations. There is a jealousy against London, and to bring work from London is to expose oneself to allegations of unfairness. An unfortunate case has just arisen in Glasgow in connection with the new art galleries. Sculpture is to be introduced into the building. The architects have recommended that the greater part of it should be intrusted to Mr. E. FRAMPTON, an artist who has already manifested his competence to treat architectural decoration; on the other hand, Glasgow possesses a school of art, and years ago sculpture was produced under the direction of its architects which will sustain a comparison with similar work in London. In such a case a heavy responsibility is cast on whoever introduces a stranger, for the northern clannishness has to be disregarded. But architects can have no higher guide than their conscience. It would be well if a compromise could be arranged, for Mr. FRAMPTON's appointment is a slur on local ability. We are afraid, too, that the outcry on the subject will oblige the authorities on future occasions to restrict their competitions to Glasgow architects. If Mr. FRAMPTON could make out some relationship with Scotland there would be less grumbling over the importation of his work.

COTTAGE homes for workhouse children are likely to be generally adopted throughout England since the Aston Board of Guardians (that is, Birmingham) has this week resolved to expend 50,000*l.* upon them. Originally it was contemplated to expend only half that sum, but on the suggestion of the Local Government Board the scheme was enlarged and the expense doubled. Sixteen homes are to be erected. As there are not more than 250 children in the workhouse the outlay will appear to be 200*l.* a child, but in reality it will not mean more than about 8*l.* per child per annum; or, in other words, 3*s.* a week for housing alone. As a workhouse exists the expense is an extra, but it is a concession to modern notions of duty, and the improvement in the character of the children is likely to be worth the outlay. Whatever may be the result, cottage homes are becoming an indispensable addition in all unions which are controlled by men who are inspired by modern ideas.

AMONG the papers read at the meeting of the Iron and Steel Institute in Cardiff was one contributed by Mr. G. C. HENNING, of New York. He discussed the necessity which exists for a portable recorder for testing metals. Testing machines are very big and very costly, but we suppose it is found to be feasible to devise one which, without having the accuracy of an instrument of precision, would be perfectly trustworthy, and as correct as the other apparatus in connection with which it is used. It should cover a wide range of work of short and long, large and small, test pieces, such as are found in general use, and be applicable to hard and soft materials as well. It should also be applicable in a horizontal as well as in a vertical position. Moreover, it should give a complete record from beginning to end of the test, showing the more important elements on an enlarged, and the lesser on a natural scale. With the use of such a recorder it would become instantly apparent whether material had been previously intentionally strained to raise the elastic limit, as is well known to have been done. Over-heating of material would be clearly indicated by the change in the curve, and the general uniformity of any lot of material could be readily determined. The instrument should also be applicable for compression tests so as to record the behaviour of material when subjected to compressive stresses. There never was a time when the need for testing was more urgent than at present. The figures that are put forth as the result of experiments on the strength of materials are often amazing. The official world for a long time declined to admit that

75,000 lbs. per inch was not an exaggeration of the ultimate strength of steel, but in America from 100,000 lbs. to 200,000 lbs. are accepted as ordinary representations of strength. As a consequence many engineers become dubious, and steel is sometimes supposed to be worth no more than a 20-ton breaking strain.

THE smoke nuisance afflicts some of the American cities. There are edicts against it, but the penalties are of such a nature which cannot be enforced. The chief smoke inspector in Chicago divides the inhabitants of that city into two classes:—(1) Those who create a smoke nuisance; (2) those who are compelled to tolerate a smoke nuisance. One class has radical champions, who maintain that smoke is an irrepressible necessity—a concomitant of the commercial and manufacturing supremacy of Chicago; that smoke not only is not unhealthy, but that it is an actual disinfectant; that the advocates of smoke abatement are visionary sentimentalists, and, in a general way, they are emphatically opposed to any agitation of the subject." The second class "declare that the smoke nuisance is a positive menace to the health of citizens; that it has resulted in an alarming increase in throat, lung and eye diseases; they point to ruined carpets, paintings, fabrics, the soot-besmeared façades of buildings and to a smoke-beclouded sky, and demand that the smoke inspector do his plain duty under the law." In Chicago there are more than 15,000 steam-boilers, 12,000 of which consume soft coal. These are distributed over an area of 186 square miles. The inspector says: "I know of an instance in which a restaurant firm so consumed 600 dols. worth of coal as to cause an actual damage to adjacent property exceeding 25,000 dols." He also cites "an apartment building, under the management of a receiver, protected by the court against the enforcement of the smoke ordinance," which, he states, "ruined the furniture and furnishings of every residence for two blocks in its neighbourhood, and depreciated the value of adjacent real estate more than one-third of its former value." Professor R. H. THURSTON, who is a recognised authority on engineering science, advocates a system of fines that would make the production of smoke more costly than its prevention. A fine of 25 to 50 cents a month per square foot of grate, he says, would be more than sufficient. He is supported by other scientific authorities.

CLAUSE 170 of the London Building Act of 1894 is one of the longest. It empowers the County Council, after obtaining a magistrate's order, to enter on premises where there is any contravention of the Act, to demolish or alter the building, remove and sell the materials, and recover any deficiency from the person committing the offence. A decision given by Mr. FRANCIS in the South-Western Police Court on Tuesday would make it appear that a change of ownership does not prevent the action of the County Council or diminish the liability. Mr. SCHIEFER, a builder, was in March last fined 10*s.* for erecting wooden structures at the rear of some mansions without the leave of the Council. As they were not removed, he was again summoned for the recovery of the cumulative penalties, but the summons was dismissed, because the Council had proceeded under the wrong section of the Act. A new summons under Section 170 was therefore taken out, and a magistrate's order empowering the Council to enter the premises and demolish the illegal structure and charge the defaulter with the expenses was sought. Defendant's counsel raised the plea that his client, having parted with the property since his conviction in March, had no longer control over the structures. The magistrate said the section of the Act was clearly intended to reach the premises without reference to the owner or occupier. Certain buildings were condemned, and the important thing was to demolish them. If the defendant would not do it, no question of ownership could stop the Council from carrying out the order of condemnation. A decision in favour of the Council with two guineas costs was given. On the application of the defendant's counsel, his worship agreed to grant a case for the consideration of a higher court.

THE GALLERY OF APOLLO IN THE LOUVRE.

ONE of the reasons which the President of the Royal Academy gave for his proposal to remove the Wallace collection to new buildings at Trafalgar Square was that a sort of gallery, corresponding with the Galerie d'Apollon in the Louvre, could be established with the help of the furniture. It is needless to say there is not much furniture in the Paris gallery, unless under that name we comprise the gilded cases which contain the treasures of the goldsmiths and miniaturists' art and the marble tables which are used as stands for caskets. But the gallery, although it is without any pictures, except the figures of artists high up on the walls and the ceiling paintings, is as entrancing as the Salon Carré. The visitor's attention by means of it is diverted from the duty of discriminating between various schools of art, and it would be an unquestionable advantage if something similar could be introduced in our National Gallery. At the same time it was well that the proposal was not adopted, for the Wallace collection is, all things considered, in its most fitting quarters in the mansion in Manchester Square. We may, however, be allowed to take the opportunity to consider the history of the beautiful gallery which was in Sir EDWARD POYNTER'S thoughts.

The majority of visitors to the Louvre do not realise that if ever a building could be considered as "a thing of shreds and patches," it is the great Palace of Art. Even with the aid of the numerous series of plans and drawings, it is difficult to imagine that for centuries there was no unity among the buildings, and that the existing dispositions would surprise any of the National Guards who fell in the contests of 1848. What is now known as the Galerie d'Apollon was subjected to as many modifications as any other part of the buildings. It is uncertain whether it was part of the additions undertaken by CATHERINE DE MEDICIS and attributed to her son; but apparently a gallery in that position was completed by HENRI IV. It replaced a terrace, and formed a part of a wing that was intended to form part of the royal apartments. By SAUVAL, two architects—PLAIN and FOURNIER—are said to have had charge of the works, but there is no other evidence of their existence. It is more likely that the gallery was among the extensive works directed by DU CERCEAU towards the close of the sixteenth century, and which were intended to form a residence that would not be connected with the old Louvre or with the Tuileries.

There is nothing to show that the gallery was originally dedicated to the Sun-god. But from the first it was adorned with paintings by BUNEL, PORBUS and BREUIL. Between the windows were full-sized figures of the kings of France from SAINT LOUIS to HENRI IV., with their wives. In order to insure accurate likenesses BUNEL and his wife travelled through France in search of contemporary portraits, costumes and details. The portraits were not confined to the rulers. There were also busts of the men who were distinguished in the different reigns. In that way was created a characteristic of the Louvre, for the outside now displays so many portrait statues, it has more claim to be considered as a dedication to the *grands hommes* of France than the Panthéon itself. The designs for the ceiling paintings were entrusted to BREUIL. Some subjects were derived from the Old Testament, others from mythology. The artists all belonged to the school of Fontainebleau, and the slightest engraving from their works would be invaluable as suggesting whether there was any progress among French painters. But no provision of that kind was made, and in 1661 the pictures were destroyed by a fire, which injured other parts of the aisle containing the gallery.

LOUIS XIV. was desirous to have the gallery restored, and entrusted the task to LE BRUN. That artist could adopt his master's words and say, "L'Art c'est moi!" He made sculpture subject to painting. The figures which were lavishly introduced were designed by him, and executed by GIRARDON and three other sculptors. The king offered a premium of 300 louis to whoever among them was most successful, and the choice fell on GIRARDON. The ceiling paintings and panels on the walls were undertaken by LE BRUN, but were never completed. Out of compliment to LOUIS XIV., the "Roi-Soleil," on the ceiling he proposed to paint APOLLO in his chariot, surrounded by figures of the Seasons, Aurora, Muses, &c. That

was the central composition. At the extremity was a scene representing Night, and the corresponding position was filled with a *Triumph of Amphitrite*. The last alone was completed by LE BRUN.

The death of the painter and the financial embarrassments of the king suspended the operations. The unfinished gallery was ill-adapted for state ceremonies, and was employed for exhibitions. LE BRUN'S pictures were hung there. Then a collection of casts from the antique was placed in it for the benefit of students of the Academy. The next step was to break it up into ateliers. It remained in a degraded state for over seventy years. In 1764 it was resolved to do something towards the restoration of the gallery. There were new ideas about economy prevailing, and it was supposed the decoration could be accomplished without the cost of a sou to the State. The French Academicians were under an obligation to present a painting on their election. By compelling each of them to fill one of the compartments of the ceiling or a panel, the rule of the Academy about diploma works would be observed, and in course of time the vacant spaces in the gallery would be embellished. The process was slow, for Academicians were not elected every year. In seventeen years only four "cartouches" were obtained.

During the revolutionary tempests and the Imperial wars which followed, the state of the Galerie d'Apollon excited little commiseration. It served for the Salon exhibitions, which sometimes did not continue for a month. Owing to the dampness, the plaster figures and ornaments gradually decayed and the subjects of the paintings were recognised with difficulty. The roof suffered most. In 1826 it was decided to construct a new one in wood, care being taken to preserve, where practicable, the sculptured and painted decoration. Under the direction of FONTAINE the difficult work was carried out with success.

In 1848 another restoration was commenced under the direction of DUBAN, the architect. EUGÈNE DELACROIX agreed to paint the central work of the ceiling, the subject being APOLLO slaying the python, and he produced one of his most characteristic works. No ceiling painting executed during the century surpasses it, and one can hardly believe that LE BRUN'S work, which was intended for the same position, would have approached it in effect. CHARLES MULLER painted an *Aurora* partly from a sketch by LE BRUN. There are on the ceiling some compartments by eighteenth-century painters, and the whole gallery is worthy of a royal palace.

It would be possible, by levying contributions on the South Kensington and the British Museums, to bring together collections that would look as well as those found in the Gallery of Apollo. There would of course be one great deficiency, as we could not have a display of Crown jewels, but that need not excite much regret. What we dare not hope to have would be the casket of the treasures—that is, the glorious room which seems to exemplify French decoration in its most grandiose form. Unless the walls and ceiling were as beautiful as those of the Louvre the Trafalgar Square gallery would be a disappointment. It would be a victory to be able to compete with the French, but as regards their Galerie d'Apollon, we must remain behind them at a respectful distance.

ASBESTOS.*

THE qualities of asbestos were exactly of the kind which were likely to excite amazement in a primitive or an ignorant age. Men felt themselves compelled to submit to nature as an unknown power that was omnipotent and not disposed to mercy. They did not dare to arrogate to themselves any competence to become its interpreter. But they felt satisfaction when they discovered that nature could have failings like themselves. Hence the fascination of *lusus nature*. Asbestos might be classed with them. To have a material resembling tow, silk or thread amidst the hardest rocks suggested a departure from nature's ordinary course, and one that was unsuccessful. For asbestos must at all times have suggested something that was commenced but never completed, an immature transformation—

* *Asbestos and Asbestic*. By Robert H. Jones, F.S.A. London: Crosby Lockwood & Son.

in one word, a freak. When the discovery was made that, light and flossy as was the stuff, it resisted man's most terrible enemy, fire, and in that quality was almost unique, we might expect that it would receive the honour belonging to a great protector. But the scarcity of the material, and the difficulty of manipulating it, so far restricted its use that it could not be considered as worth classifying among beneficial things. A chief or a rich man might have the satisfaction of considering that his ashes or his corpse would be preserved in a piece of stuff that was made from the material, but they must have been loyal followers who could take a personal interest in a post-mortem privilege of the sort. It was easy to use the filaments for wicks, and by that means some of the so-called inextinguishable lamps of the temples may have been produced. The ancient magicians may also have employed asbestos as a deceptive agent. But, as well as can be made out, the early applications of the material were limited, and if judged by modern notions, were unimportant.

The earliest account of asbestos which is based on observation is found in MARCO POLO's travels. The following information was given on the authority of a Turk named CURCIFAR, when speaking of the products of the Province of Camul:—"In this province there is a mountain where are mines of steele and audanicum, and also salamanders, of which cloth is made, which if it be cast in the fire cannot be burned. A certaine minerall of earth is found in that mountain, which yieldeth threads not unlike to wooll, which, being dried in the sunne, are bruised in a brazen mortar and afterwards washed, and whatsoever earthy substance cleaveth unto them is taken away; lastly, those threads so purged and made small are spunne, like other wooll, and woven into cloth. And when they will whiten those clothes, they cast into the fire for an houre, and then they are taken out of the flaming fire unhurt, whiter than snow. After the like manner they cleanse them when they have taken any spots; for no other washing is added to them besides the fire."

As a contrast to the thirteenth-century practice which MARCO POLO describes, we give Mr. JONES's account of the process now followed in the works of the United Asbestos Company, Limited:—

The crude asbestos, when extracted from the mines in rock-like blocks of fibre, is packed up in bags containing from one to two hundred weight each, which bags are brought over to England, and discharged into lighters in the Thames, whence they are conveyed, by way of the Grand Junction Canal, to the Company's works at Harefield, in Hertfordshire. Here the bags, on being opened, are found to contain the asbestos in rough lumps, from the size of a man's head to about as much as one man can lift. And here all classes of asbestos goods are manufactured in the several forms in which they are now offered to engineers and others.

The company's works are divided into several departments. First, there is the sorting and opening department, where the crude asbestos is dealt with. The blocks of fibre or "rock" are crushed, and opened up by special machines, in such a way as to loosen, without destroying, the fibre, but rather to free it from the material which compactly binds it together, and which, it will be observed, has no counterpart in the method of dealing with Canadian ore. The masses of fibre are passed thence to "shaking" machines, where the long fibre is separated from the short, and all particles of rock removed. The long fibre, suitable for spinning into thread, is then taken into the carding, and the short to the millboard and boiler-covering departments. The tanks here are each provided with a rotating beater, which maintains a thorough circulation by first taking up the fibre, then opening and drawing it out, and afterwards sending it on to be soaked, until it comes round again to the beater. The treatment of the long fibre in the carding and condensing department is very similar to that in a textile factory, but its appearance would be scarcely encouraging to one who had been accustomed to the weaving of cotton or wool alone. These latter staples, examined under the microscope, exhibit a notched, serrated or imbricated appearance, which explains the readiness with which these difficulties are overcome by special appliances attached to the condensing machines. As the fibre comes from the condenser in the form of silver or condensed thread, without any twist, it lightly folds itself in cans placed there to receive it, and is then taken to the spinning and doubling department, where it is twisted into threads of every degree of fineness required. The thread then passes to the weaving and braiding department, where it is made into various forms of yarn packings, tapes and cloth. The cloth is then taken to the indiarubber department, where

it is proofed, and made into what is known as asbestos and indiarubber woven sheathing, tape and rings for steam and other joints, as well as into rolled cloth and square block packings for glands.

The short fibre, reduced to fluff, is taken to edge-runners and ground, and prepared for the beating engines, where the binding material is added and the whole thoroughly incorporated, after which it is drawn into a receiving tank and placed in the millboard machine-room. From this tank it is conveyed to the millboard machine, to which agitators are attached to keep the fibre from settling. The water is drawn off, through a fine wire gauze, on a revolving cylinder, on which it leaves a thin coating of the asbestos pulp. This is then taken off by an endless band and transferred to a second solid rotating cylinder, where it steadily accumulates till the desired thickness has been reached. It is finally cut across and removed in the form of a square sheet of millboard or paper.

The old asbestos-weavers of Camul would be amazed at the long series of operations to which the material is subjected. But more mysterious would appear the uses to which it can be converted. Following the order in Mr. JONES's book, we find asbestos employed as packing for machinery, millboard, gasket, rubber-cloth sheeting, boiler and pipe coverings, lining of furnaces, fire felt, felt for flues, breechings, bulkheads, quiltings for boilers, coverings for boiler-tops, &c., sponge for protection against freezing in pipes, electrotherms for households and hospitals, electric heat pads, electric car heating, insulating, asbestos packed side bars, closing breeches of big guns, miners' lamps, coating for ironclads, torpedoes, time-fuses, dynamite shells, military aeronautics, stove-pipe shields for tents, awnings for waggons, safes and deed-boxes, carriage of explosives, lint, hospital purposes, &c. For many of these purposes other materials are combined with asbestos, but unquestionably it imparts to them the qualities which are most prized in the market.

The employment of asbestos in connection with building is manifold, especially in the United States and Canada. One American company produces from two to four miles of asbestos roofing daily. It consists of "a strong canvas, combined with a superior quality of felt, made expressly for the purpose, with a manilla lining or backing; these materials are rendered waterproof and cemented together with a special acid and waterproof composition, and compressed into a compact flexible sheet like leather." The felt is also employed for lining weatherboarding, partitions, &c., and as sheathing. One of the building laws of New York orders that in theatres "the proscenium opening shall be provided with a fireproof metal curtain, or a curtain of asbestos or similar fireproof material," thus placing asbestos on the same level as metal for safety. In Philadelphia the underwriters offered to reduce the premium on the Academy of Music if an asbestos curtain was introduced. All the theatres in Rome are provided with them. One of the Brussels theatres has been coated with a mixture of asbestos and alum in order to render it incombustible. Mr. JONES is confident that in the United States "the use of asbestos in some form or other will be made compulsory for the shelvings and doors of public libraries and places for the custody of records, for sheathings between wooden floorings and below carpets, for hearthstones, for the linings of doors of elevators or lifts, for elevator shafts or stairways, and for the innumerable other places exposed to danger from flame or intense heat."

Can it be assumed that the supply will be equal to the demand? Asbestos is limited in quantity, but as it is likely to be found wherever there are serpentine rocks, there need be no apprehension of a deficiency for many years to come. At present Italy and Canada are the chief productive regions. There is serpentine in the United Kingdom: unfortunately, the asbestos that should accompany it is so limited as to be without economic value. Ireland seems to be doomed to immaturity. The bogs are full of premature coal, and the serpentines in Mayo, although so beautifully marked as to be fit for decorative purposes if they were brought to London, cannot tempt speculators in asbestos. Mr. JONES, as a specialist, was sent over to examine the veins, but found them only tantalising. He tells us how he found "such abundant indications as proved ample justification for the expectations which had been raised, but nowhere, unfortunately for the inhabitants of that poverty-stricken

district, could one be justified in recommending any great outlay to be incurred in the hope of attaining any favourable result." It is some consolation to know that Canada, Newfoundland, South Australia and New South Wales can yield supplies, and in the British possessions in Africa asbestos is also likely to be found.

The wonderful success of the Danville Mine, near Quebec, is moreover enough to encourage investigation, for there a material now known as asbestic has been discovered, which serves as well as asbestos for some purposes. The former owner of the property suffered through want of money while a fortune was under his feet. After the closing of the mine, a Mr. BOAS was invited to make an effort to utilise the property. Mr. JONES, when at the mines, estimated that "the whole mass contained, at least, 90 per cent. of good merchantable asbestos or asbestic," and, in fact, all that used to be considered waste can be utilised.

The volume by Mr. JONES is the work of a gentleman who has studied the phenomena connected with asbestos in most parts of the world. His descriptions being derived from what he saw are most vivid, and it is no exaggeration to say that although his pages are inspired by the sober spirit required in treating of business subjects, they are no less fascinating than those which have immortalised HUGH MILLER. "Asbestos and Asbestic" is a geological romance, while serving as a guide to financiers and speculators.

ELECTRIC WIRING.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

LOOKING back to the early days of electric lighting, it must be noticed that the progress made in the methods of wiring used have not been so great as in other branches of the industry. The reasons for this are easily found. Most of the profession have been engaged with the more interesting portions of the subject, and the engineers who have been engaged in the wiring business have usually not had the time to devote to improvements. They have been content with wood casing for years; no real improvements having been suggested until about three years ago. About this time the interest in the subject of wiring revived, and the only people who now lag behind are the fire insurance inspectors, these gentlemen; however, are usually not electrical engineers, although they criticise any new system submitted to them.

In the early days the wires were either fastened to the walls by staples or saddles, or embedded directly in the plaster. This reminds one more of electric-bell work than of electrical engineering; it is, in fact, unmechanical as well as defective electrically.

Another system in use, chiefly on the Continent, is to fix small insulators into the walls, fixing flexible cord to these by splitting the twisted wires and springing them over the insulators. In other cases bare wires are bound to insulators, and in others ordinary insulated wires are fixed to them. These systems are, in England, usually confined to factories, &c., where appearances need not be studied, and are omitted here, as buildings of a more ornamental character will be considered only.

The next step was that of cleating wires to the walls, and this was followed by a continuous cleating, that is, casing. This is the method now so generally used of running the wires in a wooden moulding fastened to the walls, and has been in use for many years, but it has been recognised by electrical engineers that it is not all that could be desired.

This is the first system that will be considered in detail, but it would be advantageous to formulate the conditions which a perfect system of wiring should comply with before doing so:—

1. Safety from fire risk.
2. Good protection for wires.
3. Accessibility.
4. Impossibility of inferior work.
5. High electrical insulation.
6. Low cost.
7. Ease of extension.
8. Good appearance.

It is practically impossible (at the present time) to

name a system which will comply with all these conditions, but the various systems can be compared with the standard. It must, however, be borne in mind that no one system is suitable for every case; local conditions must be fully considered.

It is a fact that if special care is taken a wood-casing system may be carried out so that the fire risk is negligible, but if any carelessness is allowed there is no doubt that the fire risk may be heavy. Let us consider the materials. An indiarubber covered wire (inflammable) enclosed in a wood casing which the insurance companies direct to be shel-laced, avowedly to keep the damp out, but which practically increases the inflammability. It is impossible for a nail to be driven through both wires, so a short circuit will not be developed, but an earth. The insurance companies insist that the wires shall be separated from each other, with the idea of preventing a short circuit. If there is an earth on one pole of the installation, and assuming a little damp, the wire will be gradually electrolysed and corroded until two fine points are made, when it is eaten through. The current passing along the wire arcs between these, dries the casing and causes a fire. If the wires were not separated both would be earthed together, the fuses would go, the circuit be entirely disconnected, and attention drawn to the matter.

Wood casing is a fair mechanical protection, but there is a great temptation to drive nails for pictures, &c., into it, owing to the difficulty in getting a nail to hold in ordinary walls. It is not, of course, waterproof. The chief point urged for wood casing is that it is accessible; but even in surface work the capping, if taken off, cannot as a rule be replaced neatly owing to the bunching of wires. When buried in plaster, as is usually the case, the wires are really inaccessible without damaging the decorations.

With regard to the possibility of inferior work this is rather high. Even with surface work the wires and joints are seldom seen when the work is being carried out, and it is not practicable to remove all the capping afterwards, so only certain places are taken. The quality of the work cannot be tested by taking the insulation resistance on completion. In one case which came under the notice of the writer, the fillet of the casing was cut away to within one-eighth inch to make room for bunched wires; this is contrary to the rules under which the work was carried out, yet it was only by chance that it was discovered. Joints are often made so that they are not water-tight, and conductors are frequently of less section than specified. Where conductors pass through walls they are seldom run through porcelain tubes; usually they are put in "compo" pipe, and more often are left unprotected entirely. Again, the safety of the work depends upon the class of insulation used, as the casing is not waterproof, but it is impossible for anyone but an expert to tell the class of wire, even if he has a sample. The thickness of the insulation is practically no guide.

The insulation of this system should be fairly high, but it is determined more by the surface leakage over the porcelain fittings than by the insulation of the wires.

The first cost in houses, and, in fact, any place where neatness is desired, and where the length of wire and casing is great in proportion to the number of points, must be high, owing to the labour charges.

The system is generally inextensible unless new casing is put up, as fresh wires cannot be laid in the same unless allowance has been made for this.

The appearance of the system is of course unobjectionable if the casing is buried, and the surface work may look neat or otherwise, depending on the kind of decorations or the skill of the workmen.

We have now seen the objections to and the faults of wood casing, and will go into the systems devised for the purpose of improving upon it.

One system is that of employing iron barrel for drawing the wires into. This conduit is similar to gas-pipes: iron junction-boxes, &c., are made, and the wires are drawn in the last thing, when the decorative work is finished. This system is being largely used for the higher-class work in London.

Another and somewhat similar system is that which has been used in America for some time, and is now being introduced here as the interior conduit system.

The conduit consists essentially of bitumenised paper tubes, connected together by metal joints in a manner which is watertight. These paper tubes are buried in the plaster; joint-boxes and special blocks are provided; the wires, as in the iron barrel system, being drawn in later. These paper tubes are sometimes armoured with brass sheathing and sometimes are placed inside iron barrel.

High-class cables and wires are used in the plain iron barrel system, and wires with thin insulation in the interior conduits.

Both these systems must be taken on a higher level in every way than wood casing, and the fire risk is very low. Both wires being in one tube (the wires being often twin), it is practically impossible to injure one wire without the other, as a short circuit is produced which immediately blows the fuse and disconnects the circuit. It is very difficult to see any objection to the iron barrel system, or to the iron armoured interior conduit, as they are gas, water and fireproof; any arc in the pipe will hardly produce sufficient heat before the fuse blows to ignite even the most inflammable material surrounding the pipe.

The protection for the wires in the iron conduit is perfect, while in the paper interior conduit it is quite as good as wood casing. There is some danger of damaging the wires with the iron barrel system, especially during drawing in, and the insides of the pipes should be rymered out before being used, and with careful drawing in any serious damage may be avoided.

There is perfect accessibility; any wire can be drawn out without removing anything but the lid of a junction-box and perhaps a fitting or two.

There is much less liability to bad work with these systems than with wood casing, and any bad joints in the pipes, &c., can be found by a simple air-pressure test, preferably before plastering. All joints in wires are in junction-boxes or fittings, and can thus be examined easily. This is a great point in its favour. The great disadvantage of the system is the want of flexibility of the conduits, &c. The insulation resistance will be about the same as with wood casing. The first cost is high, being from 50 per cent. to 5 per cent. above that of wood casing, and if the tubes are put in fairly large to commence with extra wires can easily be drawn in. The appearance of any of these systems would be very bad for surface work, but they are primarily intended for buried work.

A modification of the iron barrel system for surface work in highly-decorated rooms, &c., is that in which brass tubes are substituted for iron barrel. These are placed under the cornices, and are also used as picture rails. Very neat and effective work may be done in this way.

There is an iron-armoured system which is not a conduit system, viz. the concentric, in which rubber-covered wire armoured with iron wires is fixed up to the walls, the iron armouring serving as the earth return. This system has met with some success, and its advantages are somewhat similar to the concentric system. It is, in fact, the connecting link between the conduit and the lead-covered systems, which will next be dealt with.

The lead-covered systems have one thing in common. In every case the two conductors are enclosed in one continuous lead sheathing, which is watertight and flexible. The conductors are in some cases arranged concentrically and in others they are twin.

The first used system of this class was the concentric, earthed outer. Here the inner conductor is insulated with jute impregnated with a resinous insulation. The outer conductor consists of copper strands, on which is pressed a continuous lead covering. The iron-armoured concentric mentioned above differs from this in the fact that the lead-covered is watertight and the iron-armoured is not.

Special concentric fittings, switches and lampholders are used with both systems, the idea being that the insulated conductor shall always, even in switches, be surrounded entirely by the outer earthed one. Iron armouring is sometimes stranded over the lead in the latter system where the wire is exposed to mechanical damage.

The fire risk is reduced to a minimum with this system. Any fault in the inner wire *must* develop a short circuit, blowing the fuse long before a fire can be caused. There must be gross carelessness in erection if any combination of circumstances can cause a fire. Of course, if the fuses are

replaced by thick copper wires, and if the joints are made badly, a fire may be caused, in the latter case by electrolysis of the outer wire and its subsequent destruction causing arcing; but these are practically the only points to be guarded against.

With regard to accessibility, this is the chief fault, as the appearance of the joint boxes, &c., is against the system for surface work. If buried in the walls, the wires and, worse still, the joints are inaccessible.

The protection for the wires is good in the case of armoured, and as good as wood casing in the plain lead-covered wire. The possibility of bad work is, I should think, about the same as with a conduit system. The insulation is high, and the cost does not exceed that of wood casing by more than 15 per cent., and this is due to the cost of special fittings which are patented. There are no facilities for extension, and with regard to appearances, although the wires are themselves not so unsightly, the joints and special fittings are very objectionable; but, if buried, most of these objections disappear. The great disadvantage is that with such a system the outer conductor *must* be earthed, otherwise the method of jointing falls to the ground and the wires become bulky. The flexibility of the wire is certainly one of the chief advantages of the system.

A system somewhat on the same lines, but adapted for working on public supply circuits is the twin-wire lead-covered system. The twin wire is arranged so that it is very small (the branch $2\frac{1}{2}$ -ampère wires being only a quarter of an inch in diameter); being paper insulated, it is mechanically strong. The cheapness of this wire and the low cost of fixing enables it to compete successfully with any other system, and there is no doubt of the permanency and efficiency of the work. The lead covering is sweated into solder bases for switches, ceiling roses, &c., the ordinary fittings being screwed to these blocks, the whole is made water-tight by means of rubber rings, or a form of small end connection, &c., may be used. When joints are made the lead coverings are wiped as a plumber would make a joint in a water-pipe, but it is better for all joints to be at the distribution board or in switches, &c.

It will be seen that as no conductor is earthed the system can be generally applied, and as it is much cheaper than wood casing it will come into general use. The general advantages and disadvantages of this system are similar to those of the concentric. With this system it may be preferable to use a concentric cable for the larger mains.

No one system is suitable for every circumstance, and this must not be lost sight of when choosing the system. The iron conduit has many advantages for buried work, leaving out consideration of expense.

Having now gone into several systems of wiring, it may be well to take two cases, viz. that of a new building and an old one.

In the case of a new building it is to be regretted that the lighting is generally left until the building is nearly completed. The architect then naturally does not feel disposed to have his walls and decorations pulled to pieces, with the result that a surface system is adopted. If the matter had been settled earlier not a wire need be seen, conduits or pipes being run in a manner similar to that for gas and water-work. The wires need not be drawn into these conduits until the building is completed, thus obviating any injury to them or inconvenience to workmen.

If, on the other hand, a highly decorated building which is not new is to be illuminated, it requires a very considerable amount of skill and consideration to work in wood casing or moulding with the surroundings, but if done carefully a very good effect may be obtained. Brass tubing of small size (already mentioned) may often be adopted with advantage for the branches, being run under the cornices without the least reason for complaint as to unsightliness, the mains being run in iron barrel, or with concentric mains twin lead-covered branches may be used, either painted to match the surroundings, or with a brass fluting as a cover, or it may be covered by a wood moulding.

Sir J. Blundell Maple has offered to advance 3,000*l.* for the erection of club buildings in the grounds of the Royal Botanic Society.

DEPARTMENTAL MUSEUMS.

THE select committee appointed to inquire and report upon the administration and cost of the museums of the Science and Art Department have agreed to the following second report:—

Your committee have met twenty-seven times, and have examined witnesses, including Earl Spencer, a former Lord President, the Earl of Carlisle, trustee of the National Gallery and art referee in connection with the Science and Art Department, Sir Edward Maunde Thompson, Principal Librarian of the British Museum, the Secretary of the Science and Art Department, the Directors of the South Kensington and Jermyn Street Museums, the Director for Art at South Kensington, and also the Directors of the Edinburgh and Dublin Museums. Your committee have, by the death of Mr. Mundella, which they deeply regret both on public and private grounds, lost the advantage of the evidence which he was about to give to the committee on the subject of their inquiry. They have been unable to complete the inquiry in the course of the present session. They feel bound, however, to confirm and emphasise the recommendation of their first report as to the necessity of immediate action to secure the buildings against fire; and to express their sense of the importance of completing the building on the east side of Exhibition Road, with a view to the safe deposit and satisfactory exhibition of the art collections (including the Indian section now on the west side of the road in a hired building) at South Kensington. These collections are, in the opinion of the most competent authorities, of immense value in themselves, and increasingly fulfil the great national purposes for the promotion of which they have been brought together. Your committee have agreed to report the minutes of evidence taken before them, together with an appendix, and to recommend that the committee be reappointed at the beginning of the next session of Parliament.

BRITISH ART AT THE BRUSSELS EXHIBITION.

THE honorary secretary of the British Fine Art section of the Brussels Exhibition writes:—

It is probable that the significance of the awards made to British artists in the section devoted to the fine arts at the Brussels International Exhibition has not yet been fully realised in England, and I shall be glad if you will permit me through the medium of your columns to make a few observations to show what the results really mean. To do this it is necessary to compare the awards with those achieved by other countries, both as regards their number and the relationship of the number to the number of the exhibits.

In the class devoted to painting three Médailles d'Honneur were given, and of these one has been taken by England, one by France, and one by Belgium. Nineteen other medals have been awarded to British artists (eight first class and eleven second class), as against seventeen to French artists (eight first and nine second), twenty-one to Belgian artists (nine first and twelve second), eight to Dutch artists (three first and five second), and three to Italian artists (one first and two second).

If these figures be compared with the number of pictures contributed—Great Britain 315, France 435, Belgium 503, Holland 216, and Italy 69—it will be found that Great Britain has taken one award in every 16 pictures exhibited, France one in every 24, Belgium one in every 23, Holland one in every 27, and Italy one in every 23 pictures.

In sculpture Great Britain contributes but 22 works and has obtained three medals—*i.e.* one in seven exhibits; France has 86 works and obtained 12 medals, or one in seven exhibits, and Holland contributed 23 works and has been awarded three medals, or one in seven exhibits.

In the sections of engraving and architecture Great Britain has taken but one second-class medal in each, but in these arts we have been, as we expected to be, completely out-classed.

It will be noted that first and second class medals only have been awarded at this exhibition, third-class medals and honourable mentions usually given at international exhibitions having in the present case been abolished. Hence the comparatively few awards are of greater value; though, on the other hand, considerable injustice is done to many artists in an exhibition such as ours of a high level of excellence. To say of two works of nearly equal merit that one is worthy of a second-class medal and the other nothing at all is at once misleading and oppressive.

I am anxious to lay stress upon the fact, nevertheless, that these satisfactory results as regards the British section have been obtained in spite of the fact that many of the most attractive works are by artists now deceased, and that upwards of eight other leading painters have withheld their works from competition—all of them being thus disqualified from the award of medals. Otherwise it cannot be doubted that a still larger number of honours would have been awarded in our section.

Owing to the fact also that four other important exhibitions in England and on the Continent were being promoted at the same time as that at Brussels many of the finest English works were unavailable. These gratifying results, too, it may be added, were obtained notwithstanding that England—owing to the brief notice given by the Belgian authorities—was represented by only one vote upon the international jury and one voice in the proceedings to press forward English interests.

TESSERÆ.

English Village Churches.

IT must not be imagined that it is only in great abbeys and cathedrals that the thirteenth century was fertile. On the contrary, little village churches in all parts of the land illustrate the same possession of power on the part of the country architect or mason that we see in those who built the former. There are no examples more interesting than these, whether we take the Sussex village church, with its intensely simple lancet windows, its coved wooden roof, and its shingle spire; or whether the Northamptonshire churches, built of good stone, with much rich decoration in their detail, and adorned with towers and spires, which are the pride of the whole country; in all will be found the same extraordinary equality in detail and harmony in character. They bring before us the especial glory of England—the small village church—in perfection; and there is one feature in them which one may almost say is unsurpassed elsewhere. This is the steeple. Usually it is placed at the west end of the church, and surmounted by a spire. The outline of this is always of the most severe kind; an octagon placed on the square tower, with very simple spire-lights on the cardinal sides only, and a steep slope, and sometimes small pinnacles connecting the octagonal base of the spire with the square outline of the tower. Here, as in most works of the period, the effort seems to have been to obtain as simple and graceful an outline as possible, and to construct the work so that there should be as few elements of decay in it as might be. In later times, though the early broach spire was sometimes copied, it was much more usual to add parapets, flying buttresses and complicated pinnacles at the base of the spire, and thus at the same time to destroy the simplicity and diminish the stability of the work. The history of our village churches is of course involved in much more obscurity than is that of our cathedrals. We know but little indeed as to the architects or the builders of the latter, but nothing at all as to those of the former. And though an occasional reference may be found to some one man now and then in Italy, Spain and France, it is after all only a conjectural result at which one can arrive as to their condition or character.

The Interior of Milan Cathedral.

The first particulars which strike one on passing to the interior are that it is dark and gloomy, and that the leading lines are very much interrupted by the shrines introduced in the capitals of the piers, which injure also the apparent solidity of the building. And when we are told that it is nearly 500 feet long, 180 feet wide and 150 feet high, we can hardly believe it. Indeed, as to the last dimension one remains incredulous; for whether we estimate the height by a general comparison with the other dimensions, or from summing up the estimated heights of the different parts which compose it, or from counting the steps which lead to the outside and measuring some of them, it seems to fall short of 140; and it is necessary to be aware that the side aisles are 96 feet in height to be reconciled even to that supposition. To what we are to attribute this want of apparent magnitude is uncertain; the height of the side aisles certainly diminishes the appearance of that of the nave, but the width of the nave is not remarkably great in proportion to the other dimensions. At Amiens this is 45 feet 6 inches. In York, our largest cathedral, it is 47; here it is about 55. With all these defects, however, it is impossible not to acknowledge the sublime effect of the interior. The style does not correspond with any of our English modes of pointed architecture. The vaulting is simple, without any branching ribs or any ridge piece; it is so much supervaulted that each bay appears to be the portion of a dome; and the disposition of the materials in concentric circles, or in portions of such circles, makes one believe that this is nearly the case. The windows of the clerestory are extremely small and insignificant; those of the side aisles are long and narrow. They are ornamented with quatrefoils; but a division of the height into two parts by arched ribs, which have not precisely the effect of transoms because they do not cross the window at the same level, indicate a very different period of taste from that of the rose and quatrefoil heads in France and England. The lower part of the capitals has something of the running foliage of the fourteenth century in England; but the shrine-work which forms the upper part is

perfectly unique. The bases and the plans of the pillars are equally anomalous, and any person would be baffled in attempting to determine the date from the architecture; only he might safely decide that it could not be very early. The smallness of the upper windows produces a gloomy appearance and oppressive feeling, like that of the cavern style of architecture in the south of France, with which it has nothing else in common. The height of 78 feet, which is that of the lower range of aisles, seems, indeed, to give plenty of room for the admission of an ample quantity of light from this part alone, but such a disposition seldom produces a pleasing effect. There are three fine large windows in the polygonal end of the choir, but even these are ill-placed and have little effect.

The Archbishop's Chapel, Ravenna.

Noblest among specimens of fifth century work at Ravenna are the mosaics in the chapel built by St. Peter Chrysologus about A.D. 440, in the archiepiscopal palace. This palace is itself a curiosity, and one of its great halls contains a valuable museum of local antiquities, Christian and Pagan, mostly monumental; among the former series a fine apostle's head in mosaic, and some rich inlaid pavement from the now, alas! vanished cathedral. It is from this antiquarian treasury that we pass into the beautiful chapel, in plan like the letter T; and as we first distinguish by dim light the solemn figures and sternly expressive heads, the large-winged angels and sacred symbols on the golden groundwork of storied walls and vaults, the mind is possessed by a sense of the majesty of the ancient Church and her sacramental mysteries. We seem to have left behind the glare and follies of the world in crossing this threshold. Above a marble incrustation round the lower parts expands that field of mosaics in brilliant hues unfaded, as the quaint and massive architecture is alike intact, since the days when the emperors of a ruined state trifled away their fear-stricken lives at Ravenna. The Saviour is everywhere conspicuous and central here, represented as at different ages, but always at once recognisable. We see Him as a boy, with the twelve Apostles in a series of medallion heads; we see Him again as a youth of about eighteen years; with the same benignly beautiful features more developed; and again as a fully-matured man, still in mind and noble-looking, in costume like that of a Greek emperor, with tunic of gold tissue, purple chlamys with jewelled clasp at the right shoulder, in one hand a long red cross, in the other a volume open at the words of most blessed assurance:—"Ego sum Via, Veritas et Vita." His head alone among all here before us is crowned by the nimbus, and striking indeed is the superiority, the majestic benignity that distinguishes the Divine subject as here conceived by art compared with the repulsive aspect given to its form in another mosaic treatment of the same year, 440, at the Ostian Basilica, near Rome. On the vaults of this venerable chapel are the usual winged symbols of the evangelists, each with a jewelled book, and at the centre the holy monogram in a disc, supported on the uplifted arms of four angels—majestic creatures in long white vestments, whose solemn countenances express a kind of awful joy. The numerous other figures and heads of apostles and saints are characterised by general sameness of type, with eyes large and staring, forehead low and flat, lips full, the female heads all veiled, but with rich coiffure and braided hair in sight, except St. Felicitas, who has the head-dress of a nun. SS. Peter and Paul display the well-known types with which one is familiar even from the period of catacomb art. Over the altar is the only mosaic here of later date than the rest, one from the lost cathedral (twelfth century), representing the Blessed Virgin in act of prayer, with outspread arms, the head closely veiled, the figure in long purple robes, the aspect that of matron maturity, modest, severe—the unmistakable character here intended, that of the interceding mother, or rather the personified Church.

The Column of Phocas in the Roman Forum.

When the sunset-light gilds the ruins of the Roman Forum the eye is arrested by that lone column that stands isolate amidst statelier relics, and the Classic style of whose shaft and capital strangely contrasts with the rudeness of the plinth and basement raised on a quadrangular staircase; this being the monument that had so puzzled archaeologists before the disencumbering (1813) of its lower part from the soil in which it had been deeply embedded, brought to light the mutilated inscription on its plinth that records its dedication to a Greek emperor, not by Senate and people, but by Smaragdus, Exarch of Ravenna, Patrician of Rome, and Prepositus (or major-domo) of the Imperial Palace, who erected this column, A.D. 608, in honour of the despot Phocas, whose gilt bronze statue stood at its summit. That usurper had opened his way to the throne by the deliberate murder of Mauricius, his unfortunate predecessor, who was actually slain in his presence on the mangled bodies of his five sons, one an infant, put to death before their father's eyes. To this wretch is ascribed every imaginable virtue in the eulogistic epigraph; but, for the honour of humanity, it is satisfactory to know that not only was his statue cast down from

this column after his death, but his epithets of adulation—"optimo, clementissimo, piissimo, &c."—were partially erased, and the mention of that bronze image entirely so, from the inscription; so that, but for the name of Smaragdus, and the date by the year of indiction still to be read, this monument would be without any mark serving for historic identification. Phocas lost his throne and his life by revolution and assassination not long after his last detestable crime in ordering the widow and three daughters of Mauricius to be put to death, though he had given promise to the Byzantine patriarch to leave them unmolested in the convent where they had taken refuge. The memorial to such a ruler serves not only to perpetuate his guilt but to attest the moral degradation of the age and social state in which it could be erected.

Points of View.

If unity of point of view be a *sine quâ non* in a picture, how comes it that we allow a scene—depicted according to the laws of perspective, of light and of effect—to be so placed that the spectator is forced to look at it from a position 4 or 5 yards below its horizon, and possibly a long way to the right or left of this correct point? This has to be tolerated whenever monumental painting makes use of the processes proper for easel pictures. In the great epochs of art such enormities were forbidden. During the Middle Ages, in pictures painted upon walls at all kinds of elevations, painters never took into account either horizon, locality, effects of perspective or the rigid laws of light. Again, in the fifteenth and sixteenth centuries they resolutely grappled with the difficulty by composing the scenes to be represented in proper perspective, placing the personages and objects to be painted exactly as the things or people would themselves appear in the same situation. So we see in the ceilings of that epoch people who show hardly more than the sole of the foot, and others in which the knees hide the breast. Such boldness resulted in a great success. It is obvious, however, that if in such a method of decoration the horizon be supposed to be placed at a height of 2 yards from the ground, there would be only one point of sight, and that 2 yards above the floor of the room for the whole horizontal surface. Now so soon as the spectator shall move from this point of sight the perspective of the whole decoration will become false; all the vanishing lines begin to dance, and to give a feeling of seasickness to people who are accustomed to trust to the perspective power of the eyes. This system, however, can give good reason for its existence, since it had its origin, at least, in a reasoned out principle. It possesses a disadvantage, for it condemns the whole scheme of decoration of a room to appear true to one person alone—he who happens to occupy the proper point of view.

Ninth-Century Churches in Rome.

In the revival of Italian architecture from the Carolingian period, best exemplified at Rome by S. Maria in Cosmedin, S. Prassede, S. Maria in Dominica, SS. Nereo ed Achilleo, SS. Quattro Coronati, and in the towers of S. Vilestro, S. Maria Nova, S. Cecilia, S. Michele in Sassi (the last said to have been founded by Leo IV. especially for funeral Masses for the souls of those who fell in the defence against the Saracens, its beautiful tower and cornices the sole portion now left of the ninth-century building)—in this new style we see the tendency to admit more varied and fantastic ornament: terra-cotta cornices and corbels, inlaid work of coloured marble or earthenware on the dusky surfaces of those quadrate towers; small arcades with marble colonnettes, low porticoes or porches with heavy columns, mosaic friezes, and profuse decoration in the same art on the interior walls. Instead of the Classic capital a barbaric variation, sometimes in form a simple cube, takes its place at the summit of the shaft; and instead of the wooden roofing, with horizontal coffers or slanting beams, stone vaulting begins to be carried over the subordinate, though not yet over the principal compartments, as in chapels at S. Prassede and S. Benedetto in Piscinula, and in the aisles of the SS. Quattro. The campanili, divided into storeys of arcade-windows, with terra-cotta string-courses between, continued to multiply in Rome from the eighth to the thirteenth century, and are now indeed the sole structures, besides the picturesquely ruinous walls of the Leonine city, that remind us of Mediæval Christianity at this centre—at least, in the view of the city from high places. Such features as distinguish the public works of this period announce, indeed, a departure from the simpler type of the primitive basilica; but we may hail the innovation as proof, at all events, of life and progress, of art's correspondence with the age's impulse and feeling.

A Town Hall which has just been erected for the burgh of Prestonpans at a cost of 1,500*l.* was opened on the 9th inst. It provides accommodation for 450 persons, and was designed by Mr. Peter Whitecross, architect, Prestonpans.

NOTES AND COMMENTS.

IMAGINARY grievances are often the hardest to bear. Welshmen believe they are deprived of the dignity which is their due because the red dragon of Wales does not appear in the shield on one side of the coinage; it is also absent from flags and standards in which the royal arms are introduced. It was one of the subjects brought before the Eisteddfod at Newport. Principal RHYS, of Jesus College, Oxford, the President, maintained that Wales had as much right to be heralddically represented as England, Scotland or Ireland, but while Wales was deprived of all share, England held two quarters of the shield. The Welsh people, he said, had a sincere desire for the prosperity of the British Empire, but they would be more disposed to be brotherly towards their fellow subjects if they were treated with justice and regard for their feelings. One of the conclusions arrived at by the assembly was to move their representatives in Parliament and elsewhere to exert themselves to obtain a quarter of the shield for Wales. The Welsh do not appear to have given much attention to arms, and an expert in heraldry seems to have had no place in the organisation of society, but that is no reason to compel them to withhold a just claim, and the Welsh people form too important a part of the community to be unrecognised in any coat-of-arms which is a presentment of the constituents of this country.

A NEW use for the vapour of iodine has been found by Professor BRUYLANTS of Louvain. By its aid alterations in manuscripts can be detected. It appears that when a sheet of paper which has been sized and finished is moistened and then exposed, after thorough drying, to the action of vapour of iodine, the portion which has been moistened assumes a violet tint, while the remaining portion of the surface appears a brownish yellow. This principle may be used to produce a sympathetic writing, since if we write with water upon the surface of paper treated with ordinary size, the writing will appear in a violet colour when the dry paper is exposed to the vapour of iodine. The pale violet upon a yellow ground becomes a deep blue on a pale blue surface, when the paper is again moistened, and the characters disappear altogether under the action of sulphurous acid. When a manuscript is suspected of having been fraudulently retouched or altered, the use of the vapour of iodine will often serve to reveal the nature and extent of the alterations. Those portions which have been rubbed will become brownish in tint, and, when a rubbed surface is moistened after exposure to the iodine, it takes a blue colour, varying in intensity according to the duration of the exposure. The outline of the rubbed portions remains perfectly distinct after drying, being paler in tint than the rest of the surface. This action is evidently due to the removal of a portion of the starch contained in the size. These reactions also appear upon paper which has been entirely moistened and dried, as in the case of a letter copied in a press, but the indications are somewhat less distinct. The process will also reveal the existence of pencil marks erased by rubbing. Apart from any traces of plumbago which may have remained, the path of the pencil-point disturbs the surface of the paper, as would any blunt instrument, and, even when the rubbing has been so carefully performed that it has not removed any portion of the surface of the paper, the marks are made entirely legible when exposed to the iodine vapour. The clearness of all these reactions depends upon the character of the paper, and that which contains the smallest quantity of sizing material will naturally give the least brilliant effects; but in every case the changes above described will appear to a greater or less degree, and the use of the reagent in skilful hands should give material aid in clearing up disputed questions of this nature.

AN unusual exercise of authority by the Académie des Beaux-Arts has given rise to much discussion among French artists. In the competition for the Prix de Rome in the section of sculpture, the coveted award was found to be in favour of the model prepared by M. BOUCHER, who had studied under the three great sculptors, MM. FALGUIÈRE, CHAPU and MERCIER. Contrary to custom, the decision

which was arrived at by the members who are sculptors was set aside by the Académie des Beaux-Arts acting as the supreme judge. The Grand Prix was given to M. SÉGOFFIN, a pupil of MM. CAVELIER and BARRIAS, and the two other prizes to M. MAGROU and to M. VERMARE. It will be observed that the artist who was placed first by the jury is not considered worthy of an inferior prize by the Academy. So remarkable a difference among experts is deserving of more official explanation than is as yet forthcoming.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: TOMB OF THE BLACK PRINCE

PRINCE EDWARD must have been a man of remarkable precision, for the instructions he left for his monument are as detailed as if he were a sculptor and decorator. The greater part of his life was spent in the tented field, for he held a command at Cressy when he was barely sixteen. If all the amateurs of the fourteenth century were equally acquainted with details, it is no wonder the arts flourished. The BLACK PRINCE died at Canterbury and might be supposed to be well acquainted with the cathedral. But it is remarkable, that in his will he supposed that the body of St. THOMAS A BECKET was still lying in the undercroft, and his desire was for his tomb to be placed beside the martyr's. The spirit of the will was observed, and consequently the Prince's tomb was set up as near as possible to the famous shrine. One advantage was gained, for as the tomb is in one of the bays of Trinity Chapel the architecture becomes a setting for it, and its effect is enhanced to an extent that would be impossible if it stood in the centre of a chapel. The effigy in plate armour covered by a jupon and chain mail gorget is an excellent piece of work, and it is surprising that JOHN FLAXMAN did not refer to it when treating of English Mediæval sculpture. His connection with Cressy and Poitiers is enough to establish the Prince's reputation as a hero and a mirror of knighthood, but we cannot forget that, like ACHILLES, he could become inhuman. The massacre of Limoges a few years before his death reveals that he could give way to unmeasured cruelty. "There was not that day," says FROISSART, "a man in Limoges with a heart so hardened or so little sense of religion as not to bewail the unfortunate scene before his eyes. Upwards of three thousand men, women and children were slaughtered. God have mercy on their souls, for they were veritable martyrs!" The slaughter would have been greater if it were not for an incident which was recorded by MONTAIGNE. Amidst the general panic three French gentlemen were observed by the Prince to be attempting to resist his army. "Then it was," says MONTAIGNE, "that the consideration of and respect unto so remarkable a virtue first stopped the torrent of his fury, and that his clemency, beginning in the preservation of these three cavaliers, was afterwards extended to all the remaining inhabitants of the city."

LEAVES FROM SKETCH BOOK.

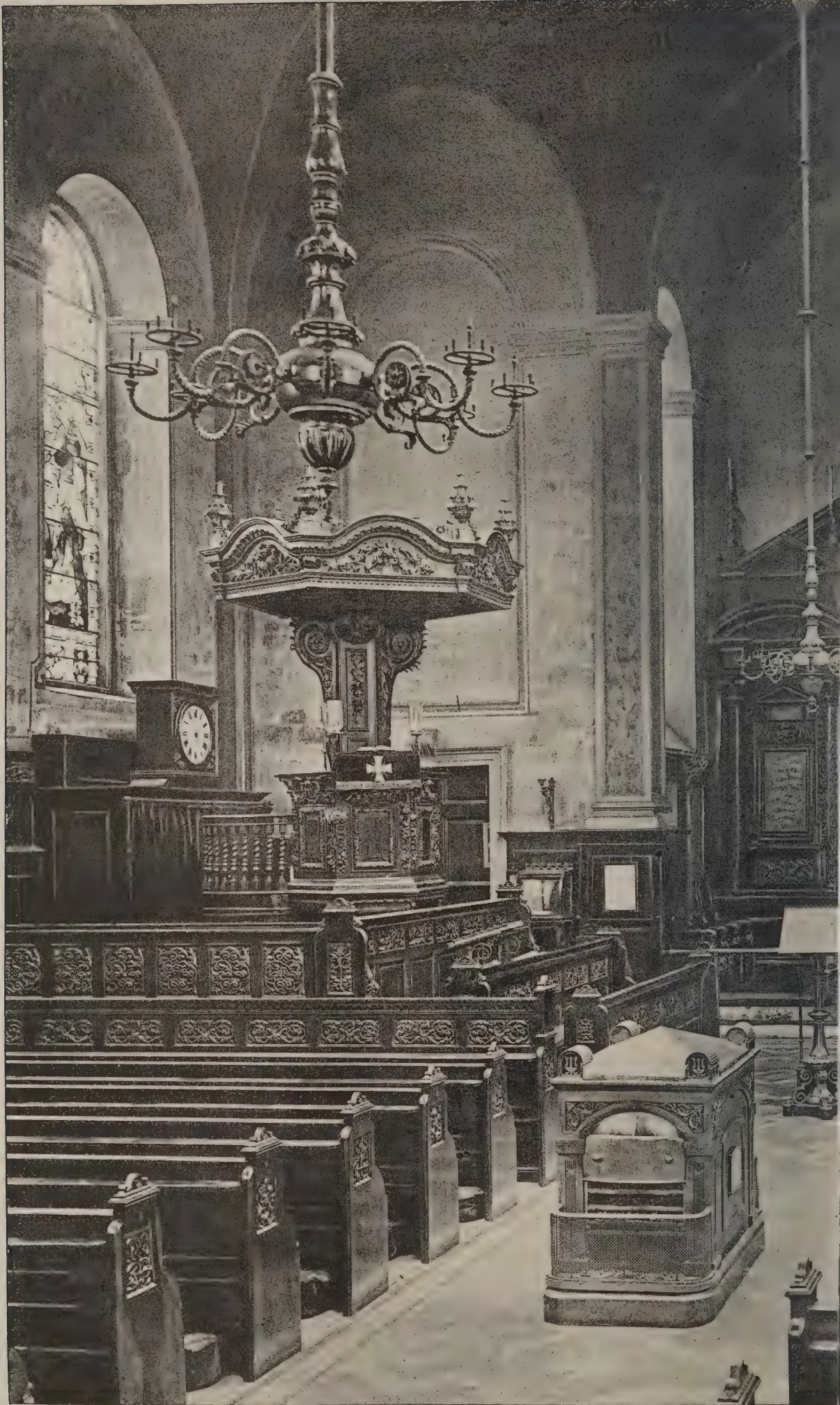
THE sketches by Mr. RAILTON which we give are all of English subjects, and suggest the character of the impressions which buildings make on his mind. Although quickly executed in order, as it were, that "the Cynthia of the minute" may not escape the artist's grasp, they contain sufficient materials to enable more elaborate drawings to be made from them, whether by the artist who had made them, or another who could not supplement them by recollection.

THE NATIONAL GALLERY OF BRITISH ART, MILLBANK, S.W.: INTERIOR OF GALLERY (THE GIFT OF MR. HENRY TATE).

THE gallery which is the subject of the plate contains some of the late Sir JOHN MILLAIS's pictures, *The North West Passage*, *Ophelia*, &c., as well as other modern pictures of lesser value.

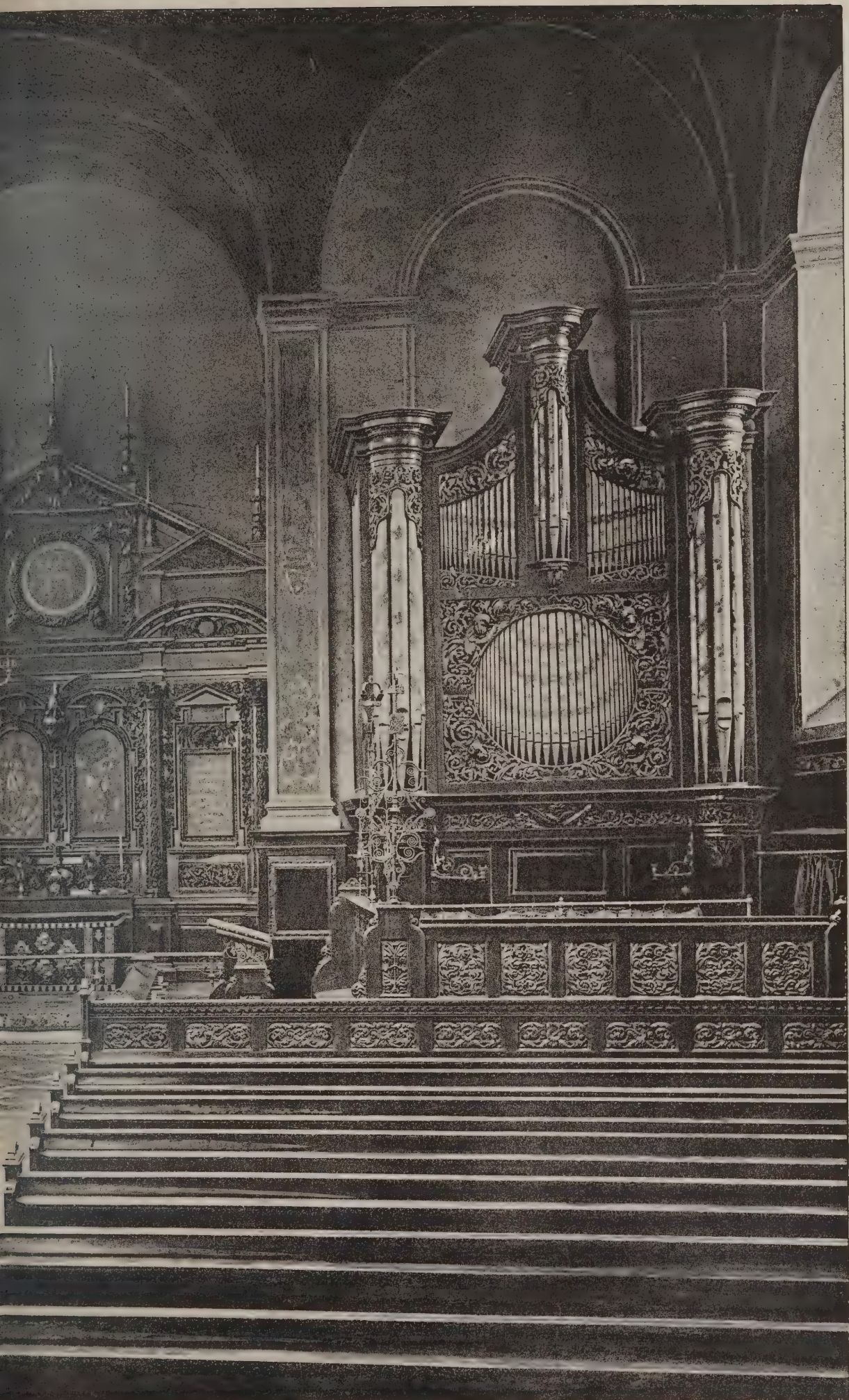
ALL HALLOWS CHURCH, LOMBARD STREET: GENERAL VIEW.

THE interior of All Hallows, by the quantity of carving, suggests the church of a wealthy parish, but it has been submitted to severe alterations since WREN's time.



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Aug. 13th 1897



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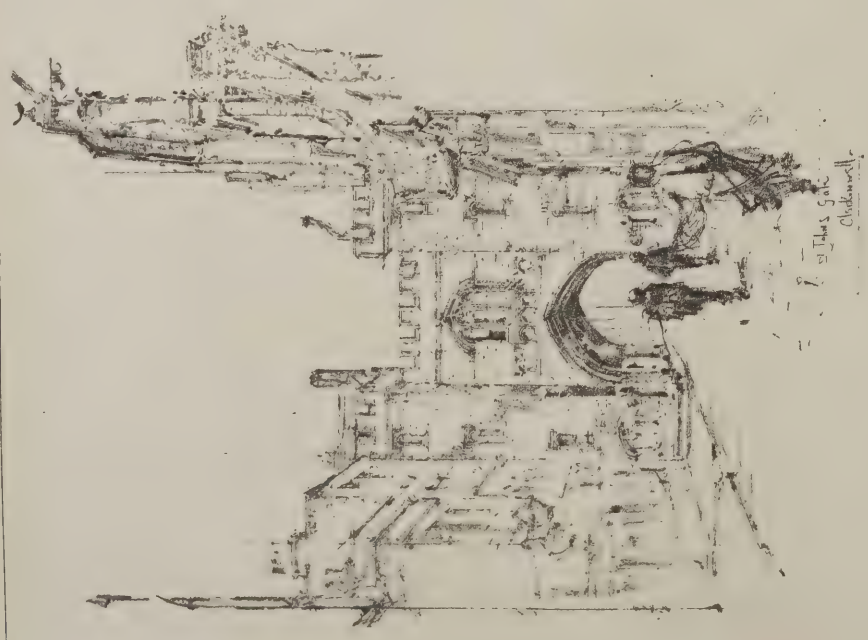
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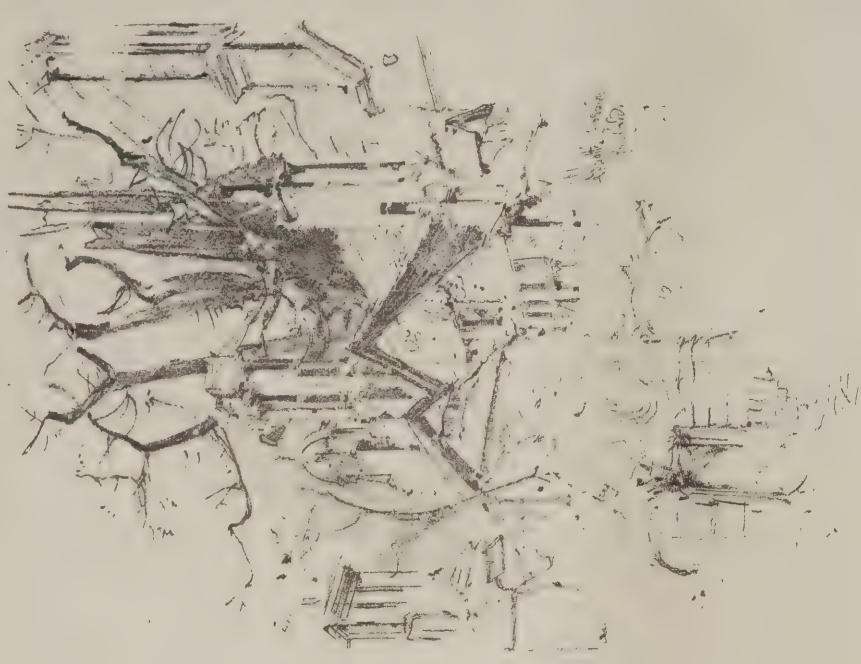


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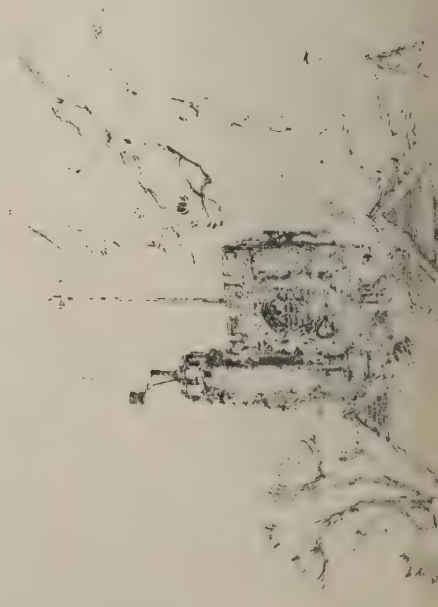
MILLBANK, S.W.: INTERIOR OF GALLERY.



of the Gate
Chelmsford



of the Gate
Chelmsford





St. John's Gate
C. 1840



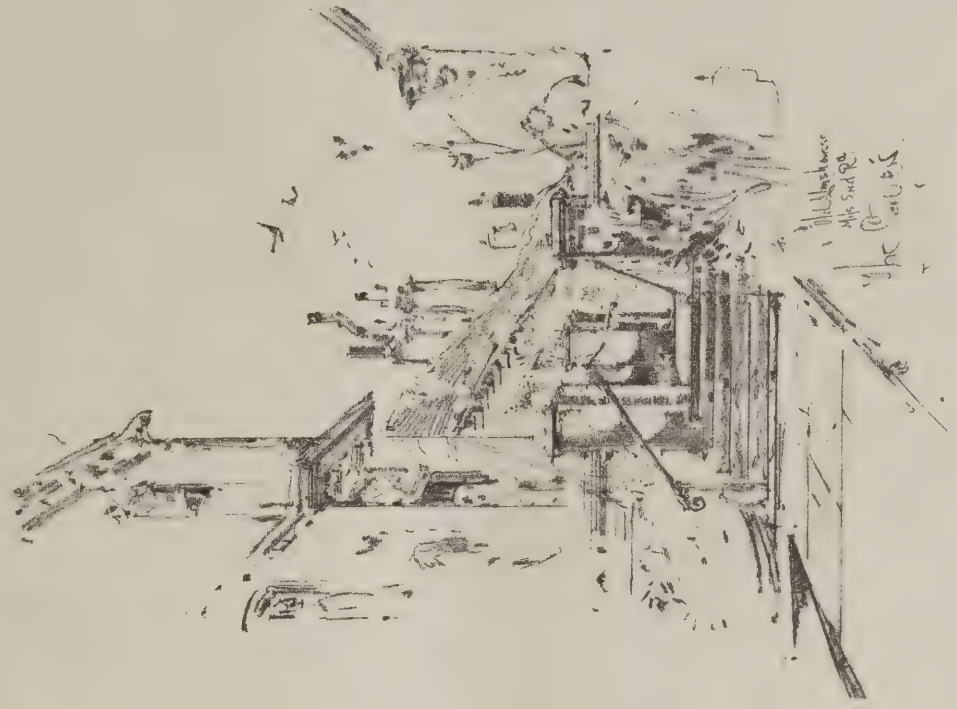
St. John's Gate
C. 1840



St. John's Gate
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St. John's Gate
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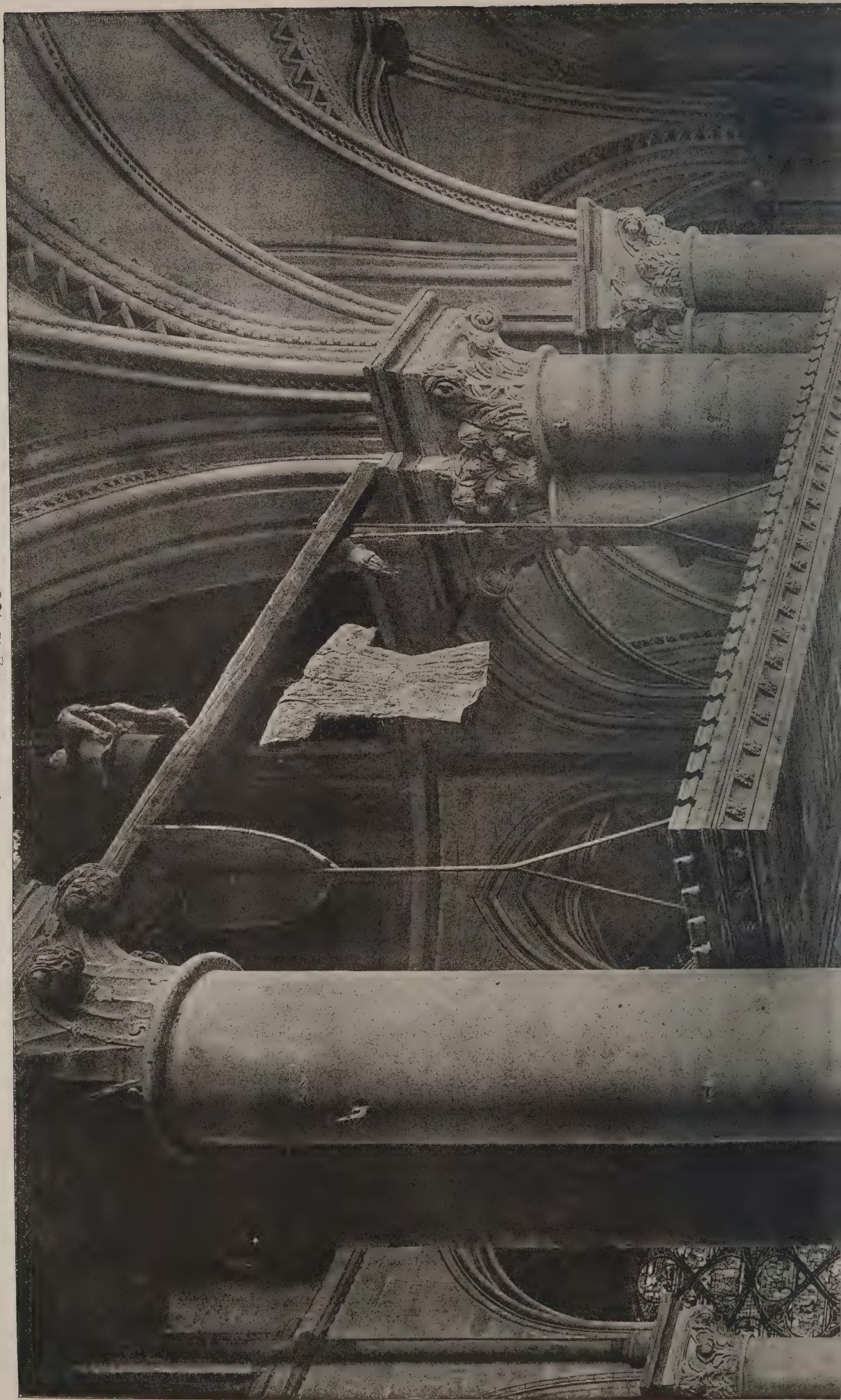
St. John's Gate
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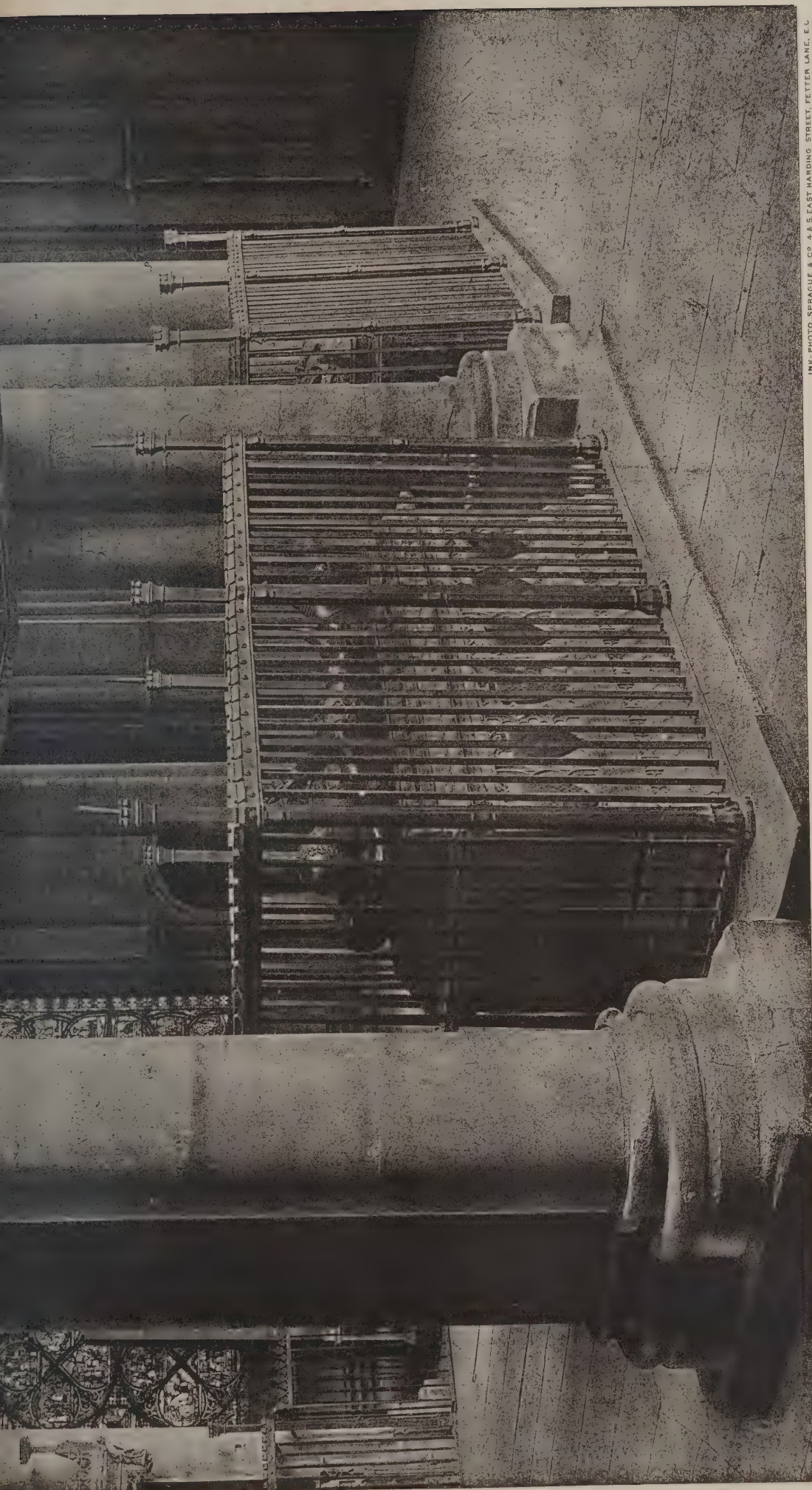
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LEAVES FROM SKETCH BOOK.

BY HERBERT RAILTON.

The Architect. Aug. 13th 1897





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CATHEDRAL SERIES, No. 65.—CANTERBURY: TOMB OF EDWARD THE BLACK PRINCE.

HERTFORD HOUSE AND THE WALLACE COLLECTION.

THE following evidence was given before the special committee on the disposal of the Wallace collection by Sir John Taylor and Mr. A. Waterhouse, R.A.

Evidence of Sir John Taylor.

Chairman: You are the senior first-class surveyor in the Office of Works, I believe?—Yes.

Have you had an opportunity of examining Hertford House?—Yes, a general examination, but not one in detail.

Up to the present time that house has been used for residential purposes; but can you give us any idea as to its fitness for the purpose of a public exhibition of the collections it contains?—The new portions of the building were, I believe, constructed for the express purpose of an exhibition; but in regard to the older portions of the building I have no accurate details to offer.

Sir F. Mowatt: Can you speak positively in regard to the modern portions of the building?—I was told that the construction was fireproof.

Chairman: With regard to the approaches and to the means of ingress and egress, do you think the building is a convenient one for the purposes of an exhibition?—The means of ingress and egress as they stand now are not suitable for a place used as an exhibition. The place was really not constructed for an exhibition though of late it has been used for that purpose as well as being used as a private residence. If the original entrances to the building were all thrown open, I imagine there would be sufficient means of egress for exhibition purposes; there would, however, be no second entrance to the building, though I understand that hitherto when visitors were admitted they went in at Spanish Place.

Mr. Mitford: Would not the ingress in Manchester Square suffice, providing there was no meeting of the tides of people at any one point?—Yes, I think so.

Chairman: Can you give the committee any idea of the amount of space available at Hertford House?—Yes, I have prepared a rough statement of that. Taking the rooms occupied by the exhibits on the first floor and on the ground floor together, I find the floor area to be about 18,000 feet; and the wall space at present occupied in those rooms I estimate as about 34,000 superficial feet.

Sir F. Mowatt: Does that include the residential rooms?—Yes, those used for the purposes of exhibition. That is the net total wall space at present in use at Hertford House for exhibition of works of art. The lineal extent of the walls is about 1,950 feet. For the purposes of comparison I had the corresponding measurements taken of the extensions of the National Gallery which were carried out by Mr. Barry in 1878 and by myself in 1887. The area of the floor space at Hertford House, taking the first and the ground floors together, comes to 18,000 feet, while the floor area of the two extensions of the National Gallery which I have named amounts to 24,500 feet, and their lineal measurements amounted to about 2,000 feet, as against the 1,950 in Hertford House.

Chairman: Are those portions of the National Gallery which you have taken for the purposes of comparison the portions marked grey and blue on this plan?—Yes.

Mr. Armstrong: Will you give us the area of the first extension of the National Gallery?—The floor space of the first was 15,780 feet and of the second 8,730 feet. The line of the wall in the first or the grey extension is 1,287 feet, and in the second or the blue it is 734 feet.

Chairman: Coming back to Hertford House for a moment, have you at all considered whether the house could be so altered as to appropriate certain rooms which are now used for other purposes to the purpose of exhibiting the collection?—Yes, I have ascertained that a very considerable addition might be made to the exhibition space in Hertford House.

Can you in general terms give the committee the opinions you have arrived at as to the reappropriation of the space at present occupied and the possible erection of new buildings to receive a part of the collection?—The alterations would principally be made in the stable portion of the building, and in the portion of the residence which has been used for offices. Some of those offices are on the ground floor and some in the basement. A large portion of the building, the stables and the coachhouse, which is not now used, could be altered and utilised for exhibition purposes.

Sir F. Mowatt: Would that bring us into contact with other buildings?—No, because a street bounds the stable yard.

Chairman: If those stables and offices were converted into galleries, how would they be lit?—By means of side lights looking into the streets and into the courtyard.

Do you think both the western and the northern galleries could be well lit by side lights only?—Yes.

Passing to the eastern side of the block, still on the ground floor, have you anything to say about the room now used as a smoking saloon?—I think that was intended as a saloon for sculpture, and that there are some pieces there now.

Would that part also be available for an exhibition gallery?—Yes.

Does anything occur to you in regard to the ground floor of the house itself?—I think some changes might be made to increase the accommodation; that is, on the western side where there are now the rooms occupied by the butler and the housekeeper.

Could they be converted into galleries with side lights?—Yes, and they might have screens similar to those now used in the National Portrait Gallery.

Would there be any possibility of utilising a part of the space now occupied by the garden for the erection of new galleries?—Subject to everything being so arranged as not to interfere with the side lights of other galleries.

Would there be any room for a central gallery across the courtyard without robbing the eastern and western galleries of too much of their light?—I think the idea of a central gallery had better be left out.

Mr. de Rothschild: Do you think the means of egress on the ground floor could be materially improved; there is a small door there where you can get out?—That door is on the east side, and it takes you into the street.

Yes, but could not the means of egress be materially improved?—There would be no difficulty in getting egress either side, whichever you like; there is no practical difficulty about that. If that were done it would leave the principal entrance practically free as an entrance.

Chairman: Have you any observations to offer in regard to the space available on the first floor?—I have not fully considered what could be done by way of increasing the accommodation. I have made my examination principally with a view to seeing what exists and whether the building could be adapted.

Have you considered the question of access to the first floor?—I have no doubt whatever that any improvements required in that way could easily be carried out.

Does it occur to you that it would be possible to give, on the first floor as well as on the ground floor, some such improved means of egress as Mr. de Rothschild suggested just now?—There is the staircase in the eastern picture gallery which gives access to the ground floor immediately below.

Could the same sort of staircase communication be provided on the western side?—Yes, there is no doubt about that.

I see on the western side of the plan rooms marked "Lady Wallace's dressing-room," "Lady Wallace's bath-room," "Sir Richard Wallace's dressing-room," are those rooms occupied by works of art now?—Yes, I have taken them into account. They are partially occupied by works of art and I have included them in the figures I have given.

Sir F. Mowatt: Have you on your estimate of wall space included the walls that are now occupied by cabinets?—Yes, to a certain extent.

Sir E. J. Poynter: Can you give us the area of the large gallery?—I think it is 120 feet long by about 35 feet wide.

Chairman: What is there above the first floor?—I have not been through the upper portions of the house, but I think there are only bedrooms above the first floor.

Have you any suggestion to make in regard to using any portion of the upper part of the house for exhibition purposes?—I do not think it would be fit for such purposes.

Sir F. Mowatt: Do you mean they would not be fit for pictures?—Yes, I think the rooms would be too low.

But would they be too low for such exhibits as cases containing snuff-boxes and miniatures?—Not too low if the light were sufficient.

Mr. Waterhouse: I think the rooms are about 10 feet high?—That is not very high for a room that may be crowded, but of course it might be used.

Mr. Mitford: Do not you think we want some rooms for the servants and the staff?—I do not think servants ought to be lodged in such a building; I think it would be better not to have them living in the house. There are the lodges.

Sir E. J. Poynter: Do you think it would be possible to increase the skylight area of the galleries?—I have not considered that point, but I do not think it would be possible to increase the skylight area of the rooms now so lighted.

Sir F. Mowatt: But a gallery could be carried across the present courtyard?—Yes.

Could a connecting gallery between the present eastern and western galleries be carried across the courtyard and lighted from above by a skylight?—Yes, but I think it would be better to leave that gallery out.

Chairman: If you constructed a gallery across the courtyard that would darken the rooms now used as a billiard-room and as a dining-room, would it not?—To a certain extent; it would all depend upon the height.

Mr. de Rothschild: You can get more top-lighted galleries for pictures by removing the armoury, can you not?—Yes.

Sir E. J. Poynter: Do you know the area now lighted by skylights?—Judging by the plan I should say the area would be 7,164 square feet.

And that is all the available top-lighted space unless you build a gallery across the courtyard on the ground floor?—Yes.

Chairman: Can you give us an approximate estimate of the cost of acquiring Hertford House for the nation?—Yes. I had occasion to make a valuation and it came out very nearly to the same amounts as those asked by the leaseholder and the freeholder for their interests. The leasehold interest was valued at 35,000*l.* and the freehold at 30,000*l.*, and those figures I consider quite reasonable. I believe some change has since been made in the price asked for the freehold, but it has not come before me.

To that total sum, whatever it may happen to be, would have to be added the cost of the alterations to the rooms if any were made?—Yes.

I suppose it would be impossible for you to give us anything like a close estimate of the cost of those alterations, but have you in your mind the kind of sum which would cover that cost?—That could only be accurately ascertained when the proposals as to alterations are put into a definite shape, but I think 10,000*l.* to 15,000*l.* would go a long way towards it.

Mr. Mitford: That would not include the cost of an additional gallery across the courtyard?—No.

Mr. Waterhouse: Would that amount of 15,000*l.* include the cost of the conversion into galleries for exhibition purposes of the rooms on the ground and first floors which are not now so used?—Yes; the stables, for instance.

Mr. Armstrong: Is that supposing the alterations to be carried out on the same scale of dignity as that which obtains in the rest of the building?—I am assuming that nothing very elaborate would be done on the lower floors. I do not think that is required.

It is not proposed to make the new exhibition rooms differ from the old, is it?—Some of the old are decorated in a very expensive style; I have not estimated for marbles and things of that kind.

Sir F. Mowatt: Would you say that the large picture gallery was in any way exceptionally magnificent?—The large picture gallery is arranged for top lighting, and you cannot get top lighting on the ground floor, to which my estimate has reference. I have only taken into consideration the cost of preparing the rooms for exhibition purposes, but I have not estimated for costly materials.

Mr. Armstrong: Can you give us any idea of what it would cost if the new rooms were treated in the same way as the old ones, so as to make the whole thing harmonious?—I could make such an estimate if required.

Mr. Waterhouse: Is it not the fact that the new galleries built by Sir Richard Wallace are treated in a very much simpler way than those in the older portions of the house?—Yes.

Mr. Armstrong: Do you think the house could be so modified as to afford absolutely free admission to the public without any inconvenience, so that any number of people could come and circulate as they please?—Yes, the building could be made to admit people as freely as the National Gallery does now.

Mr. Waterhouse: Can you tell us the height of the rooms on the ground floor which it would be possible to convert into galleries?—To the best of my recollection they are about 18 feet high.

Can you tell us what would be the extra accommodation in floor space which would be obtained if we turned those portions of the ground and first floors into exhibition galleries which are not so used at present?—I should say something like 7,000 feet.

Then we should get altogether something like 32,000 feet of exhibition space as compared with the 15,780 feet of space available behind the National Gallery?—Yes, if you add the portion which I built to that erected by Mr. Barry; but you must remember that in dealing with the space behind the National Gallery, I have taken one floor only, whereas at Hertford House I have taken two floors.

On the site behind the National Gallery could we have two storeys of exhibition space—is there sufficient light for that?—Yes, if the building is a detached one.

And with as good a light as we could get from Manchester Street?—I am not prepared to say that the light would be so good, because the buildings of the National Gallery are of considerable height, and if another building were added there would be a certain amount of shadow thrown over the new buildings by the existing ones.

Mr. de Rothschild: In your estimate of the probable cost of the alterations, have you considered the necessity for improving the skylights over the long gallery, the two other galleries and over the staircase?—No.

That would be a material improvement, would it not; because at present they are very unsatisfactory?—My examination of the building has not been sufficiently detailed to take in all the improvements which might be effected.

Sir E. J. Poynter: If the public were admitted to Hertford House as freely as they are now to the National Gallery, how would it be necessary to rearrange the furniture?—I think the furniture could be rearranged in the additional space which we

should get in the extensions I have suggested; we could then take away from the gangways a considerable number of cases which are now in the direct line of route round the rooms.

Would it be possible to keep any of the rooms as they are at present in regard to their furniture?—I think some of the rooms are too crowded with exhibits at present, they would certainly require to be rearranged.

Notably the famous boudoir of Lady Wallace?—Yes, certainly.

What would be the additional area gained by making a gallery across the courtyard?—About 1,500 feet roughly.

Chairman: With regard to what you said about there being sufficient room for the number of visitors who might be expected, I suppose what you had in your mind was an ordinary number and not the number who might be attracted when the collection was first thrown open, and which might be an exceptional crowd?—I think there would have to be some restriction put upon the numbers admitted at first; I have no doubt the public will at first be much interested in seeing this collection, and there will be a rush.

But if the proper precautions were taken there would probably be sufficient space for the ordinary number of visitors who might be expected to come, would there not?—Yes.

Mr. Mitford: Have you formed any sort of idea as to what length of time it would take to prepare Hertford House and get it ready for the exhibition of the works of art that it now contains?—I should think it would take from six to eight months to complete the structural portion of the work.

Chairman: Turning now to the National Gallery, with reference to the portion coloured pink on this plan, I understand that represents the contemplated extension which was designed to provide for the normal expansion of the National Gallery?—Yes. That extension has been under consideration for years, and from time to time we have been in communication with the War Department with a view to getting a portion of the barrack yard for the purpose of carrying it out.

Would such an extension, assuming that the National Gallery did not require it for its own purposes, afford sufficient room for housing the Wallace collection?—I think it would be scarcely sufficient. The area which has been given to the National Gallery extensions has been of one floor only, but two floors are possible for exhibition purposes.

At any rate, may we take it that if the Hertford House collections were lodged in the pink extension they would take up the whole of it, and that nothing would be left over for what might be called the normal expansion of the National Gallery?—That would be so.

Supposing the Hertford House collections were brought to Trafalgar Square, has it ever occurred to you whether it would be possible to obtain room for them by further extensions involving the appropriation of land lying to the west of the present National Gallery buildings?—Any extension in that direction would involve the purchase of a site. I have taken out the area of the block occupied by Watherston's and Hampton's and extending back to the next street as shown on this plan.

You mean the block bounded on the south by Pall Mall East, on the west by Hedge Lane, on the north by a narrow street running towards St. Martin's Lane, and on the east by the National Gallery buildings and the barracks?—Yes, and the area of that is about 33,600 feet. If we required that site we should have to take compulsory powers in order to get it.

That site is now occupied by business premises the goodwill of which is, I presume, of very great value?—Yes.

Are you able to form any conjecture as to the terms upon which that block could be acquired?—I think it would cost at least 300,000*l.* or 350,000*l.*

And to that would have to be added the cost of any new buildings that were put up?—Yes, and a building with such a street frontage as that would require suitable architecture.

Mr. Mitford: What would be the cost of such a building as you have in your mind?—I should say that a building of sufficient size, put up on such a site as that, would cost not less than about 125,000*l.*, perhaps more.

Chairman: With reference to what you said just now as to the time required for carrying out the alterations at Hertford House, I presume it would take a great deal longer to appropriate the present occupants of the Hampton block and to put new buildings upon it?—It would certainly take not less than five or six years.

That is evidently a very expensive block. Is there any other site in the neighbourhood of the existing galleries the acquisition of which might be entertained by the committee? Here is a block bounded on the north by Spur Street, and running south and west of Leicester Square?—I think you would require also the block to the eastward—that is, between St. Martin's Street and St. Martin's Baths; I think both those blocks would have to be taken in order to obtain the requisite amount of accommodation.

That would take in the whole south front of Leicester Square?—Yes.

Can you give us any idea as to the difficulty or otherwise of acquiring that block?—I think there would be the same difficulty in acquiring that block as there would be in acquiring the Hampton block; there are the usual trade and professional interests. The block between Spur Street and Blue Cross Street contains 26,400 superficial feet, and the block to the eastward contains 19,800 feet, giving a total of 46,200 feet; and the cost of acquiring those two blocks would be about 250,000*l.* or 300,000*l.*—land is not quite so expensive there.

What would be the cost of building upon that block?—Something about 150,000*l.*

Have you anything to say in regard to that site in respect to convenience of access?—It would be convenient of access from the Leicester Square side, but on the other side I think it would be rather hampered.

Do you think, considering that we have to provide for a building and collection of great national interest and importance, that the Leicester Square site is one that you would naturally choose if you had a free choice?—No, and for various reasons, the principal one being that it is surrounded on three sides by other properties, some quite close to it, liable to fire at any time.

Would you say that those properties could hardly be described as of very high class?—That is so; they are a very secondary class of property.

Is there any other central site that occurs to you, supposing we are seeking for a new site?—I have not one in my mind at the present moment.

Mr. Armstrong: If the proposed addition to the National Gallery were made, you could not use more than one floor without abandoning the whole scheme upon which that building has been arranged. The lower floor of that part marked pink could not be made available for exhibition purposes?—The lower floor and other portions of the gallery recently added are not used for exhibition purposes, they are only used as repairing rooms and for purposes of a similar nature. I think an arrangement might be made by which some of the rooms might be used as side-lighted rooms. But the lighting for the lower rooms would be by no means perfect.

The accommodation at the National Gallery is too small now, is it not, and if you used up the space outside you would hamper the future extension of the National Gallery for its own purposes?—Yes.

Do you think, for a dignified public building, there is any advantage in taking a site which is not occupied by other dignified buildings?—Subject to the surroundings being made to correspond with the new building to a certain extent, there would be no objection to such a site; but if the old buildings are to be left as they are, I think it would be most inappropriate.

Is it not certain that Whitcombe Street will be widened into an important street?—I have not had that before me.

The Leicester Square site comprises 46,240 feet?—Yes, but you could not utilise the whole of it because the new building, if large, would have to be set back within the line of the present frontages. The site is larger than the buildings required, but I do not think it would be much too large when the buildings were set back.

Then you do not see any advantage in that site, not even in its proximity to the other national collections?—It is desirable to have the collections as near together as possible, but I do not think that is a good site for such a building as that now in contemplation.

Mr. Waterhouse: Can you state the whole area of Hertford House, with a view to comparing it with the Leicester Square site?—The area upon which Hertford House stands contains about 22,000 feet; the Leicester Square site is more than double that.

Comparing Hertford House and the site behind the National Gallery, which do you consider is the better for light on the ground floor?—Hertford House, distinctly.

Which do you consider is the safer in regard to fire?—With their present surroundings, Hertford House.

Sir E. J. Poynter: With reference to what has been called the Hampton block, would it not be desirable in any case to purchase at least a portion of that on account of its contiguity to the National Gallery and the danger of fire?—Unquestionably. The further the National Gallery is from such premises as those the better for the Gallery.

Is it not likely that that will be done?—I have doubts about whether it is likely to be done; it would be a very expensive operation. Nothing short of the formation of a new street would attain that object.

In reference to the acquisition of the Hampton block, would it be necessary to take the whole of that for the Wallace collection?—would not half the block do?—Hertford House now stands upon 22,000 feet and the Hampton block is 33,600 feet; but any new building put upon the latter would have to be set back considerably on the western side, and therefore a great deal of the site would be lost.

Then you would, under such arrangement, use the whole of that site for the Wallace collection and leave this pink portion for the extension of the National Gallery?—Yes.

Chairman: What would be the cost of the pink extension if carried out for the National Gallery?—From 75,000*l.* to 100,000*l.*, I think.

Suppose the pink extension were carried out and used for the purposes of the Wallace collection, what means of access would there be to that extension other than through the National Gallery?—None whatever.

Then it would be virtually impossible to obtain access to the collection except by passing through the National Gallery?—Absolutely impossible, unless the War Office would give up some land for the purpose, which we are told cannot be done at present.

Supposing, for the sake of argument, that the War Office did give up the remainder of its barrack accommodation, do you think it would then be possible to get a suitable and dignified approach to the new Wallace Gallery from the Orange Street side?—No.

Mr. Mitford: Supposing that pink site is given up to housing the Wallace collection, how do you propose to provide for the extension of the National Gallery?—I do not see any reasonable way of doing that; it would create a difficulty all round.

Has not that pink site always been regarded as sacred to the future extensions of the National Gallery?—Yes, and the Trustees have always pressed that upon us.

Chairman: But, putting that on one side, you do not see how to provide there a suitable and appropriate building for the Wallace collection?—No, unless the Government go to the expense of purchasing sufficient property to provide a new street.

With regard to what is known as the War Office tunnel under the National Gallery, you do not think that would be a very appropriate entrance to the Wallace collection, do you?—I think it would be most inappropriate.

Evidence of Mr. A. Waterhouse, R.A., a Member of the Committee.

Chairman: We understand that you have lately visited the Hertford House galleries?—Yes, I was there yesterday.

Will you tell the committee what opinion you have formed of the manner in which the collections are accommodated?—I thought the collections were well exhibited on the whole, but the light in the top-lighted galleries might be improved, certainly in the large gallery, by the removal of the old sun-lights. The light in the old portion of the house is certainly not entirely what it ought to be, and that is especially the case with the rooms looking into the internal court. If the collection were kept where it is, I do not see any difficulty in improving the light.

Do you agree with what Mr. Taylor has said as to the possibility of considerably adding to the amount of space available for exhibiting the collections?—Yes; I think the space might be increased largely; to the extent of 7,000 feet of floor area.

You have heard what Mr. Taylor said as to the improvement of the means of ingress and egress; do you agree with him?—Yes, I think subsidiary doors might be arranged which would provide convenient modes of egress. The approach from Manchester Square would be the most convenient means of entrance.

Mr. Mitford: Side doors do you mean, in each of the other three sides of the building?—I alluded especially to the two sides of the building, but there might be a third door at the back in George Street. I may say that before I revisited Hertford House yesterday I was not very much in favour of the retention of the collection there; but when I saw all the care that had been lavished upon it in the decoration of the rooms and in the matchless chimney-pieces, which form an integral part of the rooms and a most valuable portion of the bequest, it seemed to me that there was very good reason for retaining the collection where it now is. If the bequest were taken away from its present surroundings it could never be shown to such advantage; in fact, we should lose the association of the giver with the bequest, and the bequest is alive with such association now. Re-erected in another place, the staircase, for instance, would never look so appropriate as it does in its present position. The same with the fireplaces and the candelabra.

May we take it that you are disposed to regard the collection as something more than a mere aggregation of pictures and works of art? You look upon it as a collection accumulated by a man of great taste and discretion, with an air of inspiration about it that might not survive if it were removed to some other building?—I think the interest of the collection would be sadly marred by its removal from its present quarters. Then, again, there is the question of fire, which seems to be a very important one. The building has wide streets on three sides and a square on the other, and although not constructed on the most approved fireproof principles, I think it is much safer than any building constructed at the back of the National Gallery would be with its present neighbours on the north and west. I should like to refer to the subject which I brought to

the notice of Mr. Taylor, namely, the lighting of the rooms on the ground floor. It seems to me, and he confessed the same thing, that the additions to the National Gallery, which were planned and carried out by Mr. Barry, afford no exhibition space on the ground floor; but at Hertford House it certainly would be otherwise, because the light there is very good. We have wide streets all round, and a large internal courtyard.

Mr. Armstrong: Do you think the courtyard could be covered in without any great detriment to the other parts of the house?—No; I think that would be sure to affect injuriously the light of the rooms on the ground floor looking into the courtyard.

Chairman: Would you say that in regard to a proposal to cover in part of the courtyard?—A small gallery running through the centre from east to west, if kept low, would not perhaps affect the light.

But a gallery running along the sides?—That would affect the rooms which are the darkest already—they would not bear anything of that sort.

Sir F. Mowatt: Do you think, with the additional gallery you have suggested, that Hertford House would afford sufficient accommodation for adequately exhibiting the whole of the collection?—I think it could so be made capable of affording suitable accommodation.

Mr. Mitford: Do not you attach importance to the fact that whereas it would take from five to six years to purchase and make ready a new site, Hertford House could be got ready and handed over to the trustees in from six to eight months?—Yes, I think it most important to give the public access to such a collection at as early a period as possible, and that object could only be attained by leaving the collection where it is.

SOMERSETSHIRE ARCHÆOLOGICAL SOCIETY.

THE annual meeting of the Somersetshire Archæological and Natural History Society was held at Bridgwater on Wednesday, Thursday and Friday in last week. According to the report in the *Somerset County Gazette*, which we have employed, it was twenty years ago the Society last visited Bridgwater, and therefore the district was new to the majority of the members, while those few who took part in the gatherings of 1877 were delighted to renew their associations. As in former years a museum of objects of archæological interest and of specimens of natural history, particularly from the district visited, was formed, and the articles were arranged in the committee-room at the town hall under the direction of Mr. Bidgood. They formed a very interesting collection, and attracted a good deal of attention.

The annual general meeting was held in the town hall, which was decorated with a large series of rubbings of ecclesiastical brasses, principally representing the East of England. These were kindly lent by Mr. H. Corder, of Bridgwater, and were of a representative character.

The Rev. F. W. Weaver, M.A., one of the hon. secs., read the annual report of the council of the Society as follows:—Your committee beg to present their forty-ninth annual report. During the year 37 new names have been added to your list of members. On the other hand, the loss by deaths and resignations has been 17, leaving a net gain of 20 members. The number is 589, as against 577 at the date of our last report. A county society, numbering close upon 600 members, can undoubtedly claim a leading position; but there are still many names which your committee would desire to see enrolled among their members, and they have to express a hope of a still further increase during the ensuing year. The debit balance on the Society's general account has during the year been reduced from 20*l.* 0*s.* 8*d.* to 9*l.* 6*s.* 9*d.* The cost of the volume of proceedings was 77*l.* 6*s.* 5*d.*, as against 108*l.* 12*s.* 6*d.* last year, or 192*l.* 4*s.* 5*d.* in the previous year. The debit balance of last report on the castle restoration fund has now been reduced to 44*l.* 11*s.* 9*d.* Your committee regret to state that the Castle House still remains void. During the year ending December 31, 1896, the number of visitors to the Museum was 4,610, as against 4,964 in 1895. The index to Colinson's "History" is making satisfactory progress. Upwards of 100 pages have already been printed. The committee have pleasure in announcing that Mr. F. T. Elworthy has prepared and kindly placed at their disposal a full and complete index to volumes xxi.-xl. of the Society's proceedings, carrying to that date the index to the first twenty volumes issued some years ago. This is now in the press and will be issued to subscribers at 5*s.* per copy. The "Bibliography of the County," prepared some years since by Mr. E. M. Green, F.S.A., is also in the press, and will be issued to subscribers at 2*l.* 12*s.* 6*d.* per copy. Subscribers to all or any of these publications are earnestly solicited. A deed has been prepared for the purpose of formally carrying out the appointment of new trustees made at the last annual meeting, and is now in course of signature. The additions to the library during the current year have been numerous and important. At the suggestion and on the appli-

cation of your hon. secretary, Rev. F. W. Weaver, the deputy-keeper of the records has forwarded twenty-one volumes of the publications of the Record Office in exchange for a complete set of the Society's proceedings. Mr. John Batten, F.S.A., past president, and one of your trustees, a staunch supporter of your Society, has presented a complete set of annual reports of the deputy-keeper of the Public Record Office, the *Journal of the Royal Agricultural Society*, 1839 to 1895, and other volumes. About fifty monographs on natural history and antiquarian subjects have been received from the Royal University of Upsala in exchange for a number of volumes of the Society's proceedings. Numerous other volumes have been received by exchange, purchase or donation. Your Society has been fortunate during the past year in losing few members by death, but amongst the number they deeply regret to record that of Mr. Edmund Chisholm-Batten, for a very long series of years one of the most active supporters and a constant attendant at the meetings of your committee, where he frequently occupied the chair. A resolution of sympathy has been passed and communicated to the family. In their last report your committee suggested that the annual meeting in 1898, when your Society will have entered upon the fiftieth year of its existence, should be held at Taunton, its headquarters and birthplace, and that a strong and well-organised effort should be made on that occasion to provide a fund for the repair and preservation, not restoration, of the castle. The numerous festivities which have marked the current year have rendered it undesirable, well nigh impossible, that any steps should be taken in the direction indicated. Now it is time that the matter should be taken seriously into consideration, and your committee trust that every member will do his or her best to render the archæological week of 1898 a complete success.

The presidential address was delivered by Mr. E. J. Stanley, M.P. He said it was the custom of the Society that he whom they honoured by electing President for the year should address a few observations to them on such points of the archæological or other questions of the district as he might think desirable to bring to their notice. He must thank them, after twenty years, for having invited him to become their President. On the first occasion he had to send an excuse to the Society, and he did it with great regret, although the circumstance which obliged him to be absent was one which he knew would give him great happiness, which had continued ever since. He had read as much as he had been able of the different opinions of different people regarding the antiquities of the neighbourhood, and he was sorry to find the opinion of one who said that they were not many in number and had been frequently described at great length. He did not think that was right, and he thought he could point out several features of special interest which were not included in their list of tours for the next three days. He believed they would find that the natural history department had not been very much considered by the Society, and there were several quarries near Quantock Lodge which were of an interesting character. He had the authority of so well-known a geologist as Sir Roderick Murchison for stating that the quarry of green stone, of which Quantock Lodge was built, was of very great interest. Most people who saw the house considered that it was built of green sandstone, but it was not so, for the stone used was a highly igneous rock which took a polish, and the party visiting Quantock Lodge on the next day would see a table of the polished stone. The late Rev. Mr. Lance, of Buckland St. Mary, had had some columns of the stone polished, with which he decorated his beautiful church, which was still being adorned and beautified. There was another large quarry near the Lodge, in which the stone alternated very largely, and it contained building stone and limestone, which when burnt produced lime as well as polished marble. From this quarry a large chimneypiece for Dunster Castle was carved for Mr. Luttrell. Another object of interest was a cave at Holwell, which had never been thoroughly explored. There was a little difficulty in the exploration, inasmuch as to make further progress one had to crawl upon the knees, and as the ground was rather wet people shrank from further explorations. Some day, however, it might be completed, and it was rather curious that in a limestone district like the Quantocks it should be the only cavern of which they had any knowledge. There were also in the district the remains of the workings of upper mines, as he knew to his cost, because after heavy rains the soil fell in and he had to send several cartloads of soil to fill up. In addition there were a number of marble quarries to which a certain interest attached. If they had time on the next day some might like to visit the quarry from which the stone of Quantock Lodge was obtained. Sir Roderick Murchison had expressed the opinion that it was igneous rock from very near the crater of a volcano, but he reassured those to whom he told that by saying that it was not likely that the volcano would break out again in the same place. There was one portion of their natural history in which he would like to destroy a fallacy. There was a general belief that, as on Exmoor, which had been a Royal forest from time

immemorial, so in the Quantocks red deer had been for centuries. These beautiful animals, however, were claimed to have been first turned out on the Quantocks by Mr. C. E. J. Esdaile's father, and this was confirmed by Lord Ebrington. Speaking of Admiral Blake's connection with Bridgwater, he said a large number of the Blake family from America and elsewhere often came to Plainsfield Farm to see a chimneypiece there, on which were carved the letters "E. B.," but the date 1688 showed they were placed there long after the admiral's death. What was the meaning of the initials would be an interesting question to solve. Then, again, in Over Stowey Church, in front of the communion table, there was the tombstone of "Humphrey Blake, clothier, of Bridgwater, died 1619," while they knew that Humphrey Blake, the admiral's father, lived to a later date. He had known the clergy a good deal worried by descendants of the Blake family for particulars as to the relations of the admiral. One, after getting a copy of the register, wrote to know if any of the family had been omitted, and the clergyman wrote back saying he had forgotten to mention one Edward Blake, who was put in the stocks. An interesting question which had come rather prominently before them of late years was the great part which ladies took in holding property in that neighbourhood. As to his own position, he had himself bought a few farms, but the great mass of the Quantock Lodge estate belonged to his wife. Then close by, at Brymore, they all remembered the fact of Miss Hailes leaving that property to Mr. Bouverie's grandfather, while the large estate of Fairfield descended to Sir Peregrine Acland's daughter. Further on there was Crowcombe Park, which belonged to the wife of Mr. Trollope, and next there was Mrs. Bisset, of Bagborough, and long might she continue to enjoy the beautiful property which she owned. A little further on was the Tetton property, which came to the Earl of Carnarvon's family by marriage with one of the Aclands, and which had previously come to the latter by marriage with the Dykes. Then there was the Portman property, which came to the Berkeley family by a marriage with the heiress of the Portmans. Pixton Park also came to Lord Carnarvon through marriage with an Acland. Further west they met with the extraordinary fact of the Dunster Castle estate having been sold only once since the Conquest. It was given to Lord de Mohun by William the Conqueror. One of the Lords de Mohun was known as Earl of Somerset, and his wife, who had great influence over him, got him to leave the property to the Archbishop of Canterbury and others, who were to do with it as Lady de Mohun desired. She desired them to make the property over to her, and then, retaining the use of it to herself for life, she sold it for a sum of money to Lady Elizabeth Luttrell, who had three daughters—the Duchess of York, the Countess of Salisbury and Lady Strange of Nocking. The Duchess of York and the Countess of Salisbury died without issue, and Lady Strange of Nocking carried on the line. On the sale of the property by Lady de Mohun legal proceedings were taken, and an almost unprecedented thing occurred, for the House of Commons petitioned the Crown that it should be tried at bar. This was probably obtained by the influence of the Duchess of York. The trial was ordered to take place at Ilchester, but there was no record of the result, although the property remained with Lady Elizabeth's son. He (Mr. Stanley) was directly descended from Lord and Lady Strange of Nocking, and it was rather interesting to find himself settled in Somerset for twenty-five years, and then after all to find himself to be a Somerset man. There were other properties held in the same way. Halswell, for instance, came to the present worthy owners through an heiress, while an interesting fact was that the first document he ever signed as a Somerset magistrate was one brought to him by Mrs. Farthing, who was churchwarden of Dodington.

The Mayor proposed a vote of thanks to Mr. Stanley for the very able and attractive address he had given them on that occasion. He was sure they must have listened to it with a vast amount of interest and pleasure. He (the Mayor) hoped time would enable them to visit the quarries alluded to by Mr. Stanley, for they were a very instructive and interesting feature of the neighbourhood.

The Right Hon. J. W. Mellor seconded. He said there was no one better qualified than Mr. Stanley to preside over them. He (Mr. Mellor) had known Mr. Stanley for many years, but that gentleman had never previously told him that he was of Somerset descent. He was very glad indeed to hear that Mr. Stanley was a Somerset man, as that would give additional interest in the proceedings.

The vote was adopted with acclamation.

The Chairman briefly acknowledged the compliment, and this closed the meeting.

St. Mary's Church, Bridgwater.

After luncheon the company proceeded to St. Mary's Church, where the diocesan architect, Mr. E. Buckle, gave an interesting description of the building. He said it was quite impossible to look at that church with any attention at all without feeling

what an important place Bridgwater was in the olden time. It was really a larger church than it gave one the impression of being, and he believed that it seated something like 1,300 people. It was not surprising that Bridgwater should require a church of that size now, but it was really surprising that as far back as they could go there appeared to have been a church there as large as the present one. There was nothing of Norman work left, but the foundations of the Early English building extended all the way around the north aisle, and at the end of the north transept they found again some Early English foundations. That appeared to make it plain that in the thirteenth century there was a cruciform church with aisles and nave of the same width as the existing ones. Mr. Buckle then pointed out how wide it was across the nave and aisles, and said that in the thirteenth century it would have been designated a remarkable church. In the time of King John there was no doubt there was an hospital of Augustinian canons in Bridgwater, and the church was the property of these canons, who served it by one or two of their own number, while a chaplain was appointed as well. The only serious additions to the size of the church made since the time of these canons appeared to be the filling out of the space between the transepts and the nave aisles, and additions at the east end. The two side chapels were probably added later, and the chancel carried at least one bay further east than it was at that time. Of that Early English church nothing remained but the foundations and the lower part of the wall. Mr. Buckle pointed out the early niches for monuments and also the very remarkable piece of thirteenth-century work in the north door, which, however, was not *in situ*. He described the tracery of the window over the door, and said the position of the outer walls and arcades had always been the same as now, and very little alteration at all had taken place in the general appearance of the church, except as regarded the removal of the cross arches from the centre and the raising of the nave. The windows were of all sorts of dates. They had a Geometrical window, Decorated windows and windows with reticulated tracery. In one aisle they found the internal arch of the old windows remaining, whilst the windows themselves had Perpendicular tracery inserted all through. The great change which had taken place in the church was the removal of the cross arches and the addition of the clerestory. The arches varied a great deal in width, and the capital of one dropped down quite a foot. Another remarkable fact was that the clerestory windows were not over the arches, but over the pillars—a curious and quite meaningless arrangement. The old rood-screen was now utilised as choir screens, and a remarkable fact was that in olden time there was in front of the rood-screen another screen some 6 or 8 feet forward. This was a Jacobean screen, which now formed the front of the Corporation pew, and the Mayor and Corporation seemed to have been provided with seats between the two screens. Altogether the church must have been wonderfully rich in carved work, because the whole of the front of the stall-work in the chancel was filled out with panels of ancient carved work. The pulpit was a pretty one of Perpendicular date, and formerly stood against one of the pillars further down the nave. Mr. Buckle spoke of the arrangement of the squint through the north porch, and said the purpose of these squints was generally supposed to be to provide for leper houses. Speaking of the furniture of the church, the most conspicuous thing was the picture presented to the church by Mr. Anne Poulet, who was christened Anne after Queen Anne, and was at one time member for Bridgwater. Beyond that fact no history of the picture was known, but it was generally ascribed to an Italian artist. There were at one time at least seven altars in the church, as had been discovered by Mr. Weaver. They were the High altar, Trinity altar, Our Lady's altar, St. George's altar, the rood altar, St. Catherine's altar and St. Audry's altar, and there appeared also to have been an altar to St. Erasmus. There was ample room for seven altars, and there might very well have been more. There were three chantries, St. George's, Our Lady's, and the Holy Trinity's, and there were seven guilds in connection with the church. All these things pointed to the great richness and importance of the town. The small arch leading into the tower showed that at the time it was built there was no clerestory. The tower was a massive building consisting almost solely of rubble stonework, without any freestone where it could be avoided. The tower, in contrast to the church, showed poverty, but it had a really remarkable spire, being a great deal taller than the tower on which it stood, and it gave a remarkable character to the appearance of the building.

Colonel Bramble spoke of the resemblance between St. Mary's tower and the tower of old Bedminster parish church, now pulled down. Speaking of the roof, he said there was one typical style all through Somerset which had got to be known as the Somersetshire waggon roof. There they had a Somerset waggon roof and a great deal besides.

The Rev. J. Edwin Odgers, lecturer on ecclesiastical history at Manchester College, Oxford, spoke of the ceremonies which formerly took place in the church between Good Friday and

Easter Day. A sepulchre was set up in the church, watchers were appointed until the Sunday, when a curtain was drawn back revealing the figure of the risen Saviour.

Mr. Charles Major also made some interesting remarks.

Dr. Winterbotham dissented from the view of Mr. Buckle that the altar-piece belonged to the Italian school, and said he considered it was a specimen of the Flemish school. It was said to have been taken from a privateer, and it had been inspected and valued by Sir Joshua Reynolds.

It was mentioned that the Corporation annually insured the picture in 10,000*l*.

The Rev. H. Bircham, vicar of the church, said the registers were very interesting indeed, and Mr. Lockyer, the parish clerk, would have great pleasure in showing them as well as the communion plate. Alluding to previous remarks, he said the chancel did not belong to the Corporation, who were only the lay rectors. With regard to the picture, he did not believe that that belonged to them either. It had been there many years, and he doubted their having the slightest power over it, although he did not want to reopen the question.

The Rev. F. W. Weaver said the churchwardens' accounts, which belonged to the Corporation, went back to 1300, and they were some of the most interesting in the West of England.

The party next wended their way to Blake Street, to inspect what is acknowledged to have been the birthplace of the famous Admiral Blake. For some years past it has been the residence of Miss Parker, niece of the late Mr. George Parker, author of a brief history of Bridgwater and other works, who purchased the property in question. Mr. Parker, a nephew of the deceased gentleman, received the party on their arrival and escorted them through some rooms and into a garden at the rear, adjacent to what is locally known as "Mill tail," and referred to as such in Domesday Book. It was admitted that the premises had undergone very extensive alterations, but there were traces of ancient remains, and in particular Mr. Parker pointed out those of an old window and fireplace which undoubtedly constituted a portion of the original building.

The party next directed their steps to the Western Quay, and here they were shown the only remaining traces of Bridgwater Castle, consisting of a massive stone archway, formerly a portion of an old water-gate, this being situate at the entrance of some bonded cellars in the vicinity of the Custom House. This was viewed with a good deal of interest, and although no public observations were offered thereon, several members indulged in a retrospect of recorded events connected with the siege of Bridgwater and its heroic defence, and expressed surprise that the castle had been so completely dismantled that all other traces of it had disappeared.

At 4.30 the members again assembled in the town hall at a meeting, at which papers on local subjects were read and discussions took place. Mr. E. J. Stanley, M.P., again presided.

Index to Collinson's "History of Somerset."

The President first called upon the Rev. F. W. Weaver, M.A., to make a statement with regard to the index to Collinson's "History of Somerset."

The Rev. F. W. Weaver said he was bringing out in a form uniform with the Collinson's "History" an elaborate index to the whole of the three volumes. The index had now gone to the letter H, and in that connection of the work he had received valuable help from the Rev. E. H. Bates. Those who used the index would find it valuable when they wished to see what Collinson really said. He sincerely hoped that those who had not subscribed would give their names to Mr. Bidgood. The price of the work was 15*s*., and he hoped it would be ready by next Christmas.

Mr. Hobhouse said they were indebted to the two gentlemen who had undertaken the work, and appreciation of their efforts should be shown by purchasing the work.

A Photographic Survey of the County.

Mr. H. C. Bothamley read a paper on a photographic survey of the county of Somerset. He said the importance of photographic surveys, by which was meant the systematic collection of photographs of every place and every object of archaeological or historic interest, was becoming widely recognised. The matter had been brought before the Society on several previous occasions, and although the action of the council was sympathetic, the sympathy was not of an active kind, and the matter was dropped for a time. Recently the whole question had entered upon a new phase. The importance of the work had been officially recognised by the authorities of the British Museum, and the Museum was willing, under certain regulations, to take charge of the results of such surveys, and to store them in such a manner that they might be accessible to the general public. A National Photographic Society had been founded under the presidency of Sir Benjamin Stone, and its object was to encourage the organisation of photographic surveys, and to formulate rules and recommendations so that the surveys might be carried out in a fairly uniform manner throughout the whole country. The collecting of

the work, however, must be done by local branches of the National Society. It was highly desirable that there should be a local collection in each county under the custody of some responsible body, municipal or otherwise. He ventured to think that no associations could more appropriately take up the work of organisation of surveys than the county archaeological societies. So far as Somerset was concerned, the council of that Society had expressed itself ready to take charge of the results. The object was to excite interest of a somewhat more active and productive type, and co-operation in the organisation and carrying out of the work. If it were admitted that a photographic survey of the county was desirable then the sooner it was begun the better. Many objects of great historic interest were in constant danger of being destroyed, leaving no record except some drawing which might do credit to the imagination of the artist, and was of no value at all for the purpose of exact knowledge. In Somerset a considerable portion of the more interesting objects were of a domestic character—old houses and the like—and those were the objects in the most danger of destruction. In many localities, including Somerset, a large amount of the actual photographing necessary had already been done, and it only remained to collect, classify and catalogue the results. Somerset was exceptionally fortunate in the fact that there were in existence a large number of negatives of objects which had since disappeared, and they therefore had very special value. Archdeacon Ainslie, who was a photographer in the early days of the art, had a negative of the tower of St. Mary's Church, Taunton, before it was rebuilt, and in the Society's museum at Taunton there were a considerable number of prints of old houses, many of which had been greatly altered or destroyed altogether. The chief point for the consideration of the Society was whether a committee should be appointed to aid the proposal, and as to the necessary expenditure the point was whether the general fund would bear a small annual charge to meet the expenses. He urged that the subject was one which the Society might appropriately take up, and he trusted that a committee might be appointed as soon as possible, so that although Somerset could not be the first county to organise a photographic record of its objects of interest, it might yet be one of the first in initiating such, and, one would hope, in completing a work which in the mind of many was of a great deal more than local interest and importance.

Mr. Hobhouse thought it was a very proper object for the Society to take up, but the proper mode of procedure would be to refer it to the executive committee to see if they would take it up in conjunction with certain other bodies, and whether it would be desirable for them to make a small grant to cover initial expenses. It was clear that no large grant could be made at present, but Mr. Bothamley had suggested voluntary subscribers if sufficient could be found to set the ball rolling. He would like to know the extent of Mr. Bothamley's proposition before referring it to the council to consider.

Mr. Winterbotham said if the Society did not see its way to granting any large sum of money it could give an expression of opinion that the suggestions thrown out by Mr. Bothamley were worthy of consideration. They had not the funds to make themselves a Society for the purpose of protecting national monuments, great and small, in Somerset, but the idea that they could keep a faithful representation of what they had before the year of destruction came was one within their grasp and means, and although the Society might not feel themselves able to contribute largely, their protection thrown over the idea would enable it to advance, and many of them would be glad to form a subsidiary society which would aid such matters.

The Rev. F. W. Weaver said there was a valuable collection of photographs of old churches obtained by Mr. Gill, formerly of Bridgwater, in existence, but they were in possession of a certain firm, who, possibly, would part with them to the Society for a reasonable sum.

The Rev. J. Worthington said it was entirely a question of finance, but if common action were undertaken he felt sure the council and members would support the matter right heartily.

Mr. Bothamley did not anticipate the expenses would be very large. Mr. Hobhouse wished to know the extent of his proposition. His suggestion was to first obtain photographs of domestic objects which were liable to disappear, and afterwards those subjects which were less liable to alteration.

The Rev. J. E. Odgers then read a paper on "The Bridgwater Academy, 1689-1748." He began by pleading for the extension of the operations of the Society to the domestic antiquities of the last century. The domestic history of England from 1688 to the accession of George III. was much neglected. The materials existed in vast stores of pamphlets and archives. They were especially interesting in the West of England, which was a stronghold of Whiggism and Dissent, on which Tory Governments kept a jealous watch. Here persecutions of Dissenters were very severe, and after the passing of the Toleration Act chapels sprang up at once. The old building called Christchurch, or "the '88 chapel," in Bridgwater, must have been fairly in course of erection before the Act passed which licensed it. But the liberty of teaching was

strangely overlooked in the passing of the Toleration Act and the enactment of the "Five Mile Act," that no Nonconformist minister nor any member of his family might keep a school, and this remained unrepealed. The well-to-do Nonconformists wanted university education for their sons, and dissenting academies were formed. With the accession of Anne and renewed petty persecution of Dissenters, an attack was made on the dissenting academies, and just before Queen Anne's death the Schism Act was passed, which was specially aimed against them. After the Queen's death, however, this Act became practically a dead letter. The Bridgwater Academy was in the home of John Moore, a Brasenose man and an ejected minister, of Haselbury. Five years after the great ejection and in 1679, he settled in Bridgwater as pastor of the church founded by Norman. The teaching was in the hands of his two sons, who were both M.A.'s of Edinburgh. He thought the academy teaching began in 1698. In the time of William III. John Moore was arrested at the foot of his pulpit stairs, and his two sons had to go into hiding. He had the names of sixty-five pupils of this academy, the sons of dissenting gentlemen who were excluded from the Universities. Among the names locally connected were two Normans, one a grandson of John Norman and grand-nephew of Blake, Speke of Jordans, the Battens of Yeovil, Ostlers of South Petherton, Baker, Keech and Rutter of Ilminster, the Rev. Charles Gifford, afterwards of Chard, and many connected with the dissenting ministry, including a son of John Flavel, Dr. Samuel Chandler of London, Dr. J. Milner, who became the head of a school at Peckham in which Goldsmith was an usher. Peculiar interest attached to one man, Simon Brown, native of Shepton Mallet, distinguished as a writer of poetry and hymns, and a combatant against the English Deists. He suffered under a strange delusion that God had annihilated in him all reason, and that he was no longer a mortal agent and had no human soul, though he might seem rational to other people. The dissenting academies of those days were framed on the models of the Universities, all the lectures being in Latin and Latin text-books being used.

The reading of this paper concluded the meeting.

In the evening there was a very large attendance in the town hall for the purpose of hearing a paper on "Admiral Blake" read by Captain Montagu Burrows, R.N., Chichele Professor of Modern History in the University of Oxford, and Fellow of All Souls, and by Mr. W. L. Winterbotham on "Blake's Charities."

(To be concluded.)

THE SITES FOR GOVERNMENT OFFICES.

THE select committee of the House of Commons, consisting of Mr. Smith-Barry, Mr. John Burns, Mr. Chancellor of the Exchequer, Sir Charles Dilke, Mr. Disraeli, Mr. Akers-Douglas, Mr. Herbert Gladstone, Sir James Kitson, Mr. Legh, Sir Herbert Maxwell, Mr. Molloy, Sir Stafford Northcote, Mr. Whitmore, appointed to inquire into and report upon the manner in which the sites available for the erection of the new buildings required for Government offices may best be appropriated for that purpose, have agreed to the following report:—

In continuation of our report, dated July 23, 1896, we beg leave to state that we have taken further evidence upon the plans laid before the committee last year. Having regard to certain criticisms made from an architectural point of view upon those plans, we have thought it well to examine representatives of the Council of the Royal Institute of British Architects and other qualified members of the profession. Various alternative plans have been submitted to us by these gentlemen, but whilst we have availed ourselves of some of their suggestions, we have felt unable, owing partly to the enormous cost involved and partly to other considerations, to recommend their schemes generally for acceptance.

Upon a review of the whole evidence we have arrived at the following conclusions:—

We are of opinion that the new public offices on the Parliament Street or Great George Street site should be erected mainly on the lines of plan No. 1 in the appendix to the report of last year, with a frontage in a line with the frontage of the Home Office and parallel to the east side of Parliament Street; but we recommend that the south-eastern corner of the new building should be square and not rounded. The land between this new frontage and the present west side of Parliament Street would, if this plan were adopted, become part of the public street, and in our opinion there is no need to make special provision for separating the traffic at this point. It appears to us reasonable, in view of the great metropolitan improvement here to be carried out at the cost of the Government, that the London County Council should be requested to consider whether they should not put into operation the powers possessed by them under the Public Offices (Westminster) Site Act of 1896, and contribute a share of the total value of the land, which under this scheme would become part

of the public street. We recommend the appropriation of this site for the Board of Trade, the Education Department and the extension of the Local Government Board.

As regards the Whitehall site, having considered the alternative schemes for the War Office which have been placed before us this year, we adhere to the recommendation made in our interim report, being satisfied that a building satisfactory in appearance and accommodation can be erected on that site within its present boundary lines; and we are of opinion that the details as to the arrangements of buildings, courts, &c., should be entrusted to the discretion of the Office of Works, in conjunction with the architect selected. We think that a sub-way should ultimately be formed under the street between the War Office and the Admiralty.

Schemes have been submitted to the committee by the Royal Institute of British Architects and by Colonel Edis, for a widening of Charing Cross and of the northern part of Whitehall; but we cannot recommend that the taxpayers should be asked to bear the cost of this metropolitan improvement, which if undertaken comes more properly within the duty of the local authorities. We, however, strongly advise that the Mall should be opened into Charing Cross on the north side of Messrs. Drummond's bank.

We do not contemplate the passage of any other than light traffic through the Mall, and are satisfied that the skill and experience of the police would supply satisfactory means of overcoming any difficulties of traffic which might to some extent follow such opening.

We think that no decision should be arrived at as to building on the triangular site in Spring Gardens until the houses standing there have been removed, and the ultimate requirements of the Admiralty considered.

We recommend that Nos. 11 and 12 Downing Street, occupied respectively as a residence for the Chancellor of the Exchequer and as an office for the Patronage Secretary to the Treasury, should be removed as unworthy of the site they occupy; but we are of opinion that the principal block of No. 10, the historic residence of the First Lord of the Treasury, for reasons of practical necessity and on account of its associations, should be retained, the Downing Street front being masked by erecting a new building with a good architectural façade, and the Park front being cased in stone so as to harmonise with the north and west fronts of the old Treasury buildings, and the garden ground being enclosed with a screen or railing of handsome design.

We do not recommend any further building on this site. We are of opinion that whatever other office accommodation is required, which cannot be conveniently found in existing Government buildings, should be provided for by an extension of the Great George Street site in the direction of Delahay Street and St. James's Park, in which case some readjustment of the arrangement at present shown in the plan of the Office of Works might have to be made.

The following paragraph which was in the draft report was not agreed to:—

To have a second opening from the Mall, south of Messrs. Drummond's Bank, appears to us to be unnecessary, and any new road from Charing Cross to the Embankment should fall into the category of metropolitan undertakings.

SCIENCE AND ART SCHOOLS.

THE forty-fourth report of the Department of Science and Art to the Committee of Council on Education was issued on Saturday. This shows that in 1887 the science schools numbered 1,684, the classes 6,300 and the students under instruction 103,088. In 1896 the figures were 2,583, 10,300 and 196,185 respectively. Of the 2,583 schools in 1896, 144 were organised science schools with 16,654 students. This is a considerable increase on the preceding year.

The number of students who came up for examination from these schools was 91,300, a decrease of 16,863 on the previous year. Besides these, 8,518 self-taught students and pupils from classes not entitled to claim payments on results presented themselves for examination. 30,066 out of the 99,818 students who were examined were successful in passing in one or more subjects, and of these 16,551 were successful for the first time. In the previous year 52,079 were successful, and 22,542 for the first time. For the year 1896 the payments to science schools, exclusive of those made to training colleges, on the results of examinations, and on attendances, &c., amounted to 157,916*l*. The corresponding amount for 1895 was 142,542*l*. In the art division the report states that during the year ending August 31, 1896, 20,161 elementary day schools with 2,250,070 scholars were taught drawing and examined under the regulations of the Department. This was an increase of 263 schools and of 57,820 scholars, as compared with the numbers in 1894-95. Besides the scholars who were taught in the drawing standards, 18,209 pupil-teachers and ex-standard scholars were examined in drawing, of whom 8,859 were successful. The grants for drawing in 1896 to

elementary day schools amounted to 176,224 $\frac{1}{2}$, in 1895 to 164,494 $\frac{1}{2}$, and the number of schools gaining the awards fair, good and excellent respectively was as follows:—In 1896: Fair, 848; good, 12,850; excellent, 6,391. In 1895: Fair, 1,484; good, 13,323; excellent, 5,051. Eight hundred and seventy-three evening continuation schools were also examined in which 40,459 scholars were taught drawing, the grants earned by them amounting to 2,105 $\frac{1}{2}$. In the previous year the number of evening continuation schools taking drawing was 698, with 37,460 scholars, the grants amounting to 1,664 $\frac{1}{2}$. Classes for manual instruction in connection with 1,069 elementary day schools were examined in the year ended August 31, 1896, and earned grants amounting to 19,530 $\frac{1}{2}$ on account of 83,220 scholars. In the previous year the number of manual instruction classes examined was 910, and the grants earned amounted to 16,307 $\frac{1}{2}$ on account of 67,470 scholars. The number of art schools and classes (including 80 science schools which take art subjects) examined in art in 1896 was 1,851, as against 1,853 (which included 91 science schools) in 1895. The number of students in 1895 was 136,768, and in 1896 146,193. The number of students who were examined in 1896 was 78,139, or two less than the previous year. The number of visitors during 1896 was 1,135,797 at South Kensington Museum and 383,709 at Bethnal Green Museum, making a total of 1,519,506. This shows an increase of 123,630 as compared with the year 1895.

BEBINGTON CHURCH RESTORATION.

BEBINGTON CHURCH, one of the most ancient and beautiful churches in Wirral, is undergoing restoration. A village committee has been appointed by the churchwardens to determine what shall be done, and it has been determined to make extensive alterations in the structure. About fifty years ago the church underwent restoration, and several internal arches were constructed of very good design, but partly of plaster. For these it is proposed to substitute an entirely new design of decorative timber framework. The plaster on the walls of the nave is to be stripped off, and the rough rubble wall pointed, so as to make its construction conspicuous. The chancel-roof and those of its aisles are to be boarded and covered with felt and decorations of a tasteful sort, for which the able architect under whom the committee and churchwardens have placed themselves is considered to be a master. These alterations (writes a correspondent) will cause a complete transformation in the present appearance of the church, which (picturesque as its present appearance is) does not approve itself to the ideas of restorers, chiefly on account of the materials with which it was repaired at previous restorations. Some of the ancient portions of the church removed at the former restoration are still in existence and in good condition, but the taste of the churchwardens and committee seems to favour an entirely new design, at all events for the junction of the nave and chancel. Whether such extensive changes are called for may be a question, but some repairs are needful. A few decayed pieces of timber from the roof have been selected for exhibition at the doors of the church, which seem to prove that partial repair was desirable if not urgent. Whether more alterations should be made rests with the judgment of the committee and their architect, and it is to be hoped they will exercise it with discretion, as the responsibility of dealing with monuments of antiquity is no light one, and very few of the modern modes of altering and adorning them are not liable to serious criticism, and should always be in conservative and competent hands.



The Nude Greek in Art.

SIR,—Being one of those whom your correspondent "Ronald Kelly," in his letter which appears in your issue of August 6, designates as "brazen-faced apologies for girls and women," I feel I must reply to it, which I trust, out of fairness to my fellow-students and myself, you will publish.

Mr. Kelly heads his letter "The Nude in Greek Art," but he displays such a lamentable amount of ignorance of art, and the steps necessary to become an artist, that I am afraid all art is Greek to him.

He writes, "I was struck with the unsoundness of your arguments," &c. His letter is so insulting to lady art-students that I should like to strike his head with something—a mahlstick would do, only one or the other might get broken, and perhaps it would be the mahlstick, which would be a pity, as that at least is of some use.

Of course a sculptor does not look at a figure from a medical point of view; to arouse his enthusiasm a figure must be physically beautiful, whereas a medical man would take a keener interest in one diseased.

He also says, "I have always esteemed morality as the foundation of civilisation." There have been, and are now living, artists who by their work have given us sermons on morality which are for all time, and, strange as it may seem to Mr. Kelly, these men have studied the very figures he considers so objectionable, but they studied humanity with eyes wide-open, wide enough to detect the true from the false.

It is difficult to think that he is the high-souled creature he would have us believe. Does he not know that it is absolutely necessary for an artist to study from the nude even if all his finished work consists of draped figures? Surely no one with any fine feeling, and possessed of a manly spirit, would so far forget himself as to apply the expression "brazen-faced apologies for girls and women" to a body of women who socially, intellectually and morally reach a high average, simply because, having mapped out a career for themselves, they go to study in a building which contains the finest material for them, but a building which, being thrown open to the public, admits such narrow-minded creatures as your correspondent.

He seems anxious to have all figures draped. Imagine Apollo with a tall hat, tail coat and an umbrella, or Venus gowned (not an evening gown, please). They look beautiful now, but, brought up to date in the above style (as your correspondent seems to think they should be), I think they would look a very fast set.

Before Mr. R. Kelly again writes upon art and morality let him climb down from the high pedestal upon which he has placed himself and study art and his fellow men, and drop his abusive literary style. Then, and not till then, will he write anything worth reading.—I remain, yours faithfully,

August 9, 1897.

A LADY ARTIST.

GENERAL.

The Prince of Wales, as representative of Her Majesty the Queen, will lay the foundation-stone of the new Christ's Hospital Schools at Stammerham, near Horsham, on Oct. 23, the anniversary of the founding of the schools in Newgate Street by Edward VI.

The Department of Science and Art has received, through the Foreign Office, a copy of a despatch enclosing a translation of a Royal decree for the holding of an exhibition of Spanish industries in the Palace of Arts and Industry, Madrid, this year. The exhibition will be opened on October 20.

The Members of the Birmingham Architectural Association have just returned from their annual sketching expedition, which is arranged to provide students with opportunities for studying examples of ancient and modern architecture which may be of service to them. One day was devoted to a careful study of Tewkesbury Abbey, whilst the noteworthy architectural structures in the district of Bredon, Pershore and Upton-on-Severn were inspected during two days. The fourth and last day was devoted to Northampton Court.

A Statue of Charles Darwin, by Mr. Horace Montford, was unveiled in Shrewsbury on Tuesday. The figure, which is of bronze, is seated. It was presented by the Shropshire Horticultural Society, and has cost about 1,000 guineas.

An Exhibition of works by the late Robert Atkinson, Thomas Sutcliffe, Atkinson Grimshaw and Edward March, will be held in the Corporation Galleries, Leeds, during the months of November and December. It is to be hoped the exhibition will be more successful than the Spring Exhibition, which involved the ratepayers in a loss of about 150 $\frac{1}{2}$.

The East Sussex Council have resolved to give notice of their intention to withdraw in 1902 from any partnership with the Brighton Town Council in the Hayward's Heath Lunatic Asylum. A new asylum will have to be erected, at a cost estimated at from 120,000 $\frac{1}{2}$ to 132,500 $\frac{1}{2}$.

Muckross Estate, Killarney, has been selected as a site for a royal residence, and a substantial sum is said to have been offered for the property.

Miss Talbot, of Margam Park, who has already provided several churches for the diocese of Llandaff, has just built a very handsome one dedicated to St. Theodore, at Port Talbot, in memory of Mr. C. R. M. Talbot, M.P. (so long the father of the House of Commons), Mr. Theodore Talbot, and Miss Olive Talbot.

The Results of the Glasgow School of Art three days' examination in advanced architectural design, held in May last, have now been received from the Science and Art Department. Twelve students of the Glasgow School of Art entered for the examination, and all have been successful, five passing excellent, five first-class and two second-class. A further award has been made to the school of a bronze medal for a first-class honour in building construction.

The Architect.

THE WEEK.

THE annual meeting of the British Archæological Association began in Conway yesterday, under the presidency of Lord MOSTYN. The members visited the castle, the parish church and the abbey, and in the evening the President's address was delivered. On to-day St. Asaph and neighbourhood will be seen, and on to-morrow Carnarvon. The programme for next week comprises visits to Bangor Cathedral, the castle, the British camp, the Roman station of Conovium, Caerhun, Bettwys-y-Coed, Llanrwst Church, Gwydir Chapel, Gwydir Castle, St. Tudno's Church on Great Ormes Head, the sixteenth-century farmhouse at Penrhynside, St. Trillo's Chapel and Plas Fynach. Among the papers to be read at the evening meetings are the following:—"Some Ancient MSS. relating to North Wales," by Mr. WALTER DE GRAY BIRCH; "Rhuddlan Castle," by Mr. C. H. COMPTON; "Clynnog Church," by Mr. CHAS. LYNAM; "The History of Rhos Rhuvoing, the Lordship of HENRY DE LACY," by Mr. MEREDITH J. HUGHES; "Caves and Passages under the British Camp of Pen-y-Gaer, Conway Valley," by Lady PAGET; "Some Early Settlers near Conway," by Mr. J. S. PHENE; and "Conway Castle," by Colonel G. LAMBERT.

SIR JOHN EVANS has had a long practice in addressing assemblies of men of science, and it was, therefore, to be expected that his presidential discourse at the meeting of the British Association in Toronto on Wednesday would be successful. To some extent his appearance in the presidential chair was anomalous, for it was likely to give an erroneous notion of the aims of the Association. As announced by the title, it is the British Association for the Advancement of Science; the present and the future concern it, not the past. But when by the exercise of no little diplomacy an anthropological section was formed in the Association, scope was given for the display of researches in prehistoric archæology like those in which SIR JOHN EVANS has been engaged.

A STUDENT who occupies himself with the past could not speak with authority about the advancement of the various branches of science unless he relied on information supplied to him. What SIR JOHN EVANS attempted was more satisfactory. He was able to demonstrate that the various sciences as they advanced, and by means of their discoveries, could afford interpretations of archæological difficulties which were beyond the skill of the ordinary archæologist. One passage will exemplify the President's mode of reasoning:—"Every reader of VIRGIL knows that the Greeks were not merely orators, but that with a pair of compasses they could describe the movements of the heavens and fix the rising of the stars; but when by modern astronomy we can determine the helical rising of some well-known star, with which the worship in some given ancient temple is known to have been connected, and can fix its position on the horizon at some particular spot, say, 3,000 years ago, and then find that the axis of the temple is directed exactly towards that spot, we have some trustworthy scientific evidence that the temple in question must have been erected at a date approximately 1,100 years B.C. If on or close to the same site we find that more than one temple was erected, each having a different orientation, these variations, following as they may fairly be presumed to do the changing position of the rising of the dominant star, will also afford a guide as to the chronological order of the different foundations. The researches of Mr. PENROSE seem to show that in certain Greek temples, of which the date of foundation is known from history, the actual orientation corresponds with that theoretically deduced from astronomical data. Sir J. NORMAN LOCKYER has shown that what holds good for Greek temples applies to many of far earlier date in Egypt, though up to the present time hardly a sufficient number of accurate observations have been made to justify us in foreseeing all the instructive results that may be expected to arise from astronomy coming to the aid of archæology." It was likewise explained

how the other branches of science can become efficient auxiliaries to archæology, and afford to it that precision which is demanded if it should claim to be a science. But we intend next week to give a report of the address.

THERE could hardly be a more opportune time for discussing in Canada the subject of education in engineering than the occasion of the visit of the British Association. On Monday, Tuesday and Wednesday of the present week the Society for the Promotion of Engineering Education held its annual meeting in Toronto. The programme of the proceedings will suggest the comprehensiveness with which the subject of education was treated. It runs as follows:—The President's address, "The Scope and Relative Importance of Theoretical Study," by HENRY T. EDDY; "Methods of Teaching—by Text-book, by Lecture, by Design, by Laboratory, by Memoir," by W. H. P. CREIGHTON; "The Teaching of Machine Design," by J. J. FLATHER; "The Calculus for Engineering Students," by F. W. McNAIR; "The Influence of Scientific Research upon the Development of Chemical Technology," by H. BUNTE; "Chemical Engineering," by J. M. ORDWAY; "The Efficiency of Technical as Compared with Literary Training," by T. C. MENDENHALL; "A Course in French and German for Engineers," by A. N. VAN DAELL; "At What Point should Students engage in Specific Research, and how much Aid should they receive from the Professor?" by C. D. MARX; "Mining Vacation Field-Work," by F. W. DENTON; "To what Extent should Metallurgy be Taught in Mechanical Engineering Courses?" by M. E. COOLEY; "Engineering Laboratory Courses," by R. C. CARPENTER; "Elective Studies in Technical Courses," by H. L. MUNROE; "Manual Training for Artisans," by C. M. WOODWARD; "Manual Training in Public High Schools," by T. W. MATHER; "Graduation Theses; their Preparation, Form and Preservation," by IRA O. BAKER; "Agricultural Colleges; their Function with Relation to Engineering," by C. S. MURKLAND; "The Education of the Electrical Engineer," by W. E. AYRTON; and "A Course of Study in Electrical Engineering," by R. B. OWENS. It will be remarked that the Canadian educationists do not propose to encroach on architecture, and for so good an example they merit praise.

THE French are disposed to take up the King of ABYSSINIA with alacrity, especially as they believe he is not too friendly to British visitors. In such cases the newly adopted favourite is always supposed to possess wonderful qualities which will account for his preference of France to England. King MENELEK is therefore described as an architect. M. LAGARDE, the French plenipotentiary, says that when he was about to leave, the King brought him a plan prepared by the royal hands of a mansion which it was proposed to build at Addis-Ababa for the representative of France. It is said to be admirably arranged and combines all that architectural art and modern notions of comfort can accomplish to make the resident happy. Abyssinian houses are not remarkable for their excellence and diplomatists are not always the most trustworthy critics.

THERE will be, according to report, an important competition shortly in America which will not be confined to the numerous representatives of all nations which are to be found throughout the States. The conditions of the competition are to be arranged by M. GAUDET of Paris, and on the jury will be a deputed representative of France, Germany, Great Britain and the United States. As the building or buildings will serve for the University of California that institution will also have its jurymen. The preliminary arrangements were undertaken by Mr. REINSTEIN, the University Regent, and Mr. MAYLOCK, of the Agricultural Department. Several architects, it is understood, will be invited to send in sketch designs, and will be paid for their labour. At least ten plans will be selected for further elaboration. The authors will have the privilege of nominating four additional jurors, and the second competition will therefore be determined by nine judges. California, according to many observers, is to be the "happy land" of the future, and it is well to provide for its destiny with becoming liberality, but the grandiose character of the forthcoming competition is probably owing to an American lady becoming responsible for the expenses.

THE SCIENCE AND ART DEPARTMENT'S REPORT.

THE pages of the forty-fourth report of the Department of Science and Art present the usual array of figures, but it is doubtful whether any outsider can infer from them what is the extent of last year's progress. It may be assumed that the majority of officials are not more competent to determine results. The reason is that of late the system of teaching is undergoing modifications, and it is almost impossible to point to data which can be considered to have permanence enough to serve for any one who would wish to employ statistics as evidence. For example, in one table we find it stated that in the year 1896 the papers worked in science numbered 152,630, while those passed were 62,886. In the preceding year the respective numbers were 202,868 and 85,303. It is not until we go back to 1888 that we find so small a number of papers as in 1896, and there is no precedent in ten years for such a disproportion between papers sent in and papers passed. Out of 127,875 papers no less than 88,405 passed in 1887. The natural conclusion would be that unless the standard was elevated, or the students had degenerated, there was less success in 1896 than in 1887. But the report warns us that the figures are not comparable. From 1889 up to 1895 geometrical drawing was treated as a science subject, but in 1896 it was again included among art subjects. All that is necessary in order to mystify the public is, therefore, to take one of the numerous subjects which can be called science or art, and, according to the division in which it is placed, the totals will rise or fall. When there is so much elasticity it is vain to expect precision. But apparently there is no manipulating method which will veil the stern fact that expenses are increasing. Each individual science student in the schools in 1895 cost the country 14s. 9d., but in 1896 the cost was 17s. 7d. For each student in each subject last year the cost was 12s. 3½d., while in the preceding year it was 9s. 1¼d. Art is imparted on more economical and it must be said less variable terms. Embryo English artists can be trained at the rate of 1s. 9d. a head; in Scotland 1s. 8½d. is enough; while in Ireland they are turned out for 1s. 6½d. An economist will ask why the Irish method of using the money is not more generally adopted?

If the figures which have cost so much to collect, tabulate and print are not "comparable in all respects," what is to be said of the examiners' reports? The procedure followed in assessing the value of the students' works, if it were fully described, would form an amusing article. Some judges appear to be always fortunate in receiving a multitude of satisfactory attempts. There are others whose reports suggest that they wish they were endowed, like the sad-eyed justices of the hive, with power to deliver to executors pale the lazy yawning drones. The English language, too, is limited in adjectives, and the examiners are generally afraid to display acquaintance with them. In consequence, when year after year the work in any one of the wide sections of science is characterised as "on the whole good," or "fairly well," or "not distinctly good," or "not very high," or "of average merit," or as poor, satisfactory, weak, very low, &c., it is difficult to resist asking what is the significance of the scale of merit which is graduated so indefinitely? If the work is "poor" in one year and "weak" in another, are we to conclude that science classes are improving, or the reverse?

Reports of Government departments would hardly be tolerated unless there was a more than diplomatic vagueness about the statements, and the South Kensington annuals have the quality in perfection. It is evident, however, that plain speaking has at last some representatives. In the last report it is found in the remarks about school and college buildings. The Royal College of Science, which as the work of an official who was not a civil architect, was long bepraised as an example of what the Department could accomplish by its own staff, is one of the structures which are not spared. The Professor of Chemistry says of his laboratories:—

Frequent reference has been made in earlier reports to the defective ventilation of the laboratories, and the Professor regrets that no serious steps have yet been taken to remedy a state of things which, in the winter months, produces much inconvenience and must be frequently prejudicial to health. In

the South Laboratory this is the more noticeable, since not only are the draught cupboards most inefficient for the purpose of preventing acid and other fumes from finding their way into the laboratory, but the sulphuretted hydrogen cupboards are also actually in the laboratory itself, and this offensive gas frequently passes into the atmosphere of the laboratory and balance-room almost as much as into the flues provided for its escape. There can be no doubt that the students whose benches are near to the sulphuretted hydrogen cupboards are exposed to the risk of injury to their health, since the amount of this noxious gas in the atmosphere of this portion of the laboratory is sufficiently large, on an ordinary working day in the winter term, to make it impossible to carry out satisfactorily the estimation of silver, copper and lead, owing to the sulphide formed in solutions of their salts by contact with the air during the ordinary analytical operations. Ventilation, in the proper sense of the term, does not exist. There are no means either for exhausting the foul air from the laboratories or for forcing fresh air into them, and the only way of changing the air is by opening the windows and thus obtaining a through draught—a procedure which, in the winter months when the laboratories are most crowded and most in need of ventilation, is a fruitful source of colds and chills, as well as of inconvenience to the workers using gas flames for heating purposes.

When the Royal College of Science is in so discreditable a condition it is hardly to be expected that in minor laboratories there would be more respect for sanitation. We are consequently little surprised when we find one of the senior inspectors saying:—"I regret to find that in many new laboratories architects and makers of laboratory fittings are content to reproduce the old conditions without caring to ask advice in the former case, or to alter their stock patterns in the latter. I have seen during the year at least a dozen new chemical laboratories without a single sink placed in a proper position, or a single fume closet suitable for anything but a sulphuretted hydrogen apparatus. Schools which thus blindly take whatever makers choose to provide cannot surely feel surprised when on inspection the arrangement or fitting of the laboratory is adversely criticised. The responsible chemistry or physics teacher is often the last person consulted as to the requirements of his own special department." The inspector ought to have known that architects are not always called in to design laboratories, and when they are it is considered necessary to scrupulously follow the instructions of somebody who claims to be an expert. There is also supposed to be an official type, and that any departure from it will have an injurious effect on the future success of the school. The power possessed by the representatives of science in such cases is suggested by another report, where it is said, "In not a few towns the technical committees appear to consider technical education to consist mainly in the teaching of trades, languages, cookery, dressmaking, shorthand, &c., and have ignored the art school as outside their domain." The applicability of drawing in the trades and crafts is not considered. Hertfordshire is a notorious offender, for in the whole county there is not a single girls' school or department in which drawing is taught.

The question of providing technical schools of a satisfactory kind will have to be met in a short time if there is to be any advancement in technical education beyond the most elementary stage. It appears that the secondary schools of Surrey and Hampshire have at least one laboratory, and some have workshops also. But many of those schools have been largely endowed, and it is not very difficult for them to provide the apparatus and accommodation which are demanded. But there are also schools which have no aid of that kind, no dead hand regularly bestowing gold, yet these schools might be able to take more advantage of instruction than their more fortunate rivals. But the county councils appear to have favourites, and where possible departmental schools secure the larger share of grants. Why should Portsmouth, out of a grant of 3,000l. a year from the county council, bestow no more than one donation of 40l. on the promotion of science in the local grammar school, where the money would be wisely applied, and where the funds are always insufficient? In fact, the money question is too influential in some of the schools. Some organised science schools, says one inspector, have actually deleted from their time-tables any subjects but those capable of earning money grants. The students take the same view, for we are told that "in the evening school the bread-and-butter value of a particular science will for a

long time be the chief incentive to its study, whatever inducements teacher or governing bodies may hold out to the contrary." In Ireland, which seems to be ruled by some principle of contrariness that is omnipotent, the money allotted to science is devoted to a sort of literature. The Irish inspector writes :—

The course of study is framed at the beginning of the school year, and executed during the year, so as to earn the maximum grant from the Board of Intermediate Education. The results paid and the prizes awarded by this Board are so liberal that teachers and pupils alike are focussed on them throughout the session, so that, naturally, only those subjects which pay, and pay best, for the Intermediate are taken up in the schools. Now the Intermediate Board makes practically no provision for instruction in science or in art—if elementary mathematics be excluded—almost the whole bulk of their grant being awarded to literary subjects. Science does not "pay," and the schools cannot be expected to take it up until it does pay. Thus it is clearly established that not only has no portion of the large sum of money received under the Local Taxation (Customs and Excise) Act been spent in the encouragement of science in Ireland (as it is in England), but that it is so disbursed that the very reverse effect is produced. Under these circumstances, it is not strange that in Ireland we have no organised science schools, no practical physics in the schools, and hardly any practical chemistry. In most of the schools where science classes are held in connection with the Department, the teaching consists of mere "lesson-hearing," and no attempt is made to illustrate the subject by experiments performed before the class. The apparatus in many cases is not even exhibited to the class, as some teachers consider the pictures in the text-books more instructive and less troublesome.

When science is taught in so mirthful a manner, who can wonder that so few Irish names are found among the inventors in the patents list, or that the contributions from Ireland to scientific journals and transactions should be so rare? The Irish system represents the most useless teaching. It deserves to be contrasted with the system which the inspector of the Oxford division sketches as absolutely necessary if the country is to hold the rank which is desirable. He says :—

If science and art and technical knowledge in this country are to be brought to anything approaching the excellence which is attained on the Continent, where I have had considerable opportunities of studying the systems which prevail, it is imperative that in each district of the extent of the average county there should be erected, and maintained in a high degree of efficiency, at least four central institutions of the nature of first-class science and art and technical institutes; these should be provided with lecture rooms and laboratories for the teaching of pure science, which must always form a large part of the knowledge imparted, as a fundamental basis upon which all future specific technical instruction must rest, with adequate art rooms, with mechanical and technological workshops and laboratories, and with rooms available for the colloquial teaching of modern languages and for commercial subjects. The pure science rooms should include not only a chemical and a physical, but a biological laboratory, the latter being especially useful for elementary instruction in botany and physiology. In addition to these institutes for the benefit of both day and evening students, there should be, either in connection with or in close proximity to each of such institutions, a really good secondary school, where, in addition to the usual literary subjects, including modern languages taught to be spoken as well as read and written, the importance of which is not to be overrated, a considerable proportion of pure science should be practically taught; a school, in fact, of the type of the better organised science schools. The elementary schools should be made to lead more directly to the spending of at least two years in such secondary schools, after which two or three more years' work in the evening classes of the science and art and technical institutes would be spent with the maximum of advantage, and if these latter institutes approached the high order of efficiency which is so desirable, this country would soon take rank with Germany in the training of its youth for the important labours of their maturer life, and with the final polish, and a training in original investigation given to as many of the most successful students as possible in the University colleges, we should have nothing to fear from foreign rivalry.

It would be possible to do much to realise the proposal if the large sums of money which were disposed of by county councils out of the drink duty were applied to the erection of suitable buildings, instead of being frittered away in a number of small grants for the purpose of teaching rustics to execute attempts in repoussé, carving and other

fashionable accomplishments. One obstacle to the arrangement is the belief that in the old days all the arts which were required by men were taught in humble rooms, or, as in Mediæval times, in shanties erected in woods. Science will not allow itself to be treated in that way. It is only in suitable buildings that she will impart the secrets which will revolutionise life. We imagine also the Department will never support with warmth any scheme of four schools per county. The rows of figures which appear in the annual reports have been always supposed to be the main support of the Department, although not comparable in all respects, and to substitute for them a few columns relating to efficient teachers and earnest students would involve more self-sacrifice than is to be found at South Kensington.

It must be felt also on reading the report that whether the money voted for science and art is expended in the support of a comparatively few high-class schools or colleges or distributed among many village schools there will still be waste. Owing to the want of some power that can exercise control throughout the country, educational institutions appear to be undoing rather than co-operating in common work. Birmingham, for example, has an endowment which enables about 3,500*l.* a year to be spent on two high schools and seven grammar schools. According to the inspector, "Not one of these schools is conducted on the lines of a modern scientific school; and, considering the requirements of the city's large and varied industries, there is little doubt that a large proportion of the children who attend these schools would be more benefited by such an education than they are by that which they now receive. The School Board have supplied the deficiency, but inasmuch as the 'scholarship at the grammar school' is the blue ribbon of elementary education here, the organised science schools under the Board only get the rejected candidates." If we possessed an Education Department that was vigorous such an anomaly as is found in Birmingham would have a short existence. When the School Boards are allowed to adopt systems of their own for teaching drawing we have additional examples of short-sighted policy. If any of the pupils should afterwards attend the Department's art schools it will be necessary for them to unlearn many things on which time was wasted. In Birmingham the danger is obviated by making the head master of the Municipal Art School responsible for the system of teaching adopted in the primary schools. But the unity which is feasible in that case cannot be secured in the relations between the grammar schools and Board schools.

WIRING FOR THE SUPPLY OF ELECTRICAL ENERGY.

THE rules just issued by the Council of the Institution of Electrical Engineers "embody the chief precautions and requirements which the Institution considers necessary to secure satisfactory results. They have been drawn up to meet the ordinary cases of dwelling-houses, offices or business premises, but they are not intended to take the place of detailed specifications drawn up by consulting engineers to meet individual circumstances. They are confined to a statement of well-ascertained requirements, and do not recommend any special system or form of apparatus by which these may be best fulfilled."

The above are the objects of these excellent rules, which may be taken as the standard, as the gentlemen who have had the matter in hand are experienced in the carrying out and designing of wiring, some having been connected with this industry from the very commencement. We might add that there should be another object, and that is to secure their adoption by each and every insurance company.

The present number of rules, often different in essential principles, make it necessary for some one standard to be adopted, and what standard is there more desirable than that drawn up by the leading electrical engineers of the day? The point which strikes one most in reading the rules is the broad basis on which they are formed and the clearness of the recommendations.

Proceeding to the actual rules themselves, the chief point of novelty is the basis upon which the carrying capacity of wires is arrived at. For the first time in elec-

trical installation rules, the 1,000 ampères per square inch clause has been abandoned.

It is recognised that the limit of carrying capacity is that the wire shall not heat sufficiently to damage its insulation or its other surroundings. The 1,000 ampères per square inch rule does not recognise this, as a small wire will carry much more than 1,000 ampères per square inch without undue heating, while the large cables will not. This is due to the fact that the small cables have a much larger radiating surface per square inch of section than the large ones, hence they will keep cooler.

The rules as regards sectional area of cables are :—

"Their sectional area shall be proportional to the heating effect of the current required for the maximum number of lamps or other current-using apparatus that can be used simultaneously on the circuit.

"They shall be of such size that, when the maximum current is passing continuously through them, their temperature shall not exceed 130 deg. F.

"It is imperative that this temperature of 130 deg. F. should never be exceeded.

"If the maximum temperature of the British Islands be taken as 100 deg. F., then the increment due to electric heating must not exceed 30 deg. F."

A table is given showing the safe currents allowed in various sizes of wires. Column 1 gives the sizes of conductors in common use; column 2 gives the maximum current for situations where the external temperature exceeds 100 deg. F.; column 3 gives the length of wire in yards causing a drop of 1 volt when transmitting the currents in No. 2; column 4 gives the maximum current allowable in any situation; and column 5 the length of wire giving 1 volt drop. There are other columns giving thickness of insulation and minimum insulation resistances.

A few extracts from this table may be of interest :—

1 Size, S.W.G.	2 Max. current, hot places (amp.).	3 Length for 1 volt drop (yards).	4 Max. current allowable (amp.).	5 Length for 1 volt drop (yards).	6 Current at 1,000 amp. per sq. in. (amp.).
18	3.1	23	4.2	18	1.8
20	4.8	26	6.6	19	3.06
22	4.9	27	6.8	19	3.2
24	6.2	28	8.7	20	4.4
26	7.0	29	9.8	21	5.0
28	9.3	31	13.0	22	7.2
30	14.0	37	21.0	25	12.8
32	23.0	40	34.0	27	22.9
34	32.0	45	49.0	29	35.6
36	70.0	56	110.0	35	97.3
38	100.0	66	170.0	39	164.7
40	180.0	73	300.0	44	321.7
42	260	82	450	47	531.9

Column 6 has been added for purpose of comparison.

It will be seen that all sizes below A are allowed by the I.E.E. rules to carry more than 1,000 ampères per square inch in hot positions, and those below B in ordinary places, while the cables larger than these are not allowed to carry so much as this.

Another point of novelty is the recognition of lead-covered wires for house wiring. This is not provided for in any fire office rules with which we are acquainted. There are two kinds of insulation recognised:—

A. Those insulated with a material as a dielectric which is itself so impervious to moisture that it only needs further protection from mechanical injury or from vermin.

B. Those insulated with a material as a dielectric which, in order to preserve its insulation qualities, must be kept perfectly dry, and therefore needs to be encased in a waterproof tube or envelope, generally of soft metal such as lead, which is drawn closely over the dielectric.

"When Class A is used the dielectric must be perfectly damp-proof, and not in any case less in thickness, measured radially, than thirty mils. plus one-tenth of the diameter of the conductor. It should not soften at a lower temperature than 170 deg. F.

"When Class B is used the same conditions as to minimum thickness and softening temperature of the dielectric should be enforced as in Class A. Its covering should be such that a test piece cut from the conductors and immersed in water will not break down when an alternating pressure of 2,500 volts, having a frequency of from 40 to 100 periods per second, is applied for ten minutes between the conductor and the water, the test piece previous to immersion having been bent six times

(three times in one direction and three times in the opposite direction) round a smooth cylindrical surface not more than twelve times the diameter of the conductor measured outside the dielectric."

"Conductors of Class A must be protected from mechanical injury by being covered with a stout braid or taping, prepared so as to resist moisture, and must be further protected by casing or by being drawn into pipes or conduits." In the case of Class B the utmost care must be taken to keep moisture out of the wires at the ends, where in switches, &c.

There is rather a curious test for flexible cords, which stipulates that the twisted conductors shall stand a pressure of 1,000 volts between them while suspended over a pan of boiling water, not further away than 3 feet. We would not like to guarantee that 10 per cent. of the flexible cord now in use would stand this.

With regard to casing versus draw-in systems, the latter is preferred. "The use of a draw-in system in which both conductors are drawn into one strong incombustible tube or chamber, or their equivalent, is preferable to wood-casing with spaced conductors, as safety is better obtained by the use of a suitable insulation of the wires themselves than by trusting to the wood-casing or to the spacing for insulation purposes."

Bunching of conductors is allowed for circuits carrying less than 5 ampères. Conductors of opposite polarity may be bunched if enclosed in an incombustible tube or conduit. These last two paragraphs could be studied with advantage by all fire insurance inspectors, especially those who pin their faith to wood-casing, and will not hear of any other system being used.

A test for a switch which is suggested could be used with advantage is to test the switch with 50 per cent. more current and pressure than that with which it is to be used, and no arcing should result.

A point is mentioned which is often overlooked, viz. that in a three-wire system the member of the switch connected to the middle wire should make contact sooner or at the same time as the others, and break contact at the same time as or later than the others. Otherwise, if there is want of balance, the lamps may be burnt out.

We are glad to see that, providing that the fuse of a sub-circuit is sufficient to protect the smallest wire on the circuit, there need be no cut-out in the ceiling roses. These cut-outs have been a great nuisance in times past, and they are a danger with high voltage fittings, as a permanent arc may be started by one going. It has to our knowledge been very difficult to persuade fire insurance inspectors of the futility of these fuses.

There is one mistake, or, at least, an absurdity. In the rules for dynamos and motors it states that they should be protected from damp and dust, and should be so placed that no woodwork or inflammable material is within 12 inches from them horizontally or 4 feet measured vertically above them; also in the case of accumulators the same rules are said to apply. Now it is evident that accumulators and dynamos are rather different, and we have never seen a battery of accumulators which has not been on wooden stands, and we fail to see any danger in the practice. This point should certainly be altered at the earliest opportunity, as it mars an otherwise almost perfect set of rules.

A very easy and good rule which is given for the insulation resistance an installation should have is 10 megohms divided by the maximum number of ampères required.

We are pleased to see that systematic inspection and testing is urged strongly as a precaution against fire and annoying failure of the light.

In conclusion, we can recommend these rules as being fair and unbiassed, and capable of universal application by fire offices, architects and others. Restrictions are not placed upon any system or systems of wiring; the principles underlying the rules are scientific, and the results are reasonable, not dogmatic; and there is no doubt that a great benefit would be derived by their universal adoption and the suppression of some of the antiquated ones now in use.

Mr. Alfred Saxon Snell has been appointed by the Willesden Board of Guardians as architect for their proposed new workhouse, infirmary and cottage homes.

THE ENTASIS IN ITALY.

IN the *Architectural Record* (New York) for the present quarter Professor Goodyear pursues his investigation into the use of curves instead of right lines by Italian architects. His paper, entitled "A Discovery of the Entasis in Mediæval Italian Architecture," of which the first part is printed, contains a remarkable series of examples which are derived mainly from the cathedral of Pisa. Visitors to Italy will find it advantageous to be equipped with the Professor's articles, which are made more impressive by excellent reproductions of photographs which were prepared under his direction, and are therefore not to be confounded with those which are intended for the public in general. Professor Goodyear concludes by describing some examples of entasis found in buildings of a later date. He says:—

In these last paragraphs we have abandoned the treatment of the entasis in Mediæval piers in order not to omit new illustrations or corroborations offered by these pictures of points previously dwelt upon, all bearing on the general fact that subtleties of construction were systematically practised by the Italo-Byzantine builders. Additional cases of the Mediæval entasis will be described in a following paper. Meantime its general character may be further illustrated by a well-known Renaissance theatre, the Teatro Olimpico at Vicenza.

The Teatro Olimpico is a design by Palladio, constructed after his death. The stage scenery is a stationary construction of timber and stucco. Its central arch shows Palladio's use of the entasis in pilasters, a use which in this instance gives exactly the general results of the backward bend of the pilaster into the curve of the arch which appears in S. Miniato at Florence and in many other Mediæval piers. The same bend appears in S. Stefano, a Renaissance church of Vicenza, as a result of the use of the entasis in pilasters. And the Gothic cathedral of Vicenza offers a closely analogous and impregnable case of the corresponding Mediæval entasis. This is the church already mentioned as showing an entasis in half-columns which face chapel walls, instead of piers. These walls are solid, without even the break of a doorway, and are about 20 feet in depth.

It has been observed in the opening of this paper that Palladio's use of the entasis in pilasters is supposed by modern architects to be without a Roman precedent. A photograph from Baalbec shows, however, that the entasis was used in pilasters by the Roman architects of the second century of our era. I noticed this entasis at Baalbec in 1869, since which time the photograph now published has been in my possession. It is well known that many and important ruins of the city of Rome have disappeared since the sixteenth century. Two suppositions are therefore possible, either that Palladio did independently what the Roman art had done already, or that he was acquainted with Roman examples in Italy, similar to that at Baalbec, which have since disappeared.

In either case it is probable that we have at Baalbec an example of a Classic entasis which cannot be explained by theories of optical correction, and which must be due to æsthetic considerations. It is true that our instance is of corrupt style, but it is none the less important historically. None of the explanations of an optical illusion causing an apparent concavity of lines, to be corrected by an outward curve, will apply to such a case. The habit of considering the entasis of the Roman and Renaissance engaged columns as a wholly imitative feature, due to a cause existing in porticoes and not existing in the engaged columns themselves, may receive some shock from this example. As long as æsthetic considerations are allowed to have some share in the conception of the Greek entasis (also generally quoted for Egyptian obelisks) it would appear that they must have had a still more distinct influence in the engaged columns and pilasters of Palladio and of the Romans. Certain it is that the Palladian palaces of Vicenza are, of all Renaissance buildings, those which strike the student of optical refinement as having an effect of optical mystification analogous to that found in certain Mediæval buildings. Is it not possible that this is due to Palladio's universal and emphatic use of the entasis—his use of the curving line?

The point to be kept in view, however, is that, as a matter of fact, there are two sixteenth-century Renaissance examples at Vicenza of a peculiar bend of the piers supporting an arch, and that this bend is a counterpart and continuation of the Mediæval entasis of the pier.

This leads me to say that in the composition of this article I have been influenced to some extent by the very important letter below appended, and originally published in the *Evening Post* of May 3, which Professor Charles Eliot Norton was good enough to write me on the score of the discoveries which have been published in the *Architectural Record*.

Dear Mr. Goodyear,—I am much obliged to you for sending to me a copy of the last number of the *Architectural Record*. Your article in it is of great interest, and, in continuation of your former paper, it brings together a series of facts which cannot but change our con-

clusions in many respects in regard to the principles and methods of Mediæval building. You have opened a vast field for discussion, and you have provided a mass of material so exact and so well selected as to furnish a solid basis for the work of future inquirers.

But it seems to me that one result of your investigations is that much wider investigation must now be undertaken. Your work, while it solves many questions, has but opened many others. One of the most important, certainly one which it is very desirable to determine in order that we may understand properly the principles of Mediæval building, is whether the builders of the churches which show these remarkably designed irregularities erected them on a basis of well-recognised principle derived from authentic tradition, or whether in their construction they were using simply empirical methods handed down from generation to generation without intelligent understanding of their real significance.

If their work was based on a tradition from ancient times it is a surprising fact that we have no literary record of the principles by which they were guided, no reference, so far as I am aware, in any work later than Vitruvius indicating that the architects possessed a body of traditional principles by which the character of their work was determined. (And when was the tradition lost? How did the precious knowledge vanish from the minds of men?)

I am much obliged to you for bringing to my attention Mr. Middleton's article in the *Nineteenth Century*; it is a just but hardly a sufficient recognition of the value of your work, and it is of service as calling attention to the fact that there is now need of much more elaborate examination and careful measurement of the best Gothic structures in England, as well as on the Continent, than they have heretofore received.

I hope that it is your intention to gather up your own various articles upon the matter into a volume. It is not easy always to study a subject which is to be looked up in various numbers of various magazines. I hope also that your interest in the subject is such that you will carry on your investigations in other regions than Italy, for there is no one who understands so well as you the various points which are to be regarded, and the risks of overlooking some of the matters which require closest attention. Indeed, one of the most instructive general results of your investigations is the conclusion which one is forced to draw in respect to the fallibility of human perceptions, and the carelessness of our common observations of the objects which present themselves to our sight.

C. E. NORTON.

Prof. William H. Goodyear.

Two questions are raised by this letter which require consideration. How did the use of Mediæval optical refinements come to disappear, and why have we no record of them?

I suggest, on the first head, that they did not wholly or suddenly disappear with the close of the Middle Ages. The horizontal curves are found in the parapets of the Certosa at Pavia, which is Early (fifteenth century) Renaissance. The vertical curves appear in the Teatro Olimpico and in S. Stefano at Vicenza in a similar form to that which we find in the Gothic cathedral of Vicenza. It is well known that perspective illusions were practised by Bernini (Scala Regia) and by Borromini (Palazzo Spada). In fact, up to date such illusions have been only recognised as occurring in the Late Renaissance. The nave of St. Peter's narrows in 9 feet 4 inches between the entrance and the transept. This is quite possibly due to some special cause connected with the lengthening of the nave by Carlo Maderna, but it is not wholly impossible that an optical trick of the Bernini style is in question here. There is no doubt that a very considerable increase in perspective is obtained by this narrowing in of the nave at the third pier, and there is no doubt that this element of effect in increase of magnitude is universally overlooked. The deflected ground plans of the Middle Age are also paralleled in St. Peter's, whose nave axis is deflected about a foot from that of the choir. One is tempted to ask whether there have not been Masonic secrets which the Freemasons have neglected since they ceased to be masons. It may be that the secrecy of some of the Masonic guilds which preceded and developed into the modern secret society of the Freemasons may answer one of the questions which Professor Norton has raised as to the absence of written mention of the Mediæval refinements.

As to constructive asymmetry in the Renaissance, there is a suggestive passage in a recent German journal, apropos of the opening to the public of the Appartamento Borgia of the Vatican. I owe to the politeness of Mr. Edward R. Smith, curator of the Avery Library, my knowledge of this extract. The original German will be found in the *Kunst-Chronik* for May 15, 1897:—

Was it intention or was it necessity that none of the walls are parallel in any of the rooms of the palace of Nicholas V. or of the Torre Borgia? . . . All the apartments have the form of an irregular trapezoid. There are no right angles at the corners of the rooms. Consequently the division of the spaces of the vaultings (and their frescoes), and also of the walls, could not be managed without a certain haphazard (or arbitrary) appearance. Were the picturesque results reached consciously or unconsciously, by the abandonment of rules which no modern architect fails to consider? At all events, the Appartamento Borgia offers in this line also an abundance of material for thought and for study, and the influence which the arrangement and decoration of these magnificent rooms, now once more thrown open to the public, are destined to exercise on the palace architecture of modern times cannot be estimated.

Similar facts to those quoted may be noted in the Stanze of Raphael, and they are especially apparent in a more oblique setting and alignment of the pavement mosaic patterns than the irregularity of the walls would seem to call for. The given rooms are a construction of Bramante, just succeeding in time to those of the Appartamento Borgia. It is quite certain that one superiority of the early Renaissance architecture to the more formal and frigid later Renaissance style lies in its off-hand spontaneity and acceptance of natural irregularity. Possibly it also shows an occasional purposed avoidance of symmetry. There are very strong curves in plan in the loggie of the Vatican built by Bramante, which face the piazza. They are not due to movement of masonry, as they reappear in the inner wall of the third storey loggia. They may be due to carelessness, but it has not been usual to charge Bramante with this fault. Moreover, the inner wall curves and outer cornice curves are parallel.

Thus the survivals just quoted and others which may be brought to light, may illustrate a further gradual and natural dying out of the Mediæval refinements, which is already a very marked feature of the North Italian Gothic. Their ultimate entire disappearance would not be a startling fact in view of the tendencies to artistic blindness in our own age which the failure to notice the Greek entasis appears to specify and illustrate.

If the artistic effects obtained in many Mediæval buildings were due to a highly cultivated artistic sense, then the gradual dying out of this artistic sense, which seems to be a conceded result of nineteenth-century progress, would explain the disappearance of architectural refinements. If empirical observation of optical effect was one source of these refinements, the weakening of the modern eye will be one explanation as to why these effects are no longer studied. If traditional continuation of ancient classic methods was one source of the refinements, the gradual weakening of classic tradition through the later Middle Age will also explain their disappearance.

As to the absence of written records, which Professor Norton mentions, it is my impression that Mediæval writers did not indulge in architectural disquisitions or treatises on building. In so far as they have failed to give us systematic information on other points, it is not surprising that they should also have neglected this one. It appears in our own time that it is already growing difficult to write a connected history of the evolution of the steam-engine, owing to the disappearance of important early plans. Is it not a general rule that a vigorous and vital art does not tend to lay stress on literary record or literary elucidation? It would appear that the Greek works on the theory of architecture were later than the creation of the greatest monuments. In spite of the disappearance of these classic records, it is well known that many such existed, and that both optical corrections and optical illusions were considered by them. The preservation of Vitruvius was a lucky chance, and without it, it appears possible that the Greek curves might never have been discovered. We know that Pennethorne was prompted to look for the Parthenon curves by connecting his memory of those at Medinet Habou with the passage in Vitruvius prescribing the curves. These points are suggested with great deference to Professor Norton's superior knowledge of the matters concerned, and they may be summed up as follows:—The absence of literary mention during the Middle Ages may not be especially surprising, in view of the close bonds, professional jealousies and traditional secrecy of the Masonic guilds. The ultimate abandonment of optical refinements is preceded by an earlier dwindling away of the exceptional prominence which obtains for them in the eleventh century, especially in the Pisa Cathedral and St. Mark's. The Renaissance does show very late and very distinct survivals. Altogether, I think we shall be led by a study of this subject to a more vital apprehension of the overwhelming shipwreck which the Italian Renaissance brought upon Mediæval art—a shipwreck clearly prophesied in the Italian Gothic.

THE PARTHENON.

A CORRESPONDENT of the *Times* writes:—The Parthenon is doomed. These words are calculated to bring sorrow to the heart of every lover of Greece and Grecian culture. Perhaps many who have only seen the stately pile from below will be inclined to doubt the statement thus brusquely made. Indeed, when one sees the ruin from a distance or looks up at it from among the pillars of the western façade it seems so strongly built, so secure, that the visitor has no thought of decay and ruin, but leaves the place under the impression that the Parthenon will continue to defy time for countless ages. But the fact is that ever since the earthquakes of several years ago the immediate ruin of the Parthenon has been a foregone conclusion in case another earthquake should occur before certain repairs shall have been completed. As I write, in the spring of 1897, the whole western façade is

disfigured by an immense scaffolding, built in the strongest possible way from enormous beams that were brought all the way from America to serve Athens. This mighty scaffolding subserves a twofold purpose: primarily, it enables the architects to replace certain rotten and broken architrave blocks with fresh blocks; but its important secondary purpose is to serve as a prop to the entire entablature, and prevent the collapse of the building in case of an earthquake. I gained admittance to this scaffolding on two occasions recently. I was thus enabled to examine at close quarters the frieze of the western end, a privilege for which many have longed in vain. It is a privilege, too, that will not be reoffered to any one when the present scaffolding shall have been removed. From the base of the columns below any study of the frieze is out of the question—first, because, owing to the projecting epistyle, the bottom of the frieze cannot be seen, then because the whole frieze is distorted by the sharp perspective, and the lower-lying parts of the reliefs are hidden by the higher. The scaffolding affords, then, a unique opportunity for the study of certain chapters of Pheidias art.

But not to dwell upon the frieze longer in this connection, I must say that I was dismayed at what I saw. The inside and interior stones of the entablature are rotten throughout. In many cases these rotten stones were broken by the recent earthquakes into many pieces, though by the veriest miracle these pieces still cling together. As is well known the epistyle consists of three huge blocks that stand on their narrow edges side by side and span the intercolumniations. Of these three blocks the outside ones alone are comparatively sound, while the interior and inside blocks are in a most ruinous condition. All of these inside blocks are to be replaced by new ones that are now lying on the ground below ready to be hoisted into position as soon as the mighty derrick that is to lift them on high shall have arrived from Europe. The thought of new epistyle blocks in the Parthenon is shocking to most souls, and yet it is a choice between that and immediate ruin. The new blocks will be coloured with oil and wax in order to rob them of their glaring whiteness and newness. But even more sorrowful is the fact that, though this ruin may be stayed for one or two centuries yet to come, still in the end the Parthenon must collapse unless virtually the whole entablature be replaced by new and sound stones.

Am I asked for the reasons for this ruinous condition of the Parthenon? There are several reasons, several causes, some of which have been in effective operation for many years, though all unsuspected. We have been brought up to believe that the Parthenon was a perfect building erected by master builders, who employed only the best material in its construction. It occasions a shock to discover that though this is true in general, yet it is true with certain limiting qualifications, because of which the building is now threatened with ruin. In point of fact the builders of the Parthenon employed first-class marble only on the outside of the building, only where the eye could see it. In the Pentelic marble there are veins of schist that disfigure and ruin many a fair block. Visitors will remember the many unfluted drums of columns that lie here and there around the temple. These are drums that were rejected of the builders—rejected because they were faulty in some way, often precisely because of this disastrous vein of schist. Indeed, one of the new epistyle blocks has just been rejected by the committee of architects because of its faulty character, which was discovered only after the block had been completely hewn and was ready to be hoisted into position. No doubt that block will remain there for centuries to come, just as the rejected drums of columns have lain for these decades of centuries. Now, of course, perfectly sound marble was employed in columns, both because they were completely visible and also because they had a great weight to carry. Sound marble was employed also in the outside stones of the entablature and of the cella walls, but the inside stones of the cella walls, and the two inside stones of the epistyle were faulty from the start—faulty because of this vein of schist. As long as the building was covered by a roof the faulty character of these stones was of no importance whatever, and, as is well known, the Parthenon was always covered by a roof until its final disruption by the gunpowder explosion two centuries ago. The ruin that now threatens the portion left standing on that fatal occasion began from the moment of the explosion, and it has become more serious with each succeeding year. The roofless condition of the building has made it possible for the rain to penetrate into the schist-veins of the faulty stones. At first but slight damage was done to these stones, but the frost of winter and the scorching sun of summer made the evil greater from year to year, until at last the scales fall from our eyes, and we discover that these stones are rotten throughout. The horror was revealed in its full extent by the earthquakes, when a number of these rotten blocks were shivered into many pieces. The fact that these splintered blocks did not fall is due to the soundness of the neighbouring blocks on the outside. But though the ultimate cause of the ruinous condition of the Parthenon was the employment in its construction of poor marble for interior and

inside stones, which two centuries of exposure to rain, frost and heat have made rotten, still other things have conspired with these, namely, fire and cannon-balls before the disruption and earthquakes at all periods.

The repairs that are to be undertaken now are not to be thoroughgoing, but in fact are only temporary makeshifts, though they will perhaps preserve the building for a couple of centuries. Many will remember that twenty-five years ago the lintels of the grand doorway of the western end of the Parthenon were discovered to be rotten. In 1872 a supporting arch was built beneath these huge stone lintels. This arch rests upon the slabs of the Byzantine doorway. The present moment offers a good opportunity for replacing the broken lintels with new stone beams. Were this done, the arch and the ugly slabs of the Byzantine doorway could be removed, and then the mighty door would stand revealed in all its glory as it was conceived by Iktinos. It is known, too, that some of the stones used in this Byzantine patchdoor are inscribed. This fact is one more reason for removing the patchwork, because, to judge by the beauty and great size of the stones, the assumption that they bear valuable inscriptions does not seem to be an empty one. It is to be hoped, too, that the stairway to the Turkish minaret will be taken down. It has been left there up to the present because it supports rotten architraves; but we demand a purified Parthenon, and surely a few more new epistyle blocks would not disfigure the building one tithe as much as does this Turkish minaret. A conservative desire to remove only such of the old stones as are hopelessly rotten and broken prevails. This desire can be easily understood, and one's natural instinct is to share it; but, after all, sentiment should give place to common sense, which clearly calls for repairs more radical than those which are to be made.

And here comes in a fear for the frieze, the glorious frieze that fairly palpitates with the genius of Pheidias. When the final collapse of the Parthenon comes the frieze will be gone for ever. This remote danger, however, is not the only one that threatens the frieze; for there it stands exposed, like all the building, to slow but absolutely certain decay and ruin. In the recent earthquakes the head of one of the horsemen was broken off and dashed to pieces on the marble floor below. A similar fate is in store for the entire frieze, for the rotting process is already visible in the reliefs. In short, the reliefs ought to be removed now, so that they might be preserved in the museum for ages after the original entablature has ceased to exist. Dörpfeld did indeed propose to the committee that the frieze be removed to a safer and drier place and be replaced by a marble copy. But conservatism carried the day. The thought, too, that the removal of the frieze to the museum would seem to justify the spoliation of the shrine by the deeply-detested Lord Elgin had much to do with the stand taken by the majority of the committee. The frieze, therefore, will remain *in situ* and will perish.

There can be no doubt that the Parthenon would hold out for many centuries longer if it were covered by a roof. But it is thought by most men that a roof over the Parthenon would disfigure it absurdly. Of course it would, but then the roof would save the building, and sentiment would give the front seat to sound reasoning, which naturally would never, never do.

ROMAN ADMINISTRATION IN ENGLAND.

ALTHOUGH several hundred Roman inscriptions have been collected throughout the counties of England, and this number has been very considerably augmented by modern researches, it is remarkable how little light they throw upon the municipal organisation of the province. A single inscription exists to commemorate the sepulture of a decurion of the colony of Gloucester; while we have a hundred references to military there is no other whatever to any civil officer. It seems impossible to suppose that this can be merely accidental. Other countries teem with notices of *dumvirs*, *decurions*, *quinquennales*, *augustales* and *flamens*, but Britain is literally all but destitute of them. The solution seems to be forced upon us that the government of the Roman towns in Britain was generally purely military. Some light, perhaps, may be thrown upon this remarkable circumstance by another peculiarity in the Roman towns in Britain. All places of undoubted Roman origin among us were distinguished by the Saxons by the appellation of *Chester*, or *Castrum*; and these towns have a special type in common, to which, we believe, there is nothing similar in the Roman provinces on the Continent. They are all more or less square or oblong areas, intersected by two principal streets at right angles, such as we find to be the case at Colchester, Chester, Exeter, Chichester, Gloucester and, in fact, in every town among us which is reputed to stand upon Roman foundations. It is commonly supposed that all these places were originally legionary encampments, in which, after the reduction of the country, colonies were planted or civic establishments gradually grew up. Against this supposition,

however, the size of these enclosures seems strongly to militate. The walls of Chester are said to be two miles in circumference; those of Cirencester, as measured by Stukeley, a little more; those of Colchester about 3,200 yards; those of Exeter 3,000, and they generally range from 3,000 to 4,000 yards. Now, according to the measurements of General Roy, a camp of 1,000 yards by 600 yards would contain, on the Polybian scheme, 26,000 men, and on the Hyginian full 50,000; the first number would exceed two legions, and the second would not fall short of four. But the Polybian was the camp of Scipio; the changes introduced by Marius shook the discipline and morale of the legions, and it is far from probable that at least after the time of Julius Cæsar the soldiers could be induced to devote to the construction of their daily encampments the vast amount of labour required of them by the great captains of the republic. Hyginus details the practice of the time of Trajan, when the same extent of earthwork was made to hold twice as many men as at the earlier epoch; but this was only thirty years after Nero, and we see no reason to suppose any great change had taken place in that brief interval. If we were to press this argument, therefore, it would show that the supposed camps of Colchester and Cirencester and Chester were constructed for armies of 50,000 or 60,000 men. But it is doubtful whether there were ever more than four legions in Britain together, at least before the time of Severus, whose armies, according to Dion, were very numerous, and in the highest degree improbable that such a force was ever collected at the same time in one place. If, on the other hand, it be asserted that these enclosures were constructed not for temporary but for static camps, that is, for the permanent maintenance of a Roman garrison, we may point to the places which are known to have been established with this view—the stations of Caistor, near Norwich, of Burgh Castle, Richborough, Reculver and Lymne, and show that these places are each not more than 200 or 300 yards square.

MARINE SALT IN PLASTER.

ONE of the causes of the decay of the frescoes in the Houses of Parliament is supposed to arise from the use of plaster which was prepared from limestone from Durdham Down, near Bristol. All the beds of Durdham Down limestone are of marine origin, being full of marine shells; and, although in the long lapse of ages since they were deposited, the marine salt, with which the stone must have been saturated, has, for the most part, been washed out, yet still a trace of it remains, insensible to an ordinary analysis. It is the general practice to burn this stone into lime with braize (or cinder taken from the scavenger's yard), and this braize always contains sulphur. In burning the minute quantity of marine salt in the stone is converted, for the most part, into sulphate of soda, or the salt well-known in commerce as "Glauber salt." On most of the walls that grow cold in winter needle-form crystals are found, varying from a bloom 1-100th of an inch to needles of an inch in length, and in some instances, in damp old walls, such as the cloister walls of a cathedral, the crystals stand out to the length of 1½ inch. They are generally composed of sulphate of soda, in rare instances mixed with nitrate of potash, and sometimes with small quantities of muriate of lime and magnesia. When the weather becomes dry all these bunches of crystal effloresce, and are converted into a loose white powder, much of which drops from the wall, carrying with it shales of plaster, or flakes of paint, or films of whatever material the surface of the wall is covered with. Moisture will condense on the wall if allowed to grow cold in damp weather; the white powder is then dissolved, and the liquor, a solution of sulphate of soda, is absorbed by the mortar or plaster. Architects are in the habit of proving the value of the various kinds of stone presented for their use, for the endurance of frost, by a saturated solution of sulphate of soda, similar to this liquor, which on crystallising imitates the heaving and splitting action of ice forming from water. Accordingly, this liquor is no sooner absorbed as the wall dries than it aggregates into ice-like crystals, and the plaster is disintegrated and heaved by the dynamical force developed in their formation. The plaster having sustained this injury, the salt transforms itself, and shoots out into bunches of needle-form crystals, only to fall again into the terrible white powder, as the air becomes warm and dry. Thus a constant succession goes on of solution and desiccation, with the changes of the weather and temperature; and if the wall be permitted to cool with the frost, the ruin of the plaster is insured. Sulphate of soda exists not only in Durdham Down limestone, but unfortunately also in much abundance in all the *lias* mortars, in London clays, and in many other stones. In fact, it may be doubted if any London wall is free from its presence. We may, therefore, observe this kind of action of destruction going on more or less almost everywhere. In Rome and Florence, indeed, many frescoes have remained entire, with their colours smooth and in good order, for hundreds of years.

NOTES AND COMMENTS.

THE demands on the French Exchequer are too heavy to allow of grants for the restoration of many of the public buildings. M. BERGER has therefore proposed that the Government should dispose of a part of the land which is occupied by the fortifications of Paris. Two months ago it was admitted by the War Minister that as much of the fortifications as extend from the river along the Bois de Boulogne do not add to the security of Paris. On the other hand, the lines are obstacles to the extension of Paris. It would therefore become an advantage to many if the land occupied by the fortifications were sold, but there are other Departments of the State coveting the proceeds. At one time an effort was made to secure the money for the construction of warships, and there would be little difficulty in applying it to advance Russian interests. In whatever way the money is disposed of, there is no doubt the fortifications in question will have to make way for new streets lined with lofty buildings.

ON last Palm Sunday the cupola of a church in Brousse, in the department of Tarn, fell during service; seven of the worshippers were killed and about thirteen were wounded. On Saturday last MM. BONNET & CROUZET, architects, with MM. PELISSIER & MIQUEL, contractors, appeared before the Tribunal Correctionnel at Havre, being accused of "homicide par imprudence" in connection with the catastrophe. The church was constructed in 1867, and it exemplified the showy and insecure but cheap style which is now too common in the French provinces. The vault apparently was only a sort of shell or basin lying on the walls, without any groining or security against expansion. During last winter the rain attacked it in two ways, first by entering through the courses, and secondly by causing the walls to settle. The large congregation was also declared to be one of the factors in the collapse, for the people were not uniformly spread over the floor, and as it sank the walls became unstable. The original architect, M. RIVET, died some years ago, before the church was complete, and the responsibility was therefore cast on MM. CROUZET & BONNET, who succeeded him. They were also accused of having erected a belfry which was too heavy for the foundations. The architects claimed the benefit of the prescription in the Code Napoléon (2270), by which after ten years architects and contractors are discharged from guaranteeing the works they have made or directed. The Tribunal allowed them to go free; M. PELISSIER, the contractor, who declared that he followed faithfully the architect's plans, was also exempted; but before arriving at a decision an inquiry was ordered into the share taken by his partner in the construction of the building.

THE death of the Duc d'AUMALE has not interrupted the restoring of the picturesque Château d'Amboise on the Loire, which he had purchased from the representatives of the Comte de PARIS. The Duc's idea was to use a part of the building as an asylum for old servants of the ORLEANS family. Accordingly, he founded a society in order to evade any difficulty which might be raised by a Republican Government against such an appropriation of an historic building. He supplied sufficient money to pay for the works of restoration, and had plans prepared for the new arrangements. The part of the building overlooking the Loire is to be used as a museum. The alterations will be completed in 1899.

THE highest appointment open to an architect in the United States is that of supervising architect to the Treasury. Judging by the experience of past years, the tenure of the office is very brief. Probably with the intention of gaining an architect who is able to sustain the attacks on his conduct, which are inevitable however able or impartial he may be, it is now proposed to apply the competitive system to candidates. The salary is only about 900*l.* a year, but it is expected that a gentleman of high attainments and administrative ability will be secured. The candidates are to fill up forms giving information about their training and technical experience. They are also to submit drawings or sketch-plans, specifications and photographs, or other illustrations, of buildings

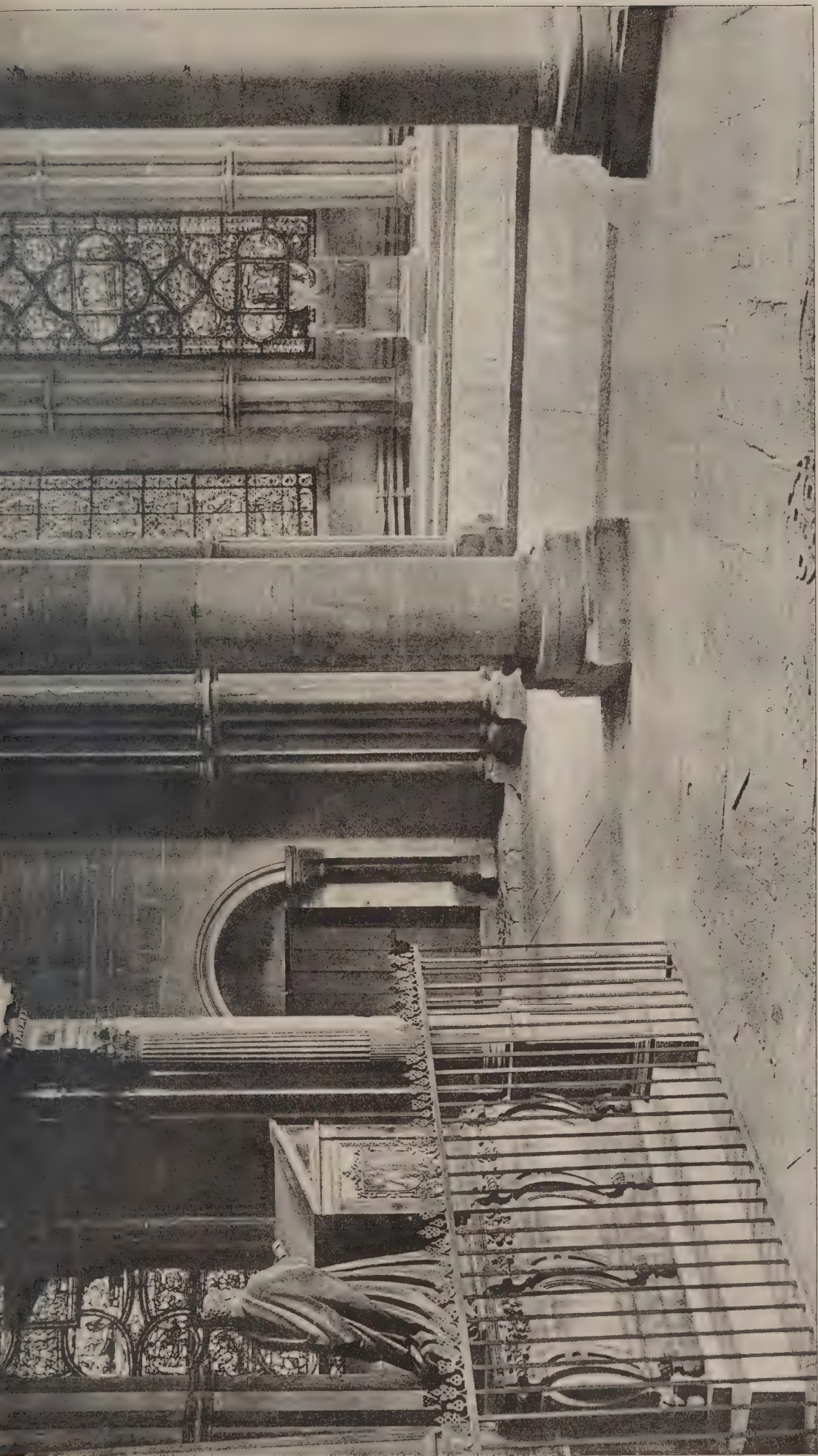
designed by them as architects, or constructed under their supervision; and two essays, one relative to designing and construction, and the other relative to office administration. The candidates must appear, on September 10, at points convenient to their places of residence, where the Civil Service Commission has suitable accommodation, for examination in regard to their qualifications for preparing a scheme for competition for a public building, and for criticising designs submitted to them for their inspection. The examination papers will be considered under the direction of the Commission by a board of architects of distinction.

HOLIDAYS are not allowed to interrupt the business of the Architectural Association for long. As a warning to all members against surrendering themselves to pleasure, the curriculum for the session 1897-98 has appeared. Not only are the classes arranged for every day, but the general meetings as well. The programme is mainly made up of practical subjects which are especially adapted for the younger members of the Association. The following papers are to be read during the session:—"Practical Lessons from the Paris Bazaar Fire," by Mr. EDWIN O. SACHS; "Classification of Trades," by Mr. S. FLINT CLARKSON; "Some New Materials for Use in Building," by Mr. H. D. SEARLES-WOOD; "The Planning of High Schools and Endowed Schools for Girls," by Mr. J. OSBORNE SMITH; "House Painting," by Mr. L. A. SHUFFREY; "Composition in regard to Public Buildings," by Mr. F. T. BAGGALLAY; "Hampton Court Palace," by Mr. JOHN BELCHER; "Leadwork, Plain and Decorative," by Mr. F. W. TROUP; "Scottish Ecclesiastical Architecture in the Fourteenth and Fifteenth Centuries," by Mr. HIPPOLYTE J. BLANC; "Constructional Steelwork," by Mr. T. C. CUNNINGTON; "The Morality and Economy of Competitions," by Mr. H. B. CRESSWELL; "Interior Lighting (Reflected Lights)," by Mr. W. ECKSTEIN; "Electric Lighting as applied to Architecture," by Mr. TOM ELKIN; "Foundations as applied to London Buildings and Riverside Foundations," by Mr. A. T. WALMISLEY.

WHENEVER several room-keepers and other occupants of a poor class are to be evicted in consequence of the proposed erection of large buildings, there is an outcry about the inhumanity of builders. In most cases it is now necessary to show that ample provision for accommodating the people is available. In a short time there will be a clearance at Westminster in order to obtain possession of the buildings which have to make way for the new Government Offices, but as yet the philanthropists make no sign of displaying any of their exuberant sympathy with the sufferers. Where there are leases the Office of Works cannot ignore them, and some sort of compensation will have to be paid to the holders. But there are few occupants who possess that sort of security. The majority of the men who occupy rooms in Parliament Street and the neighbourhood are yearly tenants, and, indeed, the tenure of many is for a shorter term. That fact has not prevented them from living there for several years. The occupants, too, form an important body. Among them are designers of engineering structures, surveyors, draughtsmen, calculators, chemists, financial agents, assistants to the parliamentary agents, &c.—in other words, the rank-and-file of the corps who have constructed great works in England according to the regulations of Parliament, and who are connected with similar works in other countries. It is not to be supposed that the occupants are richer than men in other callings who have to "devil" for their employment is precarious, and the credit of their best work is taken by those who pay for it on moderate rates. But they are compelled to live near the successful engineers, lawyers and parliamentary agents, and it is no less important for them to be able to appear in a parliamentary committee-room at a moment's notice. By turning these men out of their rooms in Westminster, especially at a time when the private bill work of the coming session is under consideration, is to cause serious inconvenience, for it is not easy to find accommodation in Westminster; but what increases the grievance is that not a penny in compensation will be paid by the Government to any occupant who is not a leaseholder, although he may have held his room or rooms for half a century.

The Architect, Aug. 20th 1897

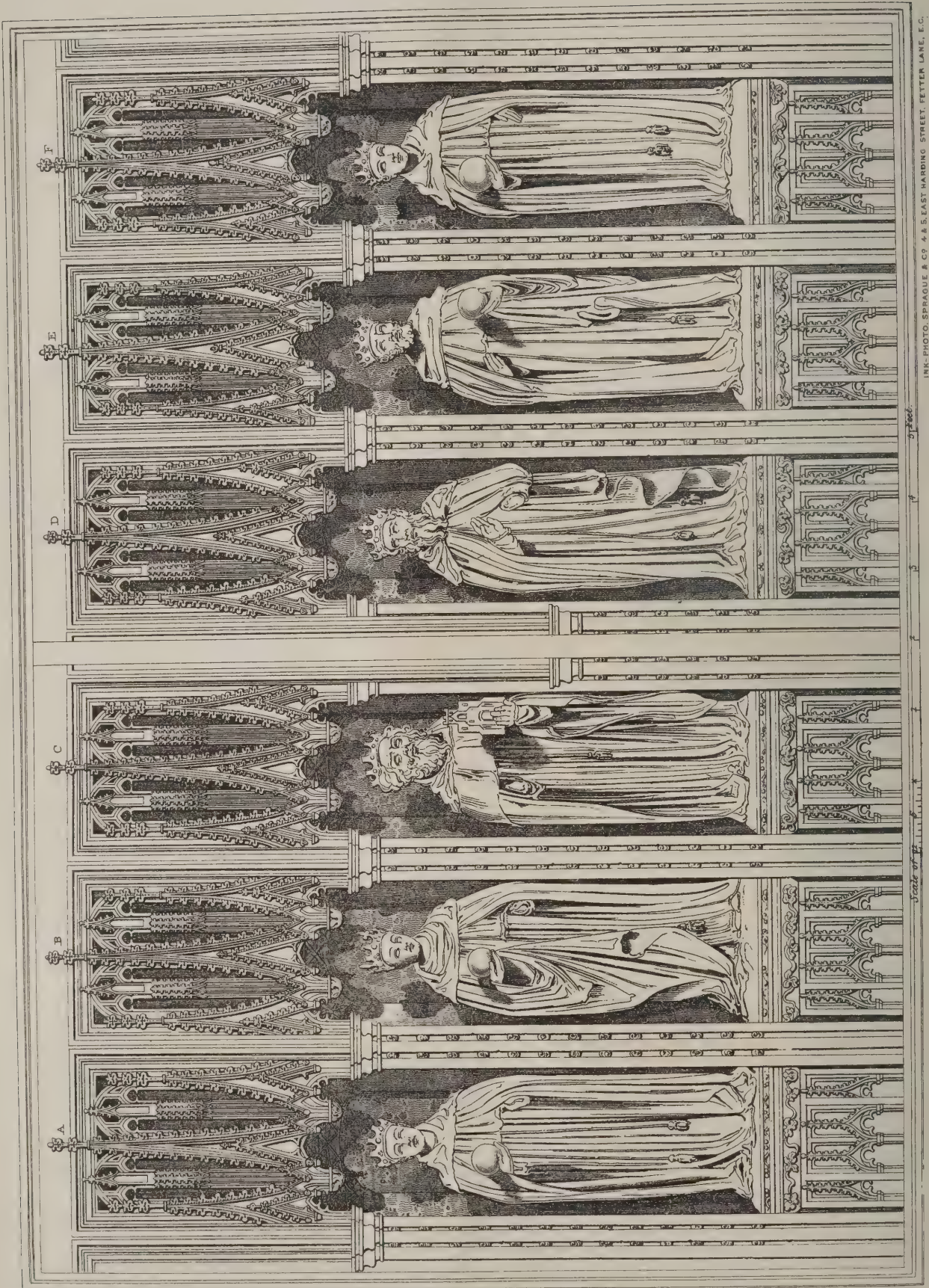


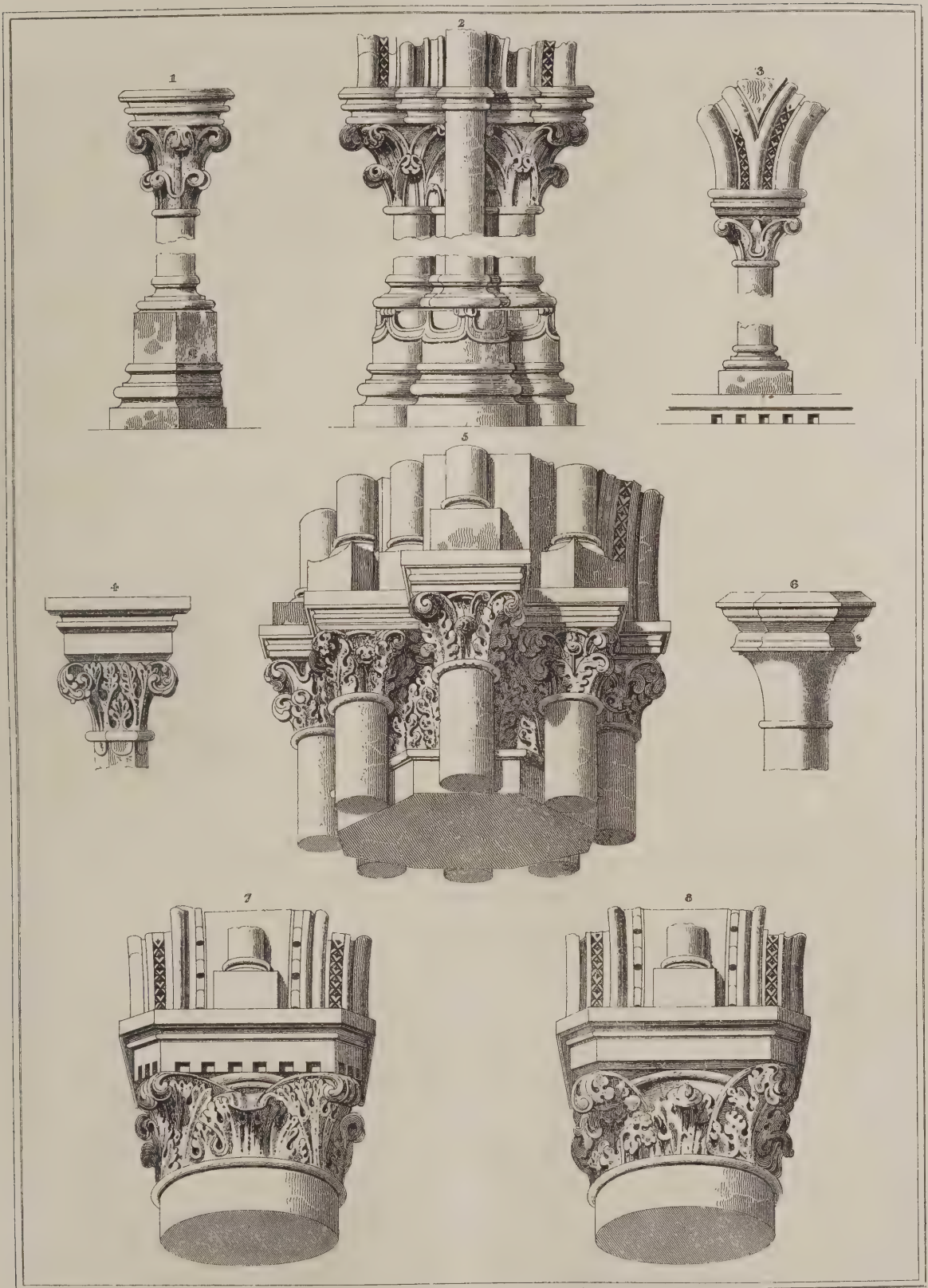


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CATHEDRAL SERIES. No. 66.—CANTERBURY: "BECKET'S CROWN," FROM TRINITY CHAPEL



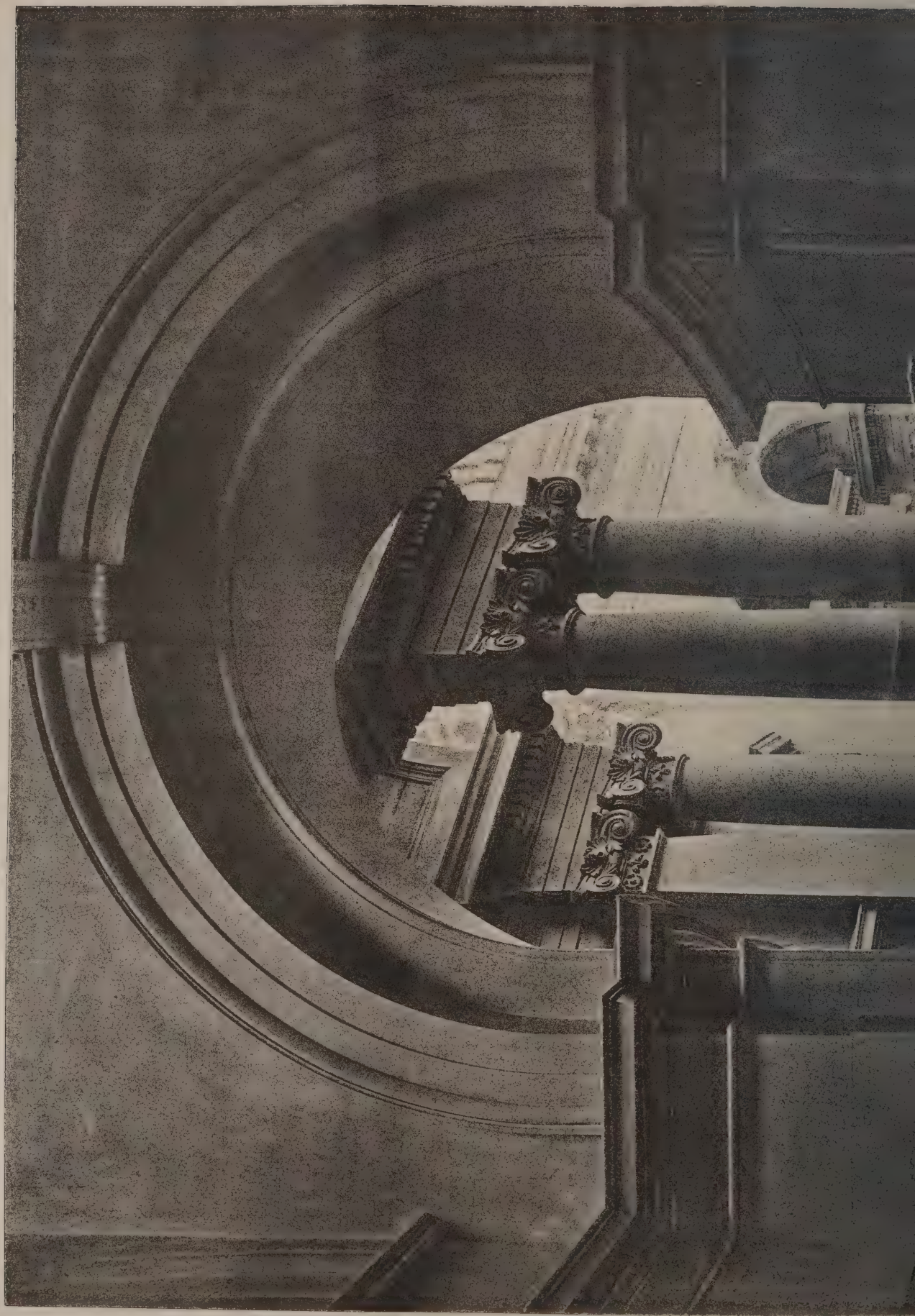


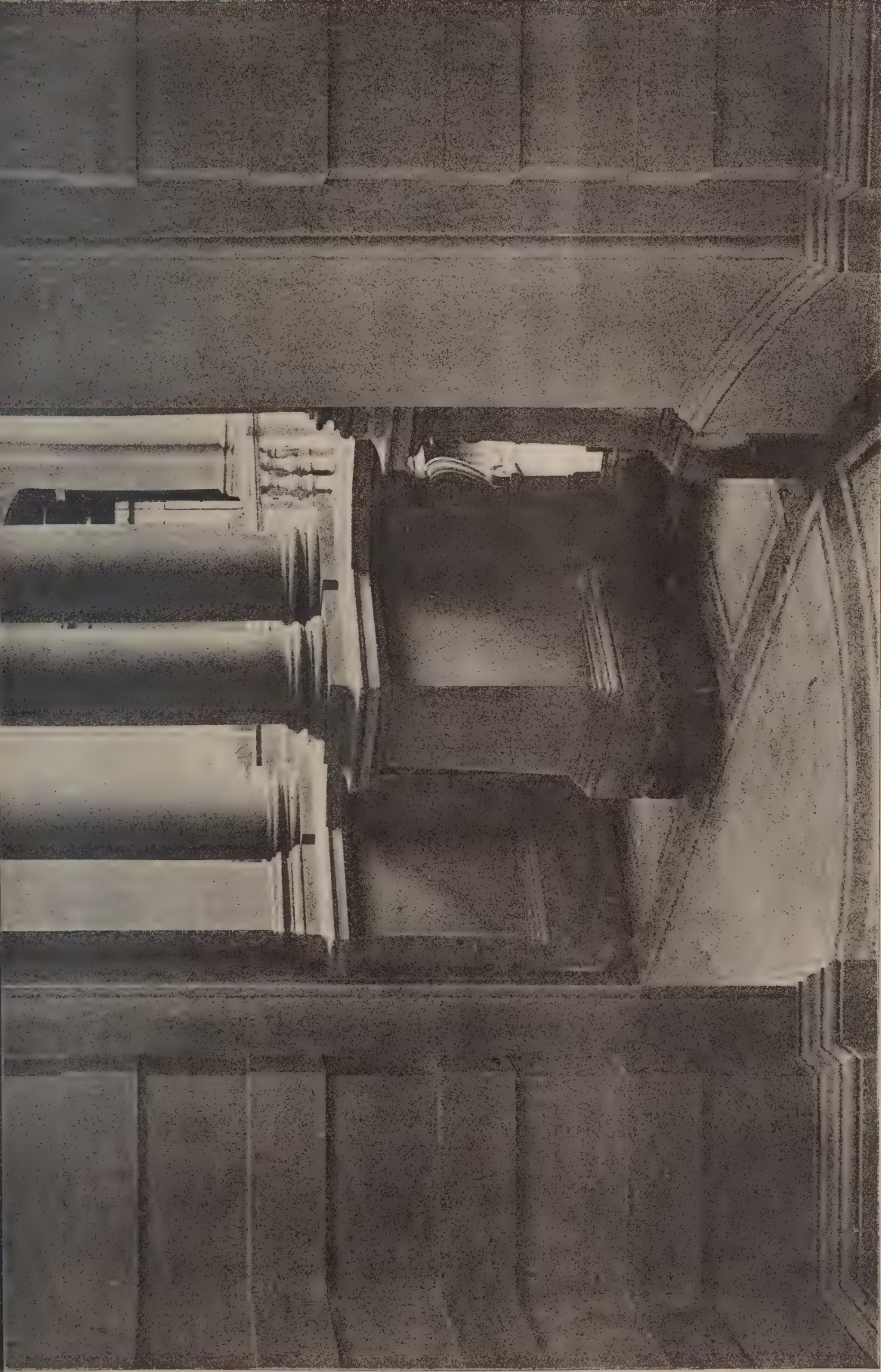
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CATHEDRAL SERIES, No. 68.—CANTERBURY: CAPITALS.

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The Architect, Aug. 20th 1897



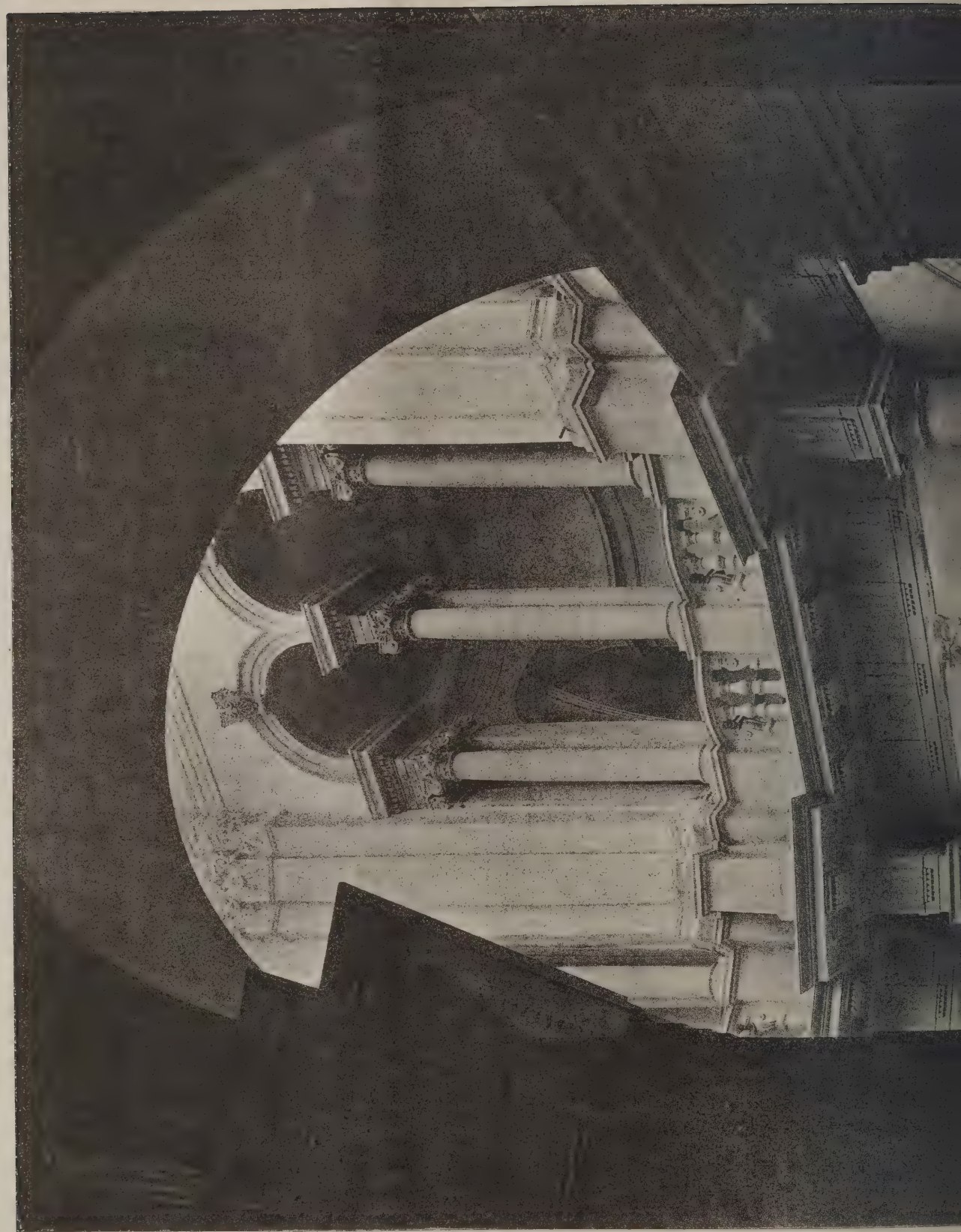


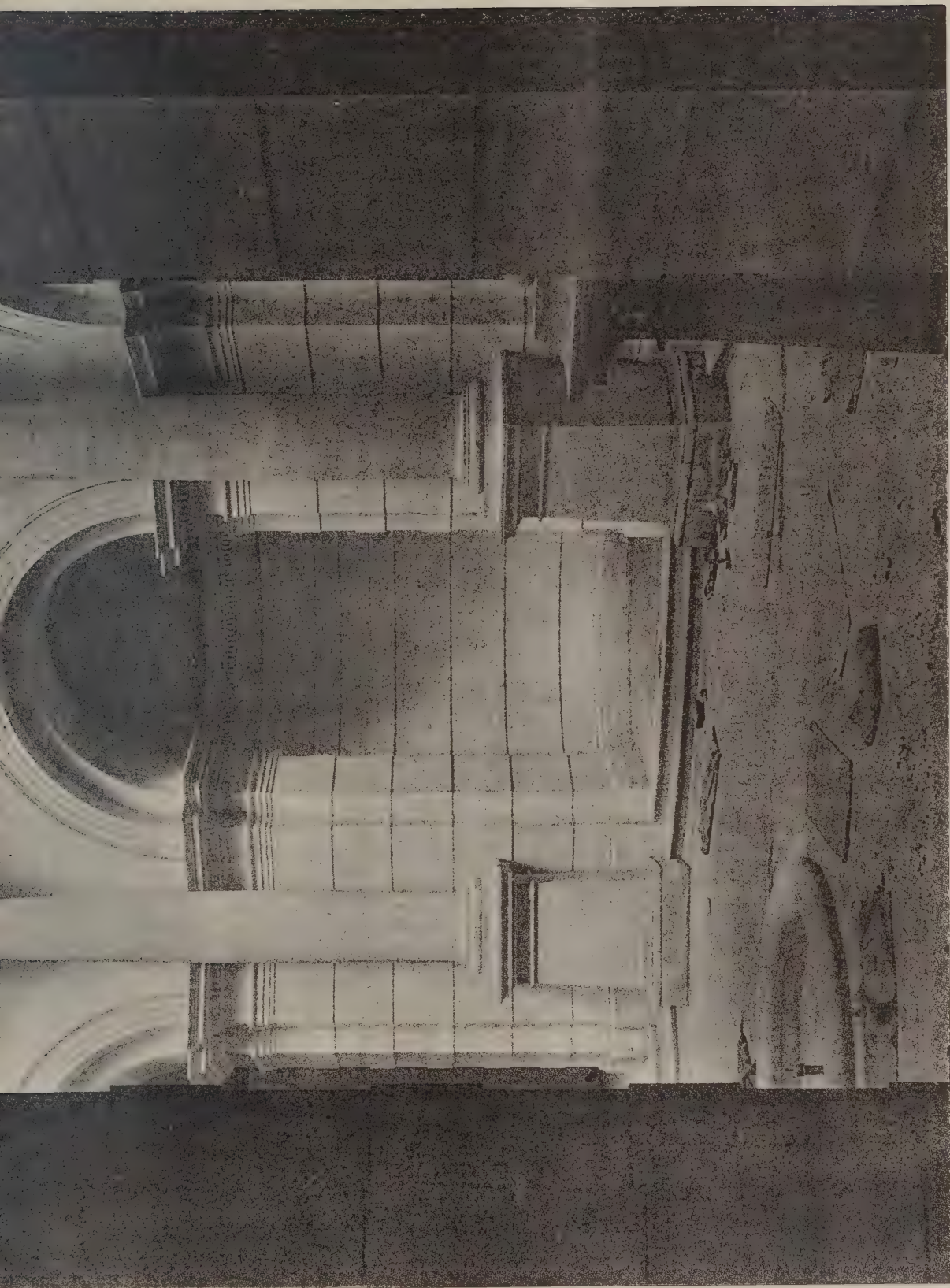
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THE NATIONAL GALLERY OF BRITISH ART, MILLBANK, S.W.: PART OF UPPER GALLERY.
(THE GIFT OF MR. HENRY TATE.)
SIDNEY R. J. SMITH, F.R.I.B.A., F.S.I., Architect.

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THE NATIONAL GALLERY OF BRITISH ART; MILLBANK, S.W.: BAY OF SCULPTURE GALLERY.

(THE GIFT OF MR. HENRY TATE.)

SIDNEY R. J. SMITH, F.R.I.B.A., F.S.I., Architect.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: BECKET'S CROWN FROM TRINITY CHAPEL.

IN an architectural sense there is no part of Canterbury Cathedral more interesting than the Trinity Chapel and Corona, because in that part of the building the skill of the English WILLIAM is more apparent than elsewhere. It has besides associations with the martyred Archbishop. GERVASE, in describing the building in which the murder was perpetrated, speaks of a chapel of the Holy Trinity. He says that there "the blessed martyr THOMAS celebrated his first Mass on the day of his consecration, and in this chapel before, and after his exile he was wont to celebrate Mass, to hear service, and frequently to pray." Although it is supposed that the Archbishop, when the knights appeared, wished to make his way to the high altar in order to meet his death, yet it is not unlikely that the goal which was in his thoughts was the chapel which was dear to him. When the rebuilding of the cathedral was commenced four years after the murder, the present Trinity Chapel formed part of the plan, and more architectural importance was conferred on it. Presumably the chapel was intended to hold BECKET'S shrine, although the evidence on that point is not convincing.

To the majority of visitors Trinity Chapel and the Corona appear to be uniform with the choir, and are assumed to be the work of one architect. But the Mediævalist architects always were eager to assert their individuality, and WILLIAM the Englishman would not be considered disloyal to his master, WILLIAM of Sens, if he introduced a few variations. On this subject Professor WILLIS writes:—

It is a very difficult task to separate the original work of William the Englishman from that of his predecessor. Gervase, indeed, has told us pretty exactly all that was erected during his superintendence, but much of this must have formed part of the original design of William of Sens. The erection of the new Trinity Chapel, or chapel of Becket, which took place wholly under the direction of the Englishman, must have been intended from the beginning, for the contrivance of narrowing the central alley of the choir, for the double purpose of avoiding the old towers and of adjusting the width to agree with that of the ancient chapel of the Trinity, was due to the French artist, seeing that the inclined part of the choir was carried up to the clerestory before his fall. Whether we are to attribute to him the lofty elevation of the pavement of the new chapel, by which also so handsome a crypt is obtained below, must remain doubtful. The bases of his columns, as well as those of the shafts against the wall, are hidden and smothered by the platform at the top of these steps and by the side steps that lead to Becket's Chapel. This looks like an evidence of a change of plan, and induces me to believe that the lofty crypt below may be considered as the unfettered composition of the English architect. Its style and its details are wholly different from those of William of Sens.

The Trinity Chapel of the Englishman is under the influence of the French work, of which it is a continuation, and accordingly the same mouldings are employed throughout, and the triforium and clerestory are continued at the same level; but the greater elevation of the pavement wholly alters the proportion of the piers to their arches, and gives a new and original and at the same time a very elegant character to this part of the church compared with the work of the Frenchman, of which at first sight it seems to be a mere continuation.

The triforium also of this Trinity Chapel differs from that of the choir in that its four pointed arches, instead of being like them included under two circular ones, are set in the form of an arcade of four arches, of two orders of mouldings each. The mouldings are the same as in the choir, but the effect of their arrangement is richer. Also in the clerestory two windows are placed over each pier arch instead of the single window of the choir. The mixture of the two forms of arches is still carried on, for although the semicircular arch is banished from the triforium it is adopted for the pier arches, as shown in the section. However, in the side aisles of the Trinity Chapel and in the Corona our English William appears to have freed himself almost as completely from the shackles of imitation as was possible. In the side aisles the mouldings of the ribs still remain the same, but their management in connection with the side walls, and the combination of their slender shafts with those of the twin lancet windows, here for the first time introduced into the building, is very happy. Slender shafts of marble are employed in profusion by William of Sens, and Gervase expressly includes them in his list of characteristic novelties. But here we find them either detached from the piers or combined with them in such a manner as to give a much greater lightness and elegance and effect than in the work of the previous architect. This lightness of style is

carried still further in the Corona, where the slender shafts are carried round the walls and made principal support of the pier arches, over which is placed a light triforium and a clerestory, and it must be remarked that all the arches in this part of the building are of a single order of moulding, instead of two orders as in the pier arches and triforium of the choir. The square abacus, however, is used throughout.

CATHEDRAL SERIES.—CANTERBURY: EFFIGIES OF ENGLISH MONARCHS IN THE ORGAN SCREEN.—CAPITALS.

THE NATIONAL GALLERY OF BRITISH ART, MILLBANK, S.W.—PART OF UPPER GALLERY.—BAY OF SCULPTURE GALLERY.

ART IN THE DEPARTMENTAL SCHOOLS.

THE following extracts from the reports of the examiners will suggest the general character of the work produced in 1896 in the schools of the Department of Science and Art:—

Freehand Drawing of Ornament.

The work in both stages of this subject seems to be quite up to the average of last year, the larger part, as usual, being of mediocre value, but there is certainly a marked decrease in very bad drawings.

Many candidates whose drawings are well balanced and neatly lined in, but quite unlike the copy, give evidence of their mistaken idea that a clean wire line is the chief thing to aim at, and their anxiety to produce this has caused them to miss the larger and more essential qualities of general planning with shapes of spaces between the ornament.

Geometrical Drawing (Art).

A good proportion of the candidates showed very creditable powers of draughtsmanship, some papers indeed being quite admirably worked; but still in far too many cases it seems hardly to be understood that the examination is in drawing as well as in knowledge of geometrical constructions. Many marks are lost through the use of unsuitable pencils (which candidates appear unable or unwilling to sharpen) and of very inferior instruments. It should be borne in mind that careless and clumsy work is of little or no practical value.

Model Drawing.

Elementary Stage.—It is gratifying to note that more care has been given to the teaching of this stage of model drawing, resulting in the attainment of a still higher level.

Fewer incomplete drawings were submitted for examination, and the perspective knowledge displayed is satisfactory, but the relative proportion of the four objects leaves much still to be desired, indicating that many schools have not supplied themselves with models in accordance with the syllabus for model drawing issued by the Department.

Advanced Stage.—It is very apparent that a large number of the candidates in this stage do not give sufficient attention to the shading of the group; this may in a measure be accounted for by the fact that shading must necessarily come last.

In this stage a considerable advance is attained in the perspective rendering of the groups. The drawing is more accurate in the cones, pyramids and prisms, the principal failures occurring in the skeleton cubes and vases.

Drawing in Light and Shade from a Cast.

The examiners notice with pleasure a marked improvement in the candidates' work, especially in the advanced stage.

The work, as compared with last year, seems more intelligent and thorough.

Good proportion was rarely met with, especially in the elementary stage; the proportion of the height to width of the cast was most frequently incorrect and often very much out, even where the expression of light and shade was fairly good.

Perspective.

Whilst the number of candidates presenting themselves for examination is still decreasing, the work done is of decidedly higher merit.

Design (Elementary and Advanced Stages).

The works sent up in the elementary stage are, on the whole, satisfactory; absolutely incompetent work grows year by year less, and (with few exceptions) conditions begin to be much more carefully observed. In one respect at least there is very marked improvement in the way of executing designs; they are much more generally in water-colour, which is the medium specified. Improvement is also to be observed in the design of ornament, which is, generally speaking, more logical than it once was. It is now only by exception that a scroll is made to grow in two opposite directions, at both ends, that is to say, or that a flower is provided with two separate stalks.

The work sent up in the advanced stage is relatively not so satisfactory as that in the elementary stage. There is some very good work in the exercises which gain, say, half the

maximum number of marks, but after that there comes a sudden falling off in accomplishment. It should be stated, however, that here, as in the elementary stage, and perhaps more markedly still, there is a great improvement in the logical consistency of pattern-growth.

Material and Process.—Candidates were asked to state in writing the material and method of execution proposed in their design. Occasionally they make no such statement, sometimes they make only one of these statements, frequently they write something haphazard quite contrary to what the drawing indicates, if it indicate any material or process at all. It is quite clear that in very many instances the design was first made, and then the student began to think what it was fit for; and it has puzzled him to say. This is not as it should be; and it is disappointing to find at this stage so little appreciation on the student's part of anything like workmanlike design. In designs for painted decoration there is no great appreciation shown of what constitutes decorative treatment. A fair understanding of what is meant by "modelled relief" is more general, although designs described as for modelling are in some instances more obviously suitable for painting.

Candidates were not asked to design in any given style, nor even in any existing style at all, but merely to design as though their work were to go with a room or building of some definite architectural character. That is a condition under which the greater part of design is, and must be, undertaken; and it is of the highest importance that the student should be able to work under it. This examination shows how little he can do that.

In reference to the written statements as to material, method, style, &c., candidates not only give too little information, but too much; they attempt to describe a process in detail when all they are asked to do is to state the method of execution. The demand for that short statement has too often brought down upon us a flood of explanation which explains nothing. The examiners do not want any process explained to them, but only to be sure that the student has a distinct idea as to the process by which his work is to be executed, and that he can make a practical design for that process.

Students do not clearly enough realise that what the examiners want to see is what they can do, and how well they can do it. When time is limited, as in these examinations it must inevitably be, one condition of success is not to waste it. The examiners wish to point out that, though in the matter of accuracy of measurement and observance of conditions there is still great need of improvement, things are in these respects distinctly better than they were; there is hope in that.

Some of the designs sent up this year in both elementary and advanced sections are excellent, and many of them are creditable to students and masters alike. Appreciation is expressed by the marks awarded, but it is thought more helpful to point out where students have gone wrong than to dilate upon excellences about which there is really nothing to say but that they are excellent.

Design (Honours).

It gives the examiners pleasure to report that in the papers of the present year there are some admirable designs, and though compared with the large number of competitors these finest examples may appear proportionately few, it must not be forgotten that the best powers of figure-design demanded in Design (Honours) are exceedingly rare. Among hundreds of students it is much to find one so endowed, and that one might remain unfound and undeveloped except for such incentive as this competition and its preparatory training supplies.

All these works are also composed without knowledge or foresight of what subjects will be set the students when assembled. It is also pleasant to note that the number of designs "characterised by swinging unmeaning swirling lines about," which was condemned in last year's report, is this year very reduced.

The suggestion that charcoal should be disused in this subject has been almost wholly complied with, with the satisfactory result that there is very little of the dirty groping and haphazard fooling and smudging which was before deplored. Almost all the papers show increased and more resolute endeavours after clear and defined execution. And when one reflects how much of the year's matter must come from comparatively new and raw students who have never entered the lists of Subject 23*d* before, there is much ground for encouragement, notwithstanding that it is again necessary to remark that not a few of the competitors are of so low a standard that they ought not to have been permitted to enter. All students who desire to compete in this subject should be proved beforehand by calling on them to give evidence of some capacity of design within a few hours' work. This would considerably thin the ranks with advantage to all.

But the prevalent impression is the rarity of the sense of beauty; perhaps in this age of ugly conditions surrounding it must needs be so. But masters might do much to cultivate susceptibility to grace of form among their pupils by setting ugliness and beauty, deformity and proportion, in strong and

frequent contrast before them, encouraging them to search into and define the features that differentiate the one from the other.

Anatomy.

The examiners are pleased to report a much higher standard of excellence this year than has existed for some time previously. Nineteen candidates have distinguished themselves by papers of great merit. In all the nineteen papers the drawing is such as to indicate that the candidates are fully aware of the significance of the details of which they are such masters. The examiners do not remember for some years past to have met with papers of such excellence in which the candidates displayed so thorough and practical a grasp of their subject.

As usual, a large number of the rejected candidates have apparently entered for the examination with little or no preparation, and an entire lack of appreciation of the relation of anatomy to their other studies. The number of such candidates is smaller than in 1895, and, as a whole, the standard of the examination this year is higher than the average.

Architecture.

The number of candidates' papers this year amounted to 486, showing an increase of 37 as compared with 449, the number in 1895.

The quality and character of the work is, generally speaking, fairly similar to that of the past and recent years, but the advanced students have not done quite so well, and the average students have done a little better than last year. The work of those who have failed is in the main very much as before, but it should be added that some of the worst is extremely bad this year. On the other hand, it is gratifying to be able to say that some defects, which had been conspicuous even in good work, have become sensibly more rare.

The questions as to Renaissance architecture have been less frequently attempted than any others, a circumstance which is regretted. The questions requiring buildings or parts of them to be drawn from memory have elicited a great many answers, of which the larger proportion have been satisfactory, in some cases very much so. Fewer attempts in bad perspective have been made in answer to these questions than last year, though still some students have attempted to show buildings or parts of them in perspective without achieving even moderate success. It is, however, satisfactory to add that some perspective studies of portions of buildings have been submitted of very great merit, the best undoubtedly being those where single features, such as a doorway or an arcade, have been the subject. It is also gratifying, in answer to a question calling for a written description of a building, to receive in a few cases an account of an English church or cathedral; this is a welcome change from descriptions of the Parthenon or the Pantheon, which are simply quoted very nearly word for word from a handbook. The power of giving an account of a building in writing is a very useful one, and describing even a very simple building with which the student is familiar is a much better proof that he possesses such a power than the reproduction of some other person's account of a building which the student himself has never seen. In the answers to a question on the meaning of architectural terms, a question which has been attempted by the great majority of candidates, more accuracy and better information was shown than in dealing with a similar question last year.

Architectural Design.

The subject set was the chance of a large and important church. A slight outline sketch was issued to candidates to give a general approximate idea of the size and height of the proposed chancel, but beyond this candidates were left entirely free, both as to their treatment of the subject and their choice of style. In examining the designs no questions of ecclesiology or ritual were taken into account, but marks were awarded solely on the merit of the work as architectural design.

Out of the seventy-two candidates fifty-three, including nearly all the most successful, have selected some phase of Gothic architecture. Many of them were evidently attracted by the possibilities of the subject to attempt something grandiose and elaborate, and the general result has been that, along with many failures produced by candidates who probably would have failed whatever the subject set, this problem has elicited a much larger amount of creditable work than has been looked over in connection with this examination, not only in last year but in several past years. It has been gratifying to find that many art students have such a good acquaintance with Pointed architecture as the best of these designs display.

With regard to the candidates who have only gained very low marks there is not much to be said, except that as yet they know too little of architecture to be able to attempt to design a building with the smallest prospect of success. But some who have advanced beyond this stage, and yet have failed to pass, appear to show a want of familiarity with architecture as it exists in buildings.

Students who have advanced some little way in the study of Gothic architecture can best fit themselves for learning to design by sketching and measuring good existing examples. In closing, it is regretted that when a subject is set which has so often and with so much success been treated in some Renaissance style, there is only one Renaissance design in the rather long list of the works that stand out from the general body of designs.

Principles of Ornament.

Great care seems to have been taken by the masters in instructing their pupils in the principle of ornament, and the result is a high average, but scarcely any of the candidates show exceptional brilliance, and there is a marked scarcity in the papers in which the human form is represented. The teaching seems generally to be good, although there are some metaphysical definitions given of symmetry and balance which are not very clear. The papers as a whole are satisfactory, and a large number are extremely creditable, though it seems there are signs here and there of cramming, and by this is meant that students are practised in drawing illustrations to the questions likely to be set, which are drawn much better than the rest.

Painting from Still Life.

The examiners are pleased to report that the standard of the work in this exercise continues to rise, and throughout the whole of it, with only a few exceptions, there is evidence of the good results of sound teaching. They are likewise pleased to note an entire absence of examples such as those which on former occasions they stigmatised as disgraceful.

Painting Ornament in Monochrome.

Generally the work compares favourably with what has been done before, and in particular it is more workmanlike. Conditions are also on the whole more strictly observed than heretofore. Those who (again this year) cannot see that the diagram is not a square but tall in proportion to its width, and who distort the drawing in consequence of trying to fit the tall design into the wide space, lose marks. Comparatively few candidates have taken liberties with the design, and none of those who have are very successful.

It should be observed that though some liberty of treatment is allowed it is not desired. Least of all should it be taken as an opportunity of shirking the difficulty of the subject. Some renderings which are little more than outline drawings are obviously not the exercise set. They afford little test of painting, and consequently do not get high marks. The result of slackening the rule as to "grisaille" and allowing "monochrome" has been on the whole successful. A certain amount of crude colour occurs, but speaking generally, the colour is fairly tasteful. The weaker students fall back for the most part upon merely dull and dirty tints.

In some of the more confidently painted works the manner is rather aggressive. Direct work is what is wanted, but not brutality, which it sometimes amounts to. The broad surface of the shield in the diagram offered an opportunity of painting which few have seized. The lettering has troubled students more than it should have done. Many give no lettering at all. Many have just sketched it in. Some have done just enough to show how badly they would have done it.

There is a rise in the number of fairly clean and workmanlike exercises. There is distinctly less slapdash, over-confident work, and, one is happy to say, very little of the pretentiousness of quite incompetent candidates, which used frequently to be seen. That is to say, many of the works marked similarly to last year are better painted than the samples of last year's work thus marked. This indicates improvement.

Drawing from the Antique.

The average of merit in this exercise is in the opinion of the examiners decidedly good, and superior to that of former years. The execution in almost all cases is suitable to time-work, with the exception of a few drawings which are still blackened all over from senseless overshadowing.

Drawing from the Life.

In spite of the considerable increase this year in the number of works, the examiners find no falling off in the majority of them, and are much pleased with the intelligence shown in most of them. The proportion of bad drawings is diminishing, though there are still a few outrageous drawings remaining that can only disgrace the schools they come from.

Drawing the Antique from Memory.

Most of the drawings in this extremely useful exercise are very satisfactory, the average qualities being decidedly higher than in previous years. The examiners are pleased to see that the student has derived much benefit from the study of the antique, and retained in his memory a feeling for the proportion and movement of the statue, and is able to transfer to paper

in a suitable and intelligent manner the knowledge he has gained.

Historic Ornament.

The papers in the examination for historic ornament show an unusually good average of awarded marks. There is not a single paper returned blank, and few which do not give answers to six or seven of the eight answers permitted. The sketching of objects of various kinds in illustration of the candidate's meaning shows a marked improvement.

Modelling Design.

Elementary Stage.—In this stage (apart from a few which are quite excellent, and a number of others which are very good) the work generally is exceedingly poor, a good deal being not properly modelling at all, but mere shapes scratched out, expressing no more than bad outlines would. It should be observed in this subject that, however low the relief may be, there should be some degree of intelligent and expressive modelling. Otherwise there is no reason for its being done in clay, as an outline drawing would express quite as much. There is a tendency to too great profusion of ornament, many of the designs being an absurd crowding of ugly bad ornament. It may be pointed out that it is a very high merit to make a good design at the smallest possible expense of ornament, quality rather than quantity being the aim.

In most cases the usual conventional ornamental forms are adhered to. In a number of instances, however, natural flower forms are used, but in few cases with any degree of success. This is unfortunate, because the adaptation of natural foliage to ornament is most commendable, and gives every chance of developing the student's originality.

There are some works which show considerable skill and care in the manipulation, evidently the result of the trade the students are engaged in (probably that of chasers in metal), but which show an almost total absence of design, *i.e.* taste or reason in the application of the ornament or appropriateness to the shape of the panel.

Advanced Stage.—The work in this stage reaches a very high average indeed. It is most gratifying to see so very many altogether excellent designs, the great number that are quite good, and the high average quality of most of the others. The really poor in this stage is a comparatively small proportion. It is especially gratifying to see the large amount of originality and individuality combined with good taste, without which, indeed, originality is worthless. There is one great weakness, however, to which attention must be called. This is the extremely bad lettering in a very large proportion of the door-plate designs. The presence of bad lettering in designs, which are in other respects refined in taste, shows that this is because lettering has not been studied, and not because the taste is bad. The necessity of studying lettering cannot be too strongly urged. Good alphabets should be at hand in all schools. It is most sincerely to be hoped that teachers will give some attention to this most fruitful element of interest in ornamental design. The appreciation of treatment for material intended is most satisfactory.

Modelling Design (Honours).

Although there are fewer works this year, the standard of excellence is far below that attained last year. There are a few works which show some promise, but there is not a single specimen well modelled, and most of the examples appear to be the work of beginners, many of whom may some day become well skilled in their art, but at present are certainly not qualified to sit for the above examination. It must again be urged that all work of an elementary nature is incompatible with the objects of this examination. It gave no pleasure to examine this collection, and it is regretted that a more favourable report cannot be given.

Modelling from the Antique.

Although there is again a large increase in the number of works submitted, it is gratifying to see there is no falling away from the improvement manifest last year. Indeed, judging the works as a whole, a higher standard has been attained this year. This satisfactory result is in a large measure due, it is believed, to the increased effort which has been made by the candidates to represent correctly the structure and character of the example set before them. The importance of great care in this direction cannot be too often or too strongly impressed upon the students.

Modelling from the Life.

A large proportion of the works sent up are poor to a degree, showing that many of the candidates had been insufficiently prepared for this exercise, and they should not have been allowed to sit. The opinion expressed upon the work last year, as to the advisability of students not being permitted to model figures from life until they were able to draw with some degree of accuracy, applies with equal force to the works submitted this year.

SOMERSETSHIRE ARCHÆOLOGICAL SOCIETY.

(Concluded from last week.)

SECOND DAY.

THE second day of the meeting of the Somerset archæologists was devoted by the members of the Society to excursions westward of Bridgwater, about 140 of them leaving the Cornhill punctually at 9.30.

The parish of Stogursey was first visited, and on the party alighting here they first proceeded to the parish church, which Mr. Buckle, the honorary diocesan architect, described as a splendid example of early Norman work, the tower especially being a very fine example of it. The width of the four central arches clearly implied that the nave must always have been as wide as it is now. In many cases where they had a Norman central tower the nave was very small indeed, making it almost impossible to see the chancel; in this case, however, it was exactly the contrary. After referring somewhat in detail to the size and shape of the arches, he expressed an opinion that the Norman window on the south side of the chancel was moved at the time of the restoration and not replaced in its true position. When the restoration took place the east wall was entirely taken down and rebuilt, and that consequently was all modern. Practically all the windows were of the earlier Norman period. He pointed out one or two peculiarities with regard to the rood door, on the side of the pulpit, below which there was an archway, but whether it was originally intended that that should lead to the small chapel behind or not he could not say. At the present time there was a square block of buildings containing a staircase reaching to the tower behind the archway, but whether there had been any alteration there in comparatively recent times he was unable to say. There was a good deal of carving on the bench ends, principally of the sixteenth century, the majority of which was of a Flemish character. Spires were very rare in West Somerset, and this one was a small wooden building covered with zinc inserted at the top of the tower. In conclusion, Mr. Buckle directed attention to a monument erected to the memory of Sir James Burnett under one of the arcades of the chancel.

The Rev. F. Meade-King added a few words, after which many of those present adjourned to the vestry and inspected several old registers and some communion plate.

The site of Stoke Courcy Castle was next visited, and Mr. Buckle being invited to say a few words with regard to it, that gentleman observed that practically he knew nothing of the castle, but it was recorded to have been fortified by one Falke de Brent in the time of Henry III., and to have been destroyed by Lord Bonville in the time of Henry VI. The castle itself, as they could see, consisted of practically but a moat and a circular wall, and he doubted if ever it was a habitable dwelling. There was nothing left, at any rate, of a domestic building if any had ever been in existence. If it had been used as a dwelling-house when they had a number of troops there it must have been a very uncomfortable one indeed.

Dodington Manor was next visited, and briefly described by Mr. Buckle, who said the chief feature of the interior was the hall, which was a remarkably perfect one. The roof was very interesting, as it varied to some extent from the ordinary pattern of a hall roof of the fifteenth century. There was a tendency for all the beams to be very wavy, and he attributed this to the fact that the tree the four principal beams were made of was peculiarly shaped, and that the carpenter used it as being the only wood he had. It was evident, however, in respect of some other beams that the carpenter had wilfully made them wavy. The windows of the hall were apparently a good deal later than the building itself, and were probably of Elizabethan date. The mantelpiece, dated 1581, was a very elaborate piece of stonework, but work of the crudest possible class, and was evidently done by some un instructed country mason. He commented especially on the wretched figures at each end, and of one in particular, which was apparently intended for a horse. It may be added that below the figure referred to was the Dodington crest, bearing the words "Support thy patrimony," and the date 1581.

From Dodington the party were next driven as near as possible to the site of Stowey Castle. Many of the members, including several ladies, ascended the rather steep declivity leading to the mounds on which the castle stood, and here the Rev. W. Greswell read a deeply interesting paper, in which he remarked that the position of Stowey Castle in former days must have been a strong one—naturally far stronger than the site of Stoke Courcy Castle. The Rev. F. Warre considered that this mound was one of a line of British earthworks, and he ranked it with Rowborough in the parish of Broomfield, connected by beacon on Cotelstone with the earthwork at Norton Fitzwarren commanding the Tone, and so on with the fortress on Castle Neroche. Castle Hill was the most northerly of them

all, and overlooked the Parrett. It was instructive, therefore, to look out for any of the old features of the British earthwork existing there before the mound was occupied by the Norman stronghold. It was not recorded when this stronghold arose. During the reign of Henry VII. there lived at Nether Stowey Sir James Touchet, who led the Cornish insurrection in 1497. Why or when was the castle dismantled? He did not think that it was because of the Cornish insurrection, *i.e.* before 1500 as some would suppose, and it had occurred to him that Lord Audley would hardly have been building a manor or court house below if the castle were standing at the time of the insurrection. Sir A. A. Hood wrote to him (Mr. Greswell) in 1897 as follows:—"Stowey Castle was, I believe, razed to the ground after the execution of Lord Audley. My grandfather (Sir P. P. Acland) had the foundation cleared." He had not yet been able to find any notice of the dismantling, but he thought that Lord Audley himself might have given up his castle and removed his residence from the court house, especially as he was said to have been "a strenuous asserter of the liberty of the subject." Much of the stone of the court appeared to have been brought from the castle hill; some of the stones in the arches seemed too heavy for their object. Mr. Greswell next referred to some interesting local traditions, and mentioned that some old men had told him that they "beat down the castle from Dorsetboro", and then the strong men beat down Stoke Courcy Castle." Stoke Courcy Castle was finally destroyed by Lord Bonville in the reign of Henry VI. for its lawlessness. Could Stowey Castle have suffered the same fate, as local traditions connected the two together? As was usual in connection with ancient encampments and hills, old people had told him that as children they used to be frightened by the giants under castle-hill mound, where there used to be a kind of amphitheatre, and it was stated that bull fights occasionally took place there and local championships at fisticuffs. Mr. Greswell also referred to the proximity of wells which people once resorted to for the cure of bad eyes. The reading of the paper (for which Mr. Greswell was thanked) was followed by applause.

The party was afterwards driven to Quantock Lodge, where they were very hospitably entertained at luncheon by Mr. E. J. Stanley, M.P., this year's president of the Society, who accompanied the members throughout the whole of the day's excursion. The repast, which was partaken of in relays, was of the most *recherché* description, and it need hardly be added that Mr. Stanley and the Hon. Mrs. Stanley did everything they could to promote the comfort of their numerous guests.

Spaxton Church was the next place of resort, and here again Mr. Buckle was invited to give an address. He first pointed out that the east window was a specimen of quite the earliest Geometrical tracery. The only other fragment in the church of an earlier date in the Perpendicular period was a little window which faced the door coming into the porch. They would see that that window was only about half the size of the other two on that side of the wall, and if they went round on the other side they would see that the character of the masonry was entirely changed. At an earlier period of the church the wall was only as high as the little window. At a subsequent period, in the fifteenth century, the walls were raised up to the present height, and the larger windows inserted, and he should imagine that that window was at that time blocked up and opened at a later date. Everything else in the church was of a Perpendicular date, of which the greater part of the Somersetshire churches consisted. In that part of the county they got out of the range of freestone, and they would observe that the arcade was built of the surface stone which came out of the Quantock Hills. The tower was of the rough class he spoke of at Bridgwater, containing no freestone which it was possible to avoid. Referring to the fittings of the church, he pointed out that they consisted of a good deal of oak carving, and that whilst some of the bench end designs were of a distinctly English character, others were distinctly Flemish. In the chancel was a very interesting monument of a knight and his lady, which appeared to belong to the end of the fourteenth century.

The Rev. Mr. Odgers said his friend Mr. Winterbotham had committed to his care a letter which he had received in reply to an inquiry he had addressed to Mr. J. H. Spencer, of Taunton, the architect interested in the restoration of this church, in reference to the beautiful canopied tomb referred to, and Mr. Spencer suggested it belonged either to the Fichtel or Hill family.

Colonel Bramble added that the date of the complete plate armour was about the middle of the fifteenth century.

Blackmoor Manor, adjoining Blackmoor Lane, was the next place visited, and what is known as the old domestic chapel or private place of worship and its surroundings, including some stone carving on the walls and a stone staircase, &c. were viewed with much interest. It was suggested that what is now requisitioned as a bedroom was formerly a pew for the use of the lord and lady of the manor, and was probably provided with a screen front, seating accommodation being provided below

for neighbours during Divine service. Some disappointment was experienced that no description of this was given.

Tea at Brymore was next partaken of at the residence of Mr. Bouverie at that gentleman's invitation, and that and other refreshing beverages, accompanied with an abundant supply of light refreshment, was greatly enjoyed, and even more so a short lounge in the beautifully shaded grounds adjoining the mansion before the party resumed their journey to visit Cannington Church.

Mr. Buckle said those who were present would observe at once on entering it the remarkable character of this building, which was almost unique in this part of the country, its shape being quite different to that generally found in their parish churches. There was only one slate roof which covered the entire building, the nave, aisles and chancel as well, and the result was that the central nave was of tremendous height. They had also a series of extremely lofty arches on both sides of the nave, and beyond that nothing but the bare wall. There were two other churches he knew of in that county which were built in the same form, one (which was the nearest approach to it) being at Norton-sub-Hamdon and the other at Washford, near Exmoor, the latter, however, being on a much humbler scale. Mr. Buckle next alluded to a striking deviation between the direction of the tower and the church, which he remarked was not always like what it was now, and it appeared quite clear that the direction of the Norman-built church was more oblique than at present. The site of the old Cannington nunnery occupied the whole of the adjoining land on the north side. This nunnery of Benedictines was founded in the year 1138 by one of the Courcy family. One suggestion that might be made to account for the obliquity of the present church was that when the nunnery wanted more space for the extension of their building an arrangement was probably made with the authorities at the time of the restoration of the church in consideration of some advantages given to them. In the chapel on the north side was a collection of some very interesting iron railings—a fine specimen of wrought-iron work, of probably 150 years ago or so, which apparently railed in a monument of the Clifford family which previously stood in the chancel. Another thing of great interest consisted in the consecration crosses, twelve of which were to be seen on the south aisle. There were no consecration crosses on the other side, and none on the tower, for the obvious reason that the tower belonged to a later period than the body of the church.

THIRD DAY.

On the third day a large party took part in an excursion to the Sedgmoor district and the country of King Alfred.

Chedzoy.

The church at Chedzoy was described by Mr. Buckle as a very fine example of the Early English style. The two arcades were very interesting and simple examples of that style. The porch, which had been considerably altered, was also Early English, and in the exterior of it were inserted three blocks of stone, one of which bore the initials "R. B.," being those of Richard Bere, the last abbot but one of Glastonbury. His initials would be seen in several places that day. Another stone bore the date 1579. On the south side there had from the first been a very wide aisle, while on the south there was a very narrow aisle. Although it was entirely Perpendicular work, it seemed that the north aisle was never any wider than the present one. At this early period there were transepts, and they had the early pillars remaining. The chancel was also Early English. On the south side there was formerly a chapel, but this had been taken down. The church had always from the thirteenth century been a distinctly important one. In the fifteenth century a clerestory was added to the nave, and there were several minor alterations. The tower at the west end had a remarkably fine arch opening into the nave. The tower, especially in the upper part, was a highly finished one, and here, just two or three miles from Bridgwater, they came to the free-stone towers with their delicate finish. Mr. Buckle pointed out that the buttresses were situated a considerable distance from the tower, and that entire blocks of benches in the nave were in the same position as the original ones. The pulpit had a curious linen-pattern series of panels. There were fragments of old work in the screen and the benches. The most important thing in the church was the embroidery. A magnificent cope was found there some time ago, and it had been converted into three altar frontals. It belonged to a period a little after 1500.

The frontals were shown by the rector, the Rev. Mr. Mullens, and they were of a very beautiful character, representing a series of angels with feathered wings.

Colonel Bramble directed attention to a brass in the north transept. He said it was a nice specimen of a man's armour, and it showed the crest of the De Sydenhams. Its date was probably about 1490.

The visitors also examined the buttresses of the church, on

which tradition says the labourers sharpened their scythes before proceeding to the battle of Sedgmoor.

A drive along the right of the site of the battle of Sedgmoor brought the party to Westonzoyland Church.

Westonzoyland.

Mr. Buckle said the chancel was Early Decorated work. The windows were very elaborate, and some of the tracery was peculiar. Except the chancel the rest of the church was of the Perpendicular period. It was a very fine open and large church, with a magnificent tower at the west end. A prominent feature was the amount of floor space, which gave much dignity to the building. The arcades were elegant, and there was a difference between the two transepts. The initials "R. B." and the Courtenay badge appeared on the outside of the south transept, and it was evident that Glastonbury Abbey had a good deal to do with the erection of the churches of the neighbourhood. The font was a rather remarkable one of the Decorated period, and was a mass of mouldings from the floor to the top. The tower was distinctly the finest they would be visiting this year, and it was enriched from the ground right up to the top. It was built of blue lias stone with Ham Hill dressings. The two stones went together remarkably well, and weathered down to a blue-grey colouring.

Colonel Bramble offered a few remarks on the bells, one of which bears the inscription, "Sancta Anna, ora pro nobis."

Mr. W. George, of Bristol, in speaking of the battle of Sedgmoor, said that after the battle 500 prisoners were crowded into Westonzoyland Church; seventy-five of these were wounded, and five expired within the consecrated walls. Lord Macaulay and other historians did not know that King James II. visited the moor a year after the battle, but such was proved by the parish registers.

Middlezoy.

At Middlezoy Mr. Buckle said the church was remarkable for the geometrical method of the Early English period. In the east window was the most delicate tracery in the world, the mullions of the tracery being only about an inch thick. It was charmingly refined work, and in a good state of preservation. Mr. Buckle pointed out that there was a kind of chancel in the aisle, and there was a low side window.

Colonel Bramble observed that in the East of England such windows were common.

Mr. Buckle said the tower was exceedingly like that of Westonzoyland, only very much smaller. It was remarkably upright, the buttresses being almost perpendicular to the top. There was great delicacy in the work of the chancel, which contained a single miserere.

The visitors inspected the tomb of Louis de Misiers, chevalier, a Frenchman who fell at the battle of Sedgmoor and was buried in the church.

Colonel Bramble showed the communion plate, which includes a particularly handsome silver Elizabethan cup, with the date 1573 upon the cover, and an old pewter flagon.

Othery.

This was the next place visited, and the church was an object of much interest. The interior of the church was in the hands of the whitewashers, who were literally plastering the walls with whitewash and the noble pillars of the church with a yellow composition, causing Colonel Bramble to remark that the order of "pure churchwarden architecture" evidently still prevailed, only in that case there was a little variation provided in the form of yellow.

Mr. Buckle pointed out a curious window in the buttress of the tower, the use of which must have been limited to looking through. It had been suggested that it was to communicate lepers who were not admitted to the church, but he thought this was not so. The tower was entirely different from those they had previously seen, as there was a great slope in the buttresses, causing quite a pyramidal outline. Mr. Buckle pointed out the figures on the tower, which include the Virgin and Child and St. Michael and the Dragon. The date of the tower was about 1500, and the chancel was built early in the thirteenth century. The great feature of the church was that it was a cruciform structure.

Colonel Bramble detailed some of the theories as to low side windows, and said the roof of the church was a fine specimen of the Somerset waggon roof.

The Vicar exhibited a cope, about A.D. 1470, which was found concealed in the pulpit.

Lyng.

After lunch the party proceeded to Lyng.

Mr. Buckle said the church had been unaltered since Mediæval times, except for the fact that necessary repairs had been carried out from time to time, and except a little having been done to the roof, which had been plastered and thus had the oak hidden. Below the plaster the roof was such as they found in many Somerset churches. The edifice, taken gene-

rally, was of a period earlier than the majority of their churches, the main part of it being of a rather transitional character between Decorated and Perpendicular. The tiny side window near the altar was worthy of remark. One of the most interesting features of the church was the very remarkable arrangement which they had for the rood-screen, which formerly filled the whole of the chancel arch. The seats were as they were originally put in. Mr. Buckle also pointed out a curious sedilia in the church.

The Vicar said that church up to 1337 was a chapelry of Athelney Abbey. Whether King Alfred resided at Athelney or not, and whether it was a resting-place for his children, he was intimately connected with Athelney, and they claimed him as the most famous parishioner of Lyng, in which parish Athelney was situated. He was glad they had been able to see the church in an unrestored state. It was his wish to have it restored, and he intended to set about it before long.

North Petherton Church.

This was the last building visited. Mr. Buckle remarked that the great feature of this church was the tower. When he said at Westonzoiland that that was the finest tower he forgot for the moment that they were coming to North Petherton. The Weston tower was an exceedingly fine one, but he thought it must be allowed by everybody that this was a still finer example, for they had there quite one of the most elaborate towers in Somerset. In this case there was no question of taking a slice out of the tower, or taking out a storey and making it higher or lower, for the whole tower from bottom to top was a single conception. The top storey was one mass of ornamentation, and the whole tower was emphatically and distinctly a complete thing and a work of art. Mr. Buckle proceeded to describe somewhat in detail its architectural beauties. With regard to the interior of the church, there was very little of importance to describe, but one of the most interesting features was, perhaps, the fact of the smallness of the piers which carried the chancel arch.

We are indebted to the *Somerset County Gazette* for the report.

THE FURNITURE EXHIBITION, BETHNAL GREEN.

ACCORDING to Mr. T. F. Parkinson, the resident officer in charge of the Bethnal Green Museum, the most important event in this Museum during the year 1896 was the Loan Exhibition of English Furniture and Silks manufactured in the seventeenth and eighteenth centuries. In order to secure the formation of a thoroughly representative collection, a number of gentlemen, well qualified by their knowledge to advise with regard to these branches of industrial art, were invited to act on a committee. This committee met in January 1896, and made several valuable recommendations, which were at once acted upon. Letters inviting loans of furniture and silks were sent, with copies of a memorandum explaining the objects and scope of the exhibition, to the owners of the principal historic houses in England, and to others whose names were suggested by members of the committee, and also to many of the City companies and to the Government departments. To these invitations many favourable replies were received. Mr. J. H. Pollen, M.A., and Mr. C. Purdon Clarke, C.I.E., then visited over seventy different collections in the provinces and in London, and reported upon the various objects offered on loan. Selections were made of the best examples which could be found; these, with the exception of a few objects of large dimensions, were readily lent by the owners. In addition to the letters inviting loans despatched by the Department, a number were addressed personally by H.R.H. the Duchess of Teck, president of the Ladies' Silk Association of Great Britain and Ireland, to her local secretaries, through which means a good collection of eighteenth-century silk dresses was obtained. Altogether 526 pieces of furniture, 95 examples of woven silk fabrics and 250 coloured designs for woven silks from Spitalfields weavers' pattern-books, dated 1727 to 1749, were obtained from 71 owners and exhibited.

The furniture was arranged in chronological order, beginning with the Elizabethan period, in which were many very fine oak chairs, tables, chests, cupboards, &c., at the west end of the north gallery. Jacobean furniture was not differentiated from the Elizabethan in the collection. The Charles I. period was the next group, then Cromwell, Charles II., William and Mary, Queen Anne, Anglo-Dutch and George I. and II.; early, middle, and late George III.; last, furniture made according to the ideas of the Classical Revival, with good examples of the Adam style. A great feature of the collection was the very large number of types of Chippendale chairs, whilst chairs of the Hepplewhite and Sheraton kind were numerous. It was natural as well as suitable to the locality, which is well known as a centre of chairmaking, that chairs should be more numerous than any other description of furniture. There were 280 chairs and settees out of the 526 pieces. The exhibition

was on view to the Press on June 11 and 12. There was a private view on June 13 from 10 A.M. to 6 P.M. At 6 P.M. it was opened to the public.

Throughout the time during which the exhibition was open great interest was taken in it by the local cabinet-makers and even by those in distant parts of England and Scotland; 667 applications were received, chiefly from cabinet-makers, to sketch, to photograph or to make measured drawings of objects in the collection. Many of the visitors expressed the opinion that a better collection of English furniture had never been got together, and some cabinet-makers said it was by far the best they had seen. The number and the variety of types of Chippendale chairs aroused great admiration, and it was a matter of astonishment to many of the local chair-makers that so many types of Chippendale chairs existed. It would seem that such a collection as this would have been even more useful than it was if an illustrated catalogue had been issued at a low price. On several evenings and on some Saturday afternoons and Sundays parties of cabinet-makers and others were taken round the collection by Museum officers, who conducted the parties, giving all information in their power concerning the furniture. These efforts appeared to be appreciated. The number of visitors to the Museum on the 139 days during which the exhibition was open was 157,305, an average of 1,131 on each day. This is only about 50 per diem more than the average for the year, but the number of ordinary regular visitors to the Museum was much diminished during September and October, owing to the wet weather which prevailed at that time. Regret was expressed by many people who came to see the exhibition after it was closed that it had not been more extensively advertised; they had not heard of it until it was closed. It may, however, be stated that bills were posted at the Museum, and were also sent round to be posted at the chief institutions and workshops in the district, and, besides, notices were printed in most of the daily newspapers.

Already the result of the collection is evident in the neighbourhood. Many cabinet-makers work in their own homes and sell their work when it is finished to larger traders. Chairs are seen daily on barrows or handcarts on their way through the streets to be offered for sale; some of these have recently been recognised as very good reproductions of chairs which were in the exhibition. Many more sketches and drawings must have been made than were duly authorised, but in all cases irregular sketching and drawing was stopped when discovered. The Department wrote to all lenders to the collection to ask if they objected to sketches, &c., of their furniture being made, and the very few refusals were respected as far as possible. Messrs. Henry & Co. made reproductions of several pieces for the Vienna Museum of Commerce. Several leading firms of cabinet-makers had men working in the Museum nearly the whole time that the exhibition was open. Each piece of furniture was photographed. A fully descriptive catalogue of the collection, with an introduction by Mr. J. H. Pollen, M.A., has been published.

TESSERÆ.

Masaccio's Financial Condition.

AMONG the acts which had made Giovanni di Bicci de' Medici famous in Florence is one which originated in 1427 and caused much ill blood in the community. He erected the office of the Catasto, invented income-tax schedules, and thus brought together an invaluable store of information as to the lives and property of every individual in the state. Even Masaccio was obliged to make a return of his income and property, and from this document, which shows that he possessed nothing but debts, history has gained not only the date of his birth, but the exact condition in which he lived and the place where he kept his shop. His mother had lost her first husband, and was now the widow of a second called Tedesco di Castel S. Giovanni. Her prospects in life were not brilliant; of her dower 100 florins still remained due. Mona d'Andreuccio di Castel S. Giovanni owed her forty florins, and the executors of her second husband sixty florins, as well as the rent of a vineyard in Castel di S. Giovanni. Beyond these sums in expectancy she possessed not a farthing. On the other hand, Masaccio, who lived with his brother Giovanni, born in 1407, and his mother, born in 1382, though he earned 6 soldi per diem, owed 102 livres 4 soldi to Niccolò di Ser Lapo, a painter, six florins to one Piero Battiloro, and had various articles of property in pledge at the pawn-shops of the "Lion" and the "Cow" (according to other records it appears that poor Masaccio would have to pay interest on these loans at the rate of 50 per cent. per annum). His assistant, Andrea di Giusto, received but irregular pay, and claimed in 1427, for salary in arrears, six florins. The family lived in a house in the quarter S. Croce, for which they paid ten florins a year, and Tommaso kept one of the shops annexed to the old Badia, built, it is said, by Arnolfo near the Palazzo del Podestà, for

which he paid two florins a year. The condition of Masaccio was more favourable, according to his own account, than the reality; Niccolo di Ser Lapo, in his schedule of the year 1427, declares that Tommaso di Ser Giovanni owes him 200 livres, and in a later declaration of 1430, that 68 livres were still due, which he had no hope of ever receiving, as Tommaso had gone to Rome, had died there, and his brother Giovanni pretended that he was not the heir.

Decay of Wood Carvings.

Decay in wood carvings is mainly caused by three species of small beetles of cylindrical form belonging to the family Ptinidæ—*Ptilinus pectinicornis*, *Anobium striatum* and *A. tessellatum*. The ravages of these creatures under favourable circumstances are stated to be such that a new bedstead has been reduced to powder in three years. The complete animal of the genus *Anobium* is known as the "deathwatch," from the noise made by it when at work. Saturation by creosote, when practicable, is effectual to a great extent against these creatures. Fumigation by sulphur, prussic acid, or benzine is believed to be most serviceable, especially if practised when the perfect beetles make their appearance, i.e. the first hot days of summer. Vaporisation by carbolic acid, a pure form of creosote, was tried without entire success; chloroform and benzine were more potent, the fumes of the latter answered, so far as could be ascertained, the purpose in question, and this seems to be the most effectual vaporiser. Saturation with chloride of mercury dissolved in methylated spirits of wine and applied by a brush was next tried, and was found to be undesirable with regard to painted and varnished works on which it may be important to retain the original colour and unpolished surface of the wood; vaporisation by means of benzine rendered saturation unnecessary. The plan of restoring works which had been injured that was adopted by Mr. W. C. Rogers with some carvings by Grinling Gibbons at Belton House, which were seriously attacked, was effectual. This plan consisted of saturating the wood in a strong solution of chloride of mercury; this process injured the colour of the material, and that had to be regained by the use of ammonia and by a slight treatment with muriatic acid. After this, the interior of the wood was injected with vegetable gum and gelatine in order to fill up the worm-holes and strengthen the fabric of the carvings. A varnish of resin, dissolved in spirits of wine, was afterwards spread on the surface.

Thomas Girtin as a Colourist.

Of the subjects which Girtin chose for imitation, his wild mountain scenery and topographical views of old towns were the best adapted for his mode of execution, which was not sufficiently light and elegant for that beautiful style of pastoral and classic landscapes which are so congenial to the feeling and taste of Turner. His masses were bold, broad and abrupt, his touch large and uncontrolled, and not unfrequently too specious to admit of severe criticism. His knowledge of effect, however, was at times exhibited in so captivating a degree that nature, and not art, seemed to prevail throughout the scene which he represented. The variety of light and shadow which he spread over his picturesque buildings, the manner in which he separated the masses, and the brilliancy of certain parts which received a partial burst of sunshine, diffused a splendour of effect to these scenes which no artist before had conceived. His fine taste for colour was most evidently conspicuous in these topographical scenes. Every tint of brick, stone, plaster, timber and tile was combined, both in broad light, medium tint and shadow, with such admirable feeling towards general harmony that no one of the least taste could behold his best productions in this style without admiration and delight. His skies were generally composed either of large masses of clouds, with partial rays of the sun, which gave variety of light and shadow, or else of a serene character, where the whole piece had a general simplicity of effect. His skies were rarely composed of many parts. The azure spaces were washed with a mixture of indigo and lake, and the shadows of the clouds with light red and indigo, Indian red and indigo, and an occasional addition of lake. The warm tone of the cartridge paper frequently served for the lights, without tinting, acquiring additional warmth by being opposed to the cool colour of the azure and shadow of the clouds. His skies in general were extremely luminous. It was a great treat to see this artist at his studies; he was always accessible. When he had accomplished the laying-in of his sky, he would proceed with great facility in the general arrangement of his tints on the buildings, trees, water and other objects. Every colour appeared to be placed with a most judicious perception to effecting a general union or harmony. His light stone tints were put in with thin washes of Roman ochre, the same mixed with light red, and certain spaces free from the warm tints were touched with grey, composed of light red and indigo, or, brighter still, with ultramarine and light red; the brick buildings with Roman ochre, light red and lake, and a mixture of Roman ochre, lake and indigo, or Roman ochre, madder brown and indigo; also with burnt

sienna and Roman ochre, madder brown and Roman ochre, and these colours in all their combinations. For finishing the buildings which came the nearest to the foreground, where the local colour and form were intended to be represented with particular force and effect, Vandyke brown and Cologne-earth were combined with these tints, which gave depth and richness of tones that raised the scale of effect without the least diminution of harmony; on the contrary, the richness of effect was increased from their glowing warmth by neutralising the previous tones, and by throwing them into their respective distances or into proper keeping. The trees which he frequently introduced in his views, exhibiting all the varieties of autumnal hues, he coloured with corresponding harmony to the scale of richness exhibited on his buildings. The greens for these operations were composed of gamboge, indigo and burnt sienna, occasionally heightened with yellow lake, brown pink and gamboge, these mixed too sometimes with Prussian blue; the shadows for the trees with indigo and burnt sienna, and with a most beautiful and harmonious shadow tint composed of grey and madder brown, which perhaps is nearer to the general tone of the shadow of trees than any other combinations that can be formed with water-colours. Girtin made his greys sometimes with Venetian red and indigo, Indian red and indigo, and a useful and most harmonious series of warm and cool greys of Roman ochre, indigo and lake, which, used judiciously, will serve to represent the basis for every species of subject and effect, as viewed in the middle grounds, under the influence of that painter's atmosphere, so prevalent in the autumnal season in our humid climate, which constantly exhibits to the picturesque eye the charms of rich effects in a greater variety than any country in Europe.

Composition in Painting.

In composition four requisites are necessary, that the story be well told, that it possess a good general form, that it be so arranged as to be capable of receiving a proper effect of light and shade, and that it be susceptible of an agreeable disposition of colour. The form of a composition is best suggested by the subject or design, as the fitness of the adaptation ought to appear to emanate from the circumstances themselves; hence the variety of compositions. The point of time being fixed upon, the action, expression and incidental circumstances oblige us often to determine on a particular arrangement, that we may be enabled to place the most interesting objects in the most promising places. Unless our attention be directed to such arrangement in the first instance, we shall often be obliged to put an emphasis on an insignificant object, or throw into repose an interesting point of the action, when we come to consider their relation to a good effect of light and shade. To secure a good general form in composition, it is necessary that it should be as simple as possible. A confused complicated form may hide the art, but can never invite the attention. Horace, in his Art of Poetry, inculcates the same doctrine:—"Denique sit quodvis, simplex duntaxat et unum." Whether this is to be produced by a breadth of light and shade, which is often the case of Rembrandt, even on a most complicated outline, or by the simple arrangement of colour, as we often find in Titian, or by the construction of the group in the first instance, evident in many of Raphael's works, must depend upon the taste of the artist; it is sufficient to direct the younger students to this particular, their minds being generally carried away by notions of variety and contrast.

Dr. Waagen's Opinion of Bath.

Bath is the queen of all the spas in the world, for there are certainly very few which can compare with it for beauty of situation, and none for magnificence of buildings. The city arises in terraces from the banks of the Avon, which winds through the valley, to the top of the Lansdown, a pretty steep eminence, about 800 feet high. The vast masses of architecture rising one above the other have a highly picturesque and striking effect when seen from the valley. The eye is chiefly attracted by the Royal Crescent, situated about half-way up the hill, and Lansdown Crescent, which towers above all. This is the name given in England to large masses of building, the façades of which gradually recede from the ends to the centre, so as to form a curve more or less near to a semicircle, a mode of building which is certainly very objectionable in its principle; they contain a larger or smaller number of dwellings for single families. The impression of grandeur and solidity is enhanced by the material, which is a stone found in the neighbourhood. Yet the various views from the several points of elevation, particularly Lansdown Terrace and King's Terrace, are almost more beautiful and worth seeing. From the first you have a view over the whole rich valley, with the finely wooded eminences that rise on the other bank of the Avon, and the whole world of buildings more or less elevated above the plain. The Gothic abbey which, with its tower, rises peacefully quite down in the valley, near the banks of the Avon, has in point of view a most picturesque effect. The whole, too, has such a southern character, the air is so deliciously mild, that

one fancies oneself in Italy, and cannot wonder that even the piratical Romans appreciated the advantages of this situation with the warm baths.

Water-Colour Landscapes.

In morning and evening effects we naturally look towards the light, which at those periods of the day is marked by a mild beauty which gratifies and attracts, yet divested of that dazzling noontide effulgence which weakens and repulses the eye. Those objects which are seen against the strongest light must wear a neutral tint, which may be termed negative harmony; for were they to be garbed in the rich and full dress liveries of nature, the influence of the lustres behind them would in a great measure be rendered nugatory and the effect weak and full of error. On the contrary, in the representation of broad sunshine or mid-day, those parts of the piece which are visited by, but not seen against, strong lights, will admit of a rich and beautiful harmony of colour without doing violence to truth or infringing on the economy of nature, and this may be called positive harmony, or a picture of colour. Every tint should be laid on with clearness and decision, so that the object may receive its proper tone at the first touch of the hair pencil; nor is less skill required in the choice and appropriation of the colours, which should be diversified as much as is consistent with the unison necessary to the 'production' of harmony. Objects which are exposed to the light require a higher finish and more flowing warmth of colour than those which are shrouded in shade; while the minutest parts of the former ought to be touched with the utmost care, so as to render visible and striking all that the broad and bright radiance of the sun might be supposed to develop. The latter will admit of a less laboured and less perfect delineation. In the lights of a picture attention to this rule is indispensable where it is necessary to distinguish, with so much correctness of detail, those very objects which in shadow would permit that intimacy of union which would almost make them appear as one. The light aerial tints should be laid on the remotest parts of a picture, gradually brightening into more rich and decided tones as they approach the nearer and more prominent objects, taking care to preserve the same atmosphere throughout the picture.

Curved and Straight Lines.

The great horizontal lines formed by regular layers of worked stone, as in the huge temples of Egypt, give an impression of solidity, of duration to eternity. Nothing, on the other hand, can be gayer than the pagodas of the Chinese, with their roofs curled upwards at the extremities—a graceful combination of the curve and the oblique. This form is to be found also in the shape of their shoes and of their head-dresses, and, stranger still, in the features of their faces. Again, nothing can be more doleful than the immense roofs of the countries of snow and ice, whose sides descend nearly to the ground by two dull and rigid lines, forming an acute angle, and stretching out from the side walls as if to enclose and smother the houses which they protect. This mode of construction still prevails in northern climes. A century ago no other was employed in the villages. The houses, which were nothing but a ground floor, disappeared beneath the thick and heavy thatched roofs, the projection of which kept out the day and gave them the appearance of being covered by an extinguisher. It is easily understood how the deliberate and clearly meant predominance of one or the other of these lines can determine, with great precision, what impression a work of art shall produce, while their skilful combination can soften or modify it to the taste of the artist. But there is as much danger in exaggeration in the one direction as in the other. If the too frequent repetition of similar lines repels by its monotony, the abuse of contrasting lines ends in a neutralisation of one impression by another, that is to say, in a total want of meaning.

Pointed and Semicircular Arches.

According to the "Théorie des Constructions," by Rondelet, the thrust of a pointed arch, compared to that of a semicircular one, is *ceteris paribus* as three to seven; and again, the weight of a pointed arch upon its supports, as compared with that of a semicircular arch, is as three to four—a result due to the sharp form of its summit and its tapering sides. From these facts it follows that the substitution of the pointed for the semicircular form rendered it possible to construct churches both lighter and higher than before, without any increase either of expense or of labour; and increased height was the great object of desire. The Orientals, with the exception of the Babylonians, sought to obtain effect by greatness of detail and immense horizontal dimensions; the nations of the west, on the other hand, pinned their faith to grandeur of vertical lines and proportions. Another improvement, not perhaps so striking at first sight, but nevertheless very considerable, contributed to increase the advantage offered by the pointed form of construction. The Romans very frequently employed ribbed vaults; but they did not place the ribs where they were most wanted—along the

angles of the diagonal groins—so they were compelled to build all their vaults, even minor ones, with heavy materials, the formidable thrust of which demanded walls and piers of great thickness. The introduction of the diagonal ribs gave a double advantage—first, it permitted the employment of very light materials, and secondly, it enabled all the weight to be so arranged as to fall upon four predetermined points.



The Nude in Greek Art.

SIR,—It is not my desire to unnecessarily prolong the discussion of this subject, but I would again ask for your indulgence in allowing me to have an opportunity of answering the "charges" brought against me in the diatribe which appears in your issue of the 13th inst. signed "A Lady Artist" with reference to my previous letter, and to, if possible, more clearly express my meaning, which, apparently, your correspondent quite fails to grasp.

I, to a certain extent, admire "A Lady Artist" for the spirited manner in which she takes up the cudgels in defence of her sisters in art, though whatever may be the merits or demerits of my opinions from her point of view, as regards the quality of her reply, I will refrain from comment.

"He seems anxious to have all figures draped. Imagine Apollo with a tall hat," &c. This one expression is sufficient to show that I have not been clearly understood; such ideas have never entered my mind. "Of course a sculptor does not look at a figure from a medical point of view." I never dreamt that he did. "He displays such a lamentable amount of ignorance of art."

I have written, believe me, conscientiously, and not without observation or experience of the matter.

What I submit is this. Though the study of the nude is a necessity, perhaps, for the production of even draped figures, the study from the *absolute* nude, which amounts to gross vulgarity, is *not* a necessity.

The countenancing of the study from statues with no attempt at covering, however slight, upon them, in public buildings where children, and young girls especially, are freely admitted, conduces to the lowering of the moral status. The publication of drawings, &c., of entirely nude (especially female) figures conduces to the same end.

I submit the foregoing to thinking men, and must emphatically reiterate the contents of my former letter, at the risk of calling down upon me the wrath of the anomalous "new woman," and even under the shadow of the dreadful mahlstick with which my fair opponent threatens me. With apologies for once more encroaching upon your space, I remain, Sir, your very obedient servant,

RONALD KELLY.

16 Southampton Street, Fitzroy Square, W.:

August 16, 1897.

GENERAL.

Mr. E. Moir, the agent of Messrs. S. Pearson & Son, the contractors, during the construction of the Blackwall Tunnel, has been presented by the staff engaged on the tunnel with a pair of handsome silver candelabra as a mark of esteem and a souvenir of his association with this great engineering triumph.

The Gloucester Union Board of Guardians have appointed Mr. Alfred Saxon Snell, of London, and Mr. Walter B. Wood, of Gloucester, as joint-architects to their proposed new workhouse, infirmary and cottage homes.

The Playing-Card Makers' Company offer the "H. D. Philips prize", of 5*l.* 5*s.* for the best special design for the backs of playing-cards, intended for presentation by the Company to its guests at the banquet of the masters and wardens in November next. Two other prizes of 3*l.* 3*s.* and 2*l.* 2*s.* respectively are offered by the company for the two next best of such designs. The designs must be in colour and be such as can be reproduced effectively in not more than six printings. The arms of the Company and the City of London are to form a portion of the design. Designs must be sent not later than September 27 next to the clerk of the Company.

A Process invented by Colonel Duilier is being tried at the South Kensington Museum in order to get rid of the smoke produced by the boilers of the electric-lighting installation. It consists in introducing jets of water into the flue. The quantity of smoke has been lessened, and by a further modification of the apparatus, which is now being made by the inventor, it is hoped that it may be almost if not entirely removed.

The Architect.

THE WEEK.

THE terms of the settlement of the Penrhyn Quarry dispute are considered to be most satisfactory by the men. But to those who judge the contest from a distance the victory does not appear to be worth the sacrifice of a year's labour. Similar conditions could have been obtained by the men many months ago. The standard wage continues to be 5s. 6d. a day. The men can make their grievances known direct to the chief manager, and can even appeal to Lord PENRHYN himself. Contracts are not abolished, but the management undertake that each employé under one shall receive his just ratio of wages. The workmen can be readmitted in a body, or as soon as work can be arranged for them. This last point is considered of much importance, for it was expected that individual supplications for employment would be necessary. If both parties are satisfied and treat their losses as trifles there is hope for the future. But architects and builders cannot have the old confidence in quarries which can cease to be productive through insignificant causes. The strike has brought rivals to the fore, and the trade will therefore be carried on henceforth with unaccustomed competition.

IT is a remarkable fact that the ten selected contractors who were invited by the Municipality of Paris to tender for the metalwork of the Pont Alexandre III. over the Seine have declined. The conditions were supposed to be too exacting. In a work of the kind the French character would be at stake, and remembering the collapse of the new bridge at Tarbes while it was being tested, the Municipality were right to insist on the best work in steel that is obtainable. The hesitation of the contractors to accept the specification in its entirety suggests a decline in morals. If the Paris Municipal Council were wise they would risk the consequences, and invite half a dozen or ten English contractors to send in tenders; in that way an object-lesson would be afforded to French constructors, and one of which they stand in need.

IT may not be known to all our readers that a committee of the British Association are co-operating with the Silchester Excavation Fund committee in their explorations. According to the report, the area selected for excavation in 1896 included two insulæ (XV. and XVI.), immediately south of insulæ XIII. and XIV., which were excavated in 1895. The result was, on the whole, satisfactory, and as usual ended in some curious and totally unexpected discoveries. Insula XV. appears, like insulæ IX., X., XI., XII. and XIII., to have been given up to the dyeing industry, of which traces were found in 1894 and 1895, and a large area in the northern part of the insula was perhaps used as a bleaching-ground. Two wells were discovered, one with a wooden framing at the bottom, the other with a large wooden tub, which will be added with other antiquities to the Silchester Loan Collection in the Reading Museum. Insula XVI. contained a large and important house of the courtyard type in the north-west angle, and two other houses of the corridor type, as well as an isolated square building. Traces were also found of other structures, which were probably of wood. A large number of pits were met with in the trenches, and from these some good vessels of pottery and other antiquities were recovered. A pit of unusual size near the south-east angle yielded a large quantity of bladebones of sheep; the numerous perforations in these showed that they had been used in the manufacture of counters. Besides the operations in insulæ XV. and XVI., a small area was trenched to the south of the parish graveyard, which is within the walls, in view of its immediate inclosure as an additional burying ground. The area is close to the two square temples uncovered in 1890. The foundations of a small house of the corridor type were disclosed, near which was found a lump of worked porphyry. It is proposed during the current year to excavate the two insulæ (XVI. and XVII.) extending from insula III. as far as the south wall.

Although more than half of the area (100 acres) within the walls has now been systematically excavated, and with most important results, the committee desire to point out that there is still several more years' work to be done before the Romano-British city can be regarded as completely disclosed.

THERE is a complaint that the ancient oak roof of Bebington Church, near Liverpool, has been removed in the course of the restoration. It is true there is decay apparent in many of the timbers, but the conclusion of more than one who surveyed it is that it was quite capable of repair, and need not have been demolished. Decay in English oak timber, says Mr. E. W. Cox in referring to the roof, has some peculiarities; while the inner heart of the well-matured wood will remain sound for many centuries, the external rings of growth on the tree, technically called the sap wood, for an inch or two are less enduring and liable to decay and attacks of the worms. The cutting out of such wood should be done at first, but should any be left in and decay it is quite easy to cut it out and repair it without in any way affecting the heart of the wood. The sawing of the apparently rotten timbers, which are exhibited as a justification for this destruction, has disclosed that the decay in this roof is to a great degree superficial, and therefore capable of repair. Most of the joints are as sound as the day they were made, and both the material and construction of the framing of the timbers are superior to what is being substituted.

ON May 31, 1895, the following ordinance relating to windows projecting beyond the building line was adopted by the mayor, aldermen and commonalty of the city of New York:—"Bay windows, oriel windows, or other windows of any dwelling heretofore or hereafter constructed may extend not more than 1 foot beyond the street or building line. Show or bow windows may be placed in front of any store window opening, provided, however, that any such window shall not start from the ground or level of the platform and is at least 18 inches above the same to the sill, and is supported on suitable brackets, and shall not extend above the first storey, nor more than 12 inches from the front wall of the building to which it is attached, nor more than 12 inches beyond the jambs or posts at the sides of the openings. Every window in this section mentioned shall in all respects conform to the laws regulating the erection of buildings in the city of New York. The penalty for violation of this ordinance shall be 100 dollars." The value of the ordinance has since been tested, and apparently it is of little avail. In February of the present year an action was brought by the Department of Buildings against a person named Dick, and the judge decided against him. He appealed, but before the case was again tried the Appellate Division gave a decision in another case (BROADBELT v. LOEW) relating to frontages, but whether it was declared that the ordinance was valid or not lawyers are unable to determine. The appeal in the Dick case was afterwards heard and the judgment of the lower court affirmed. In this state of uncertainty and confusion the acting counsel to the Corporation maintains that the Dick case does not affect the ruling in the Broadbelt case, for the reason that there were two points in the Dick case, one being the same as that involved in the Broadbelt case and another entirely different, upon either one of which the court could act in rendering a decision. From unofficial sources he believes that the court did not intend to overrule or question the decision in the case of BROADBELT v. LOEW. The officials therefore conclude that the effect of the decision in BROADBELT v. LOEW is that the ordinance in question is valid, and the effect of the case of the Department of Buildings v. DICK is that where a person fails to show the proposed window upon his plans and in his specifications, and thereafter erects the window, such person is liable as for a penalty for a violation of the building law. These two decisions, thus taken together, make it imperative that in the present state of the law the proposed window should be shown. Unofficial lawyers, no doubt, take another view of the situation, and it is evident the building regulations of New York are more dubious than those of London.

ARCHÆOLOGY AND ANTIQUARIANISM.

THESE is one passage in the address of the President of the British Association which does not appear to have received any attention from the critics, although it may have more interest for architects and lovers of what is commonly known as antiquity than those parts which appealed to students of physical science. It is one where Sir JOHN EVANS endeavoured to suggest that prehistoric archaeology, of which he is a distinguished representative, is worthy of the notice of such an assembly as met in Toronto, whilst the study of the archaeology of a later period was only a sort of *dilettante* pastime which was adapted to the weaklings who follow belles-lettres. His words were:—"A distinction does exist between archaeology proper and what, for want of a better word, may be termed antiquarianism. It may be interesting to know the internal arrangements of a Dominican convent in the Middle Ages; to distinguish between the different mouldings characteristic of the principal styles of Gothic architecture; to determine whether an English coin bearing the name of Henry was struck under HENRY II., RICHARD, JOHN, or HENRY III.; or to decide whether some given edifice was erected in Roman, Saxon, or Norman times. But the power to do this, though involving no small degree of detailed knowledge and some acquaintance with scientific methods, can hardly entitle its possessors to be enrolled among the votaries of science." The spirit which animates the words is manifest. Evidently Sir JOHN EVANS is eager to see his own favourite study placed on the same level with chemistry, electricity, mathematics and other sciences, for although in the British Association there is a section of anthropology, it is a late creation which BREWSTER and the founders of the Association did not foresee, or they would have taken measures to secure its exclusion. There are a great many members who tolerate anthropology because it is believed to appeal to untrained minds, and helps to attract subscribing associates who would be scared by discoveries in pure mathematics or speculations about atoms. It is also so comprehensive that, by the exercise of diplomacy, a paper on a Greek temple could be read in the section. For our part, we do not intend to say one word against the section or against prehistoric archaeology, but we maintain that archaeology relating to a later period likewise offers opportunities for the co-operation of the sciences, and there was no need for the President to sacrifice architecture or numismatics for the sake of a hobby. This will be more evident by a short consideration of what science and archaeology signify.

A definition of science which will be universally acceptable remains to be formed. When BACON translated "Advancement of Learning" by "De Augmentis Scientiarum," he was only employing a phrase that was familiar in his time. Science was then an equivalent for knowledge or learning, and it was accepted in the same sense long afterwards. Sir JOHN HERSCHEL, for instance, defines science as the knowledge of many scholars presented in such a form as to be accessible for all. But so much passes for knowledge which can hardly be considered as scientific, there is a desire for a more explicit connoting definition. In the same way it is no less difficult to distinguish between ancient and modern times, or to put limits to archaeology. There is much which belongs to the present century which, if brought under the notice of people now living, would seem to be as ancient as anything belonging to the times of the PHARAOHS. We may, however, assume that works of the nineteenth century do not come within the purview of the archaeologist.

Without attempting a new definition of science, we can say that the word is now assumed to signify that kind of knowledge which is certain, that is determined by as rigorous logic as can be employed, and assuming that all the tests which the phenomena of the subject will allow have been applied. In course of time more exact tests will be used, and therefore certainty is only comparative unless in a few cases. COMTE was wise when in dealing with concrete sciences, such as mineralogy, botany and zoology, he considered them as not yet formed, but he would not deny that our knowledge of them exemplified the Positive method as far as it was understood by the uninitiated. It is the hope of establishing that certainty which compels so many theorists to endeavour to seek a

scientific basis for subjects which at first view would be considered as opposed to science. The laws of thought have been declared to be as inflexible as gravitation, and books on logic have appeared which consist solely of algebraic formulæ. Political economy, although apparently always changing, is considered by its votaries to be a very exact science. Poetry also is not excluded from the influence of science, and those who insist on a rigid system of proportions and the observance of stereotyped academic laws in the arts, are they not aping the conditions of science?

The students of prehistoric archaeology are accordingly not to be censured if they insist that they are students of science. It must be allowed that it is very hard to draw a line between them and geologists and palæontologists. Experts cannot always say whether a fragment of flint is an ancient weapon, or what is left of a nodule after it has been subjected to the wear and tear of time, water and the atmosphere. Sir JOHN EVANS, in the address he delivered last week, informed the Canadians that "within the last few months we have had the report of worked flints having been discovered in the late Pliocene forest bed of Norfolk, but in that instance the signs of human workmanship upon the flints are by no means apparent to all observers." The bed in question is almost modern, if compared with some in which flints have been found; but while the archaeologists maintain they were tools or weapons, the geologists are no less convinced they were never used to kill bipeds or quadrupeds. It can hardly be upheld that the man who seeks for flints in the hope of discovering evidence of the antiquity of man is not a votary of science, but a mere antiquarian, like those who hunt curiosity shops for treasures; while he who looks for flints as evidence of the order of the succession of strata can claim to be inspired by BACON's or NEWTON's spirit. The geological and archaeological problems correspond. It is puzzling to find beds of rock far apart which are identical in construction and characterised by similar fossils. But a still greater puzzle is presented for solution when we discover "that man at two such remote epochs as the pre-glacial and the post-glacial should have manufactured implements so identical in character that they cannot be distinguished apart," although an interval which is not to be measured by years separates the epochs. There is also a wonderful analogy between nature's direct operations as seen in strata and her operations through the agency of man when we perceive no difference between the implements unearthed in Britain and those met with in France, Italy, Spain, Portugal, Egypt, &c., nay in Somaliland, for "in an ancient river valley, at a great elevation above the sea, Mr. SETON-KARR has collected a large number of implements formed of flint and quartzite which, judging from their form and character, might have been dug out of the drift deposits of the Somme or the Seine, the Thames or the ancient Solent." In all such cases, flint-hunting corresponds with fossil-hunting, and if the palæontologist can claim to be of a scientific stock, the prehistoric archaeologist is either representative of the same family or of one that is near akin to it.

If uniformity is a characteristic of the flint weapons, the same quality is to be found in many of the early forms which are sought after by the antiquary. After all, man is not a remarkably inventive animal, and when analysed the arts and manufactures of our own time are found to be made up of operations which little by little were derived from earlier efforts. A few forms of weapons and utensils have been faithfully followed for ages, and what is more extraordinary, primitive ornamentation was as restricted as primitive construction. A great step was supposed to be made by those who attempted to trace the history of art, when Celtic interlacings were traced to Norway and Iceland. But before reaching those countries the patterns had travelled over Europe, parts of Asia and Africa, and nobody can say where they originated. As long as the fret was accepted as Greek it was a hallowed form, and inspired a great deal of acute speculation; since it was found to have served many a meaner race it has lost all interest. Other patterns are doomed to a like fate.

At the present time it is not apparent how any of the sections of the British Association could help in elucidating the origin of the earliest forms of ornament. When a bone is found in a cave on the borders of Derbyshire and Nottinghamshire with the figure of a horse scratched on it,

there is no difficulty in concluding that as it resembles similar figures found in French caves there was some affinity between the artists. But ornament which is seen in lands far apart presents more difficulties, and caution is needed before any inferences are arrived at. It cannot be said that prehistoric archaeology can reckon on more aid from science. No doubt the question of time is one which is beyond our arithmetic, and the transformations of the earth's surface were of a kind which sometimes make geological periods appear to be intermingled, whatever the cause. Sir JOHN EVANS is compelled after years of toil to draw on his imagination when he wishes to attempt a sort of outline of the history of the human race. "Is it not a case," he asks, "in which imagination may be fairly invoked in aid of science? May we not picture to ourselves our earliest ancestors gradually developing from a lowly origin acquiring a taste for hunting? May we not imagine the game for the hunter becoming scarcer, and that his life in consequence assumed a more nomadic character"—and so on? But how can he attain certainty by imagining and picture-making? Science has not supplied the information which is necessary for trustworthy answers to the questions, and similar speculations were indulged in before the British Association was established. From this it will be seen that prehistoric archaeology is not much indebted to the older sections of the Association, nor is there a prospect of any change which will impart additional value to flint instruments.

Let us now consider the inferior archaeology or antiquarianism, which Sir JOHN EVANS will not designate as "archæology proper." We shall take his own cases. "The internal arrangements of a Dominican convent in the Middle Ages" would, of course, comprise the subject of building construction. The section of mechanics or engineering could co-operate in treating it according to modern principles. Professor WILLIS was the highest authority on mechanics in his time. He was Jacksonian Professor in the University of Cambridge, and whenever the Government were in a difficulty his aid was invoked. WILLIS was not afraid that any imputation of antiquarianism would injure his reputation as a specialist or as a professor, or, we might add, diminish his influence on members of the British Association. His treatise "On the Construction of the Vaults of the Middle Ages" would have been well received if read at one of the meetings of the Association, for it would have interest for students of science who were never likely to have designed an arch. To him we are indebted for the revelation of the internal arrangements of a Benedictine convent at Canterbury, and he would enter with zest into an investigation of a Dominican convent, for that order endeavoured to satisfy the desire of modern as well as Mediæval congregations by building churches without piers or columns to obstruct the view. Mediæval masonry need not be without interest to the geologist and chemist, the ornament is worth the attention of the botanist, and it cannot be said there is no more to be discovered by chemistry about stained glass than is already furnished by artists and amateurs. The American professor who has revealed so much relating to the substitution of curved for straight lines suggests there are problems in building which await the solution of physiologists. Nor are mouldings so insignificant as Sir JOHN EVANS would suppose. As clues towards identification they are comparable for certainty with those utilised by geologists.

What Sir JOHN EVANS says about coins reveals the strength of prejudice and its weakness also. To determine the age of a coin which is dateless does not entitle an investigator to be enrolled as a votary of science, although he may employ chemistry in order to discover the proportions of the materials used. But when the same chemical process is employed on a relic of the Iron or Bronze Age, or when coins are treated as fossils, and their morphology studied, then the investigator can plume himself as a fellow-labourer with CHARLES DARWIN. From the President's conclusions it would seem as if a study of prehistoric archaeology may excite the imagination, but it does not always improve the reasoning machinery in man.

If we find that, as occurred in Toronto, archaeology and architecture, for the two are closely related, are treated by the British Association as coming nearer to literature than to science, the cause is to be traced to the indifference of architects. They avoided the meetings, while the civil

engineers were allowed to appear as the only representatives of construction. It will hardly be credited that, during a period of about half a century, the late CUTHBERT BRODRICK, of Leeds, was the only architect who possessed sufficient courage to read a paper, his subject being the dome of his town hall. When the representatives of architecture have kept aloof, are men of science to be blamed if they are oblivious of any connection between their own subjects and buildings, whether ancient or modern, monastic or pagan?

ELECTRICITY METERS.

TWO papers on this subject were recently read at a meeting of the Municipal Electrical Association, one dealing more with prepayment meters.

In one paper a list of "essentials" for a really good meter was given. They are:—Accuracy, durability, low starting current, noiselessness, impossibility of being tampered with by consumers, unaffected by stray magnetic fields, reduction of moving parts to a minimum, small loss of power, absence of clockwork, liquids likely to freeze, mercury, contacts or commutators. If energy meters they must measure true watts. They must be unaffected by vibration, alteration of temperature, frequency (if alternating), or barometric pressure.

"In addition, the following may be classed as 'desiderata':—Equally correct for direct or alternating currents, capable of being checked by a short time test, low cost."

We have no hesitation in saying that the really good meter has yet to arrive if the above list of essentials is to be taken as correct. At the present time one might be satisfied with a rather less difficult standard, as the above may frighten inventors.

Some interesting figures were given with reference to the accuracy of gas and water meters. The former are said to have an error "of not more than 2 per cent. in favour of the seller and 3 per cent. in favour of the consumer" when new. Water meters are said to be correct within $2\frac{1}{2}$ per cent. of the mean. It was also stated that most modern electricity meters are correct to the same extent.

The limits allowed by the author are:—

At full or half load	2 per cent. from the normal.
At quarter load	3 " " " "
At one-tenth load	4 " " " "

The author rightly insists that the law which governs a meter should be a correct one, not an incorrect one "cooked" by numerous compensating devices to approximately correct readings.

With regard to reliability of meters, several points were mentioned as defects of many meters, and one is the use of a tinned iron case. It was pointed out that these cases cannot be made dust-tight, while a substantial cast-iron one can. Another point is the use of iron or steel in the recording train of wheels. This should be avoided, as slight rusting may stop the meter.

The really great defect of motor meters is the high current required to start them, and this defect is one which it is difficult to overcome satisfactorily. The limit of current above which the meter must (in the author's opinion) start is one-fiftieth of the maximum load.

Several devices for assisting meters to start were described, but they are nearly all rather liable to cause the meter to run when there is no load. This latter defect is one which, in the interests of the public, should be entirely obliterated and made impossible. It is distinctly annoying to find that the meter registers a hundred units or so when the house has been shut up since the meter was last read.

The author does not quite make out his case when he says that "It is hardly necessary to observe that any form of meter that requires periodical winding up should be avoided." Meters are now regularly inspected monthly, or at most three-monthly, and there is no difficulty in winding up the clock. It is well known that, as far as measuring quantities goes, the clock is of all instruments the most accurate. Mr. WILMSHURST (the author) would debar the use of this instrument simply because of the trouble of winding, thus throwing out of court the meter which is probably the most accurate of all. The Aron clock-meter starts with the smallest load, and is very accurate through the entire range.

The effect of vibration in assisting motor meters to start

was discussed briefly. The really greater error in meters, the temperature error, is scarcely mentioned, and we think this a very grave omission in a paper of this class. The temperature error in motor meters is far more serious than usually imagined, and is seldom tested. In the particulars of tests there was no temperature test, although other experimenters were referred to. Temperature has a great effect on most meters.

The next point of interest mentioned was in connection with the alternating current meter, whether it should be a quantity or an energy meter. The author very rightly comes to the conclusion that it should be an energy meter, as the error in favour of the suppliers is very great if apparatus with self-induction is used.

There are supposed to be about 100,000 meters at present in use in this country, 70 per cent. being of the quantity type.

The author has made a number of experiments with energy and quantity meters, as to the revenue they bring in.

In one case where the voltage was 2 per cent. high, and where some lamps were burning all day, the energy meter registered 1,445 units, and the quantity meter 1,375 units; and in another where one or two lights were in use eight hours, and eight lights in use two hours, the energy meter registered 23 and the quantity meter 18 units.

In every case where there were a few lamps on for many hours the energy meter was much more accurate than the quantity meter. This is because the former meters read more accurately at low loads.

A good technical description was given of the new Westinghouse energy meter, but it is not of general interest.

The works tests should, in the author's opinion, include the following:—Accuracy at one-tenth, half, and full load, starting current, running on shunt with and without vibration and slightly increased pressure, energy lost in shunt (if any), volts lost in meter at full load, insulation of meter, and, we would add, temperature error.

The other paper, dealing more with prepayment meters, was not so accurate as the one on meters in general, but still there were many good points mentioned. The author (Mr. COUZENS) very rightly points out that the poorer thickly-populated districts offer a far better field for extension of mains if the consumers can be charged for their supply in a proper manner, and the author thinks that the proper method of charging is by prepayment meters, in connection with free wiring. The reasons and economy of these systems were gone into fully in our columns a few weeks ago, and there is therefore no need to enlarge upon them here.

The author, after going into the advantages of prepayment meters, pointed to the great success attained by their use in London and elsewhere, especially by the Gas Light and Coke Company, who had on their books a short time ago 150,000 prepayment customers, and from 16,000 to 17,000 waiting to be connected up. When the author goes into the technical points of prepayment meters we think he is not very accurate. He gives the essential features of a prepayment meter as being:—Cheap (not more than 50s. each), reliable, solid, and strong, capable of storing up several pennyworths, and should be fairly accurate, though an error of up to 5 per cent. is allowable; and also "that it should be a watt meter rather than an ampère hour meter, as any deviation of the voltage from the normal will have an appreciable effect on the duration of the pennyworth. It must also be proof against being tampered with, and there must be no practicable means by which ingenious contrivances can be made to extract an unlimited supply with a single coin, as is the case with the automatic sweetmeat machines at present. The prepayment meter will not have the advantage of the public gaze to defend it from these frauds." The author also thinks that a purely prepayment meter is wanted, not a mere attachment to an ordinary meter. This is where we think the author is wrong. A penny-in-the-slot meter must essentially be a meter with a slot and switch, and a cheap meter must first be made, fairly accurate, and until this is done a cheap penny-in-the-slot meter is out of the question. Also given an ordinary meter with dials and a slot attachment, there is no fear of fraud. If the amount of money in the box does

not correspond to the quantity consumed there will be an obvious way of enforcing payment. By this arrangement any vagaries of the attachment or of the consumer can be checked.

The author then described the BASTIAN and HODGES prepayment device attached to an ordinary meter, and he said: "This constitutes a kind of half-way house between the ordinary meter and the prepayment meter pure and simple." And, "Regarding solely prepayment meters, though at present there are none actually on the market, almost everyone has some type or other just emerging from the chrysalis stage."

The ELLIS and ATHERTON prepayment meter was then described. This will shortly be on the market and is to be very cheap. We anxiously await tests, as we should think from the description that it would not be very accurate, but we hope we may be disappointed.

These two pioneer arrangements have not been described here, as it is difficult to clearly explain their working without sketches.

It is fairly certain that there will be many inventors who will take up this matter, and we may expect more types of prepayment meters very soon, but we think it will be some time before a really good cheap meter, whether with or without a prepayment device, is on the market. When it does come, however, it will have a great future.

MEGALITHIC BUILDERS.

IN the last number of the *Evergreen* Professor Patrick Geddes, of Edinburgh, had an interesting and suggestive article entitled "The Megalithic Builders." The Professor gives a rapid review of the present-day architecture in Scotland. He sets out in Glenmoriston, and describes the following scene there:—

We crossed the loch, left our boat and went up the glen. Passing the castle with its medley of new and old we stopped at the little cemetery. A pair of tall standing stones, a linden avenue, then another pair of monoliths gave worthy entrance to the grove of rest, with its grassy mounds, its massive tombstones of a long dynasty of chiefs and the many-stoned, almost cairn-built, tomb of their hereditary pipers. Castle and glen are empty now and the pipes are silent; but here at least, after love and life, after labour and war, and the music of all these the silence is of unsaddening peace.

We chose the right bank of the river (the road is on the left) and trudged on through pretty scenery of the familiar sort—hill in cloud and sunshine, river in ripple and race, birch and bracken, heather and pine, with every here and there a granite boulder among a group of stunted junipers. But a couple of hours up the stream a scene opened out, of which neither my painter friend nor myself had seen the like before. The trees grew less thickly, the heathery hillside receded, and there lay before us broad park-like grassy levels with vast masses of evergreen, here in rounded masses, there rising into graceful spires. The first impression was almost that of park and shrubbery laid out by a skilful landscape gardener of old for some unbuilt mansion, but as we came nearer it was clearly a natural glade of gigantic junipers. Tall and massive, ancient and rugged, gnarled and broken, their green spirelets rose over deep caverns of shadow, filled with writhing arms breaking through vast lichenous growths, some of hoary dishevelled age, others in broad wrinkled overlappings of strange greens and lurid blues, a gorgeous ragged foulness like a witch's draperies. Outside these shadowed hollows the scene had the melancholy beauty of a cypress cemetery in the East. And who might not one of those boulders cover? As we went on the sky was grey, and a sobbing linn settled into black pools of sorrow: we had passed the place of sighing, but here seemed the wells of the river of tears.

Soon we came to a rotting bridge, and crossed to a ruined mill, with tumbled stone heaps that not so long ago were cottages and byres; for though dramatic evictions are out of fashion, it remains more than ever the interest of any practical-minded laird (chief no longer) quietly to depopulate his glen, and as the old folks die out, throw their crofts into the forest; for the fewer the people the more winged and four-footed people, and the more rent his shooting lodger will be willing to pay.

Yet in this desolation we found a single child, a quiet wee lassie, I suppose the gamekeeper's, playing alone. It was useless speaking to her, for the education code practically works so that the children nowadays lose their Gaelic without really learning English. She did not even lift her head to look at us, but went steadily on with her playthings—a gathering of rough stones. We stepped nearer to see what she was doing with them. A shudder of astonishment ran through us—the child

had traced out a ruined sheepfold, and was building beside it a funeral cairn.

We could scarcely believe our eyes or our interpretation, but the thing was unmistakable, indisputable; and so leaving hamlet and its monument builder, we went on to the narrowing of the glen. There the explanation broke upon us; at the opening of a new labyrinth of junipers was standing; or rather slipping down, a moss-grown cairn—another and another, a group, a score, a hundred, each a recorded sorrow of the glen. The bairn with her stones was not inventing her ghastly game, but only reproducing her near and familiar impressions; yet, child historian, child artist, she had combined for us the story of a passing race, a megalithic people, the utter winter of their disappearance seemingly nigh at hand.

The Professor then passes to Inverness. He writes:—

As we return by the canal steamer to Inverness, the villas and shops, the hotels and railway stations promise no more than any other modern town to archæologist or interpreter. There seem no ancient buildings of interest, few modern ones of merit, yet on a second survey we had seen no small modern town in Scotland, hardly indeed in Britain or elsewhere, of more ambitiously monumental character. A modern castle crowns the hill, a modern cathedral stands by the river, and the towers and spires of new churches rise every here and there. Besides the weak romanticisms and conventionalities of all these, the business quarters are crowded with costly Philistinisms which would be the pride of many a larger town. In the centre of the town we have a showy Town House and fountain, the latter built over the prehistoric palladium of the borough, that fountain stone, "Clach-na-cuddain," which is not only the familiar fetish and watchword of Invernessians at home and abroad, but gives the unnoticed keynote of the town's architecture too. From minor megalith to minor Victorian architecture indeed is not an unmixed art progress; but this "Capital of the Highlands" has still to become a capital; despite latent Highland elements, its realised ideals as yet are little more than those of the Scottish market burgh and the English garrison town.

Yet as the old language comes back to the dying, and as it is with our fathers we would sleep when dead, so the undeveloped and vulgarised megalithic city of the living is overlooked by the truer and nobler megalithic city of the dead—the Hill of Tomnahurich, crowded with cross and obelisk from base to wooded crown. Here the ancient and latent art spirit is more developed, more emancipated, and so gives us one of the most characteristic, and in general effect one of the most beautiful cemeteries of Western Europe.

At this hill-foot again we found childhood at play; this time a group of merry boys, who, out of the rich variety of northern games, which we were learning to decipher as survivals of past culture-phases, had fitly gone back to the megalithic game of summer, as curling is obviously of winter—putting the stone. As the girl in her silence, as the mourners in their sighing, so now the boys in their laughter. We are wont to say that only animals have instinct, and that man acts only by reason. Is there not sometimes a word to say for the opposite?

We are wont to receive and express our emotions for the most part audibly through music or words or tones, but the emotion of architecture is latent in us still; eye and hand can surely feel as well as tongue and ear. Emotion plays not with strings or pipes only, but with things more massive and enduring also; to her Amphion-lute the very rocks range into order as sand grains ripple to the violin bow, and to her listening ear the Memnon statues sing. We speak of the rude stone ages as if they were ages of rude men, but how much is this because our tools, the machines, have mastered us, have dulled us to match their own finish? For elemental man, elemental feeling, elemental expression also; so youth, rejoicing in its strength, will ever toss the rugged stone, sorrow ever upheave her rude memorial. To feel the full depth of this ever primeval art, some modern instances must come home to us, and here by Inverness is the spot of all Scotland. On Culloden Moor there lies a gloom deeper than that of the Jacobite chronicles, a silence sadder than the songs; to these poor proud stones of the clans, landmarks of death and defeat, our heart-strings thrill as on no other stricken field.

THE OLDEST HOUSE IN GLASGOW.

A CORRESPONDENT of the *Glasgow Herald* writes:—
The advance of the modern building spirit in our city, as well as elsewhere, has a tendency to do away with all links with the past. Only the other day it was debated in Council whether the Tron Church would not be better removed. In our reforming haste it is possible that mistakes may be made that will be deplored by succeeding generations of citizens. For instance, we have still one of the ancient manses connected with the cathedral before the Reformation. This building, mentioned in M'Ure's history by the name of "Provan's Lordship," stands across the street from the north end of

Barony Church, in Cathedral Square. The back of this house is toward the Square, and this aspect of it is presented in Stuart's "Views of Glasgow," perhaps to include the little building leaning against it, which is said to have been the home of the public executioner. The original front, or present back, has three corbie-step gables, small windows and doorway, and bears the date 1070 on the eave's stone at the south-west corner. It is since the last of the local histories was written that the date was discovered, and it is a puzzle for antiquaries. In connection with this house and another of the old vicarages or manses, since removed from Rottenrow, Stuart says:—"Many will find a difficulty in believing that these houses can belong to so distant an era as that of Bishop Cameron, but the fact cannot be questioned, although they bear at the present day but few traces of the actual aspect which was theirs, owing to repairs, alterations," &c. In a petition to Parliament in 1587 from the inhabitants of Glasgow it was stated that before the "Reformation of Religion" the city was "uphelden" by the vicars and other clergy, but is now ruinous and for the most part "altogether decayit," and about that time there is no doubt that some effort was made to preserve the "grite and sumptuous buildings of grite antiquitie" that formerly belonged to the Roman Catholic prebendaries. It is possible that Provan's Lordship was originally built half-way up with stone, with outside stairs and a projecting superstructure of timber, and that in reconstructing it the date 1070 may have been put on the eave's stone as an approximation of the actual time of its erection. If it was not the first built of the vicarages, it certainly held what might be called the premier position, nearest to the great west door of the cathedral, the principal entrance of the Bishop's Palace and the Stable Green Port, in ancient times the chief gate of the city. The building itself is a marvel of strength and solidity, the interior dividing walls being 3 feet thick, the same thickness as the outer walls. The story of this house from local histories and tradition is interesting, although some parts of it are open to question. It is said to have been the manse of the celebrated William Turnbull, Bishop of Glasgow and Lord of Provan, who founded the University. In this house Cardinal Beaton is supposed to have stored the ancient documents of the cathedral, the gold image of Christ, the twelve silver images of the apostles, and other treasures which he took with him when he fled to France. There also Queen Mary may have stayed with her attendants during the sickness of Darnley in January 1567. It is unreasonable to think that Lord Darnley stayed anywhere but in the Darnley Cottage, the property of his father, and it is not improbable that the queen stayed during his convalescence in the next house to it, which was Provan's Lordship. Mary's preference for such houses as temporary residences is well known. At another period of its history it was used as the city prison during the erection of the second Tolbooth. To come down to our own time, it is now some thirty years since the first attempt was made by the City Improvement Trust to acquire it, for the purpose of its demolition, to make way for a new building, and since then it has several times been under consideration for the same purpose. The attics and cellars are closed up as insanitary. It would be a great pity to have this house destroyed for the following reasons:—

1. It is not insanitary. The tenants are respectable people and the place is kept in good order.
2. It is now closed in on three sides by new buildings, with Cathedral Square in front, and "open space-making" cannot be used as an argument for its destruction.
3. It is the last of the vicarages connected with the old chapter, and may be the most ancient inhabited house in Scotland to-day.

The current *Blackwood* contains a "Reminiscence of Tennyson" by William Knight, and in it the poet is quoted as saying that he "bemoaned the loss of all old things, old trees, old historic places, old creatures of the forest and of the air." Very little of this spirit seems now to prevail among our citizens. Did the men who wrote to the *Herald* in the early '50's about Glasgow, past and present, leave no like-minded documents? Is it asking too much that an archæological society be formed to investigate our fast disappearing old buildings, some of which are surely worth preserving?

Mr. J. Dalrymple Duncan writes:—

Your correspondent "T. W. L." is in error in supposing that the old house in Cathedral Square standing at the corner of Macleod Street is "one of the ancient manses connected with the cathedral before the Reformation." These manses were erected during the episcopate of Bishop John Cameron (1426-46), and if it could be shown that the building were one of them it would be of the utmost value and interest as a specimen of the Domestic architecture of Glasgow in the fifteenth century. But it can be readily demonstrated that it has no claim to this distinction. Even a casual glance at its architectural features will satisfy anyone capable of forming a judgment on the point that these are characteristic of a considerably

later period than the fifteenth century. Some years ago I had occasion, in writing a notice of the house for the Glasgow Regality Club, to make careful inquiries into the probable age of the building, and at that time I inspected it along with Mr. John Honeyman, who, I need scarcely say, is well qualified from his wide antiquarian and architectural knowledge to speak with authority on a question of the kind. He gave it as his opinion that the edifice, so far from being a relic of the fifteenth century, was erected during the course of the seventeenth, and most probably was not older than about 1650, basing his judgment specially on the entire absence of the Gothic feeling which is noticeable in the domestic architecture of the fifteenth century. The lintel of the principal doorway, although at some time or other it has been hollowed out so as to show an elliptical form, was originally perfectly square across, and was, like the jambs, moulded in a style common during the latter half of the seventeenth century, and the building throughout exhibited none of the preference for delicate details or mullioned windows which would undoubtedly have characterised the work of a fifteenth-century architect. From his inspection of the interior arrangements, Mr. Honeyman formed the opinion by the appearance of some of the doorways on the different storeys and the existence of thick inner walls round the staircase that the edifice had originally been built as a tenement for occupation by several families, and could not by any possibility have been a prebendal manse. I made a careful examination of the title of the property, and this tended strongly to confirm Mr. Honeyman's view. The earliest writ I was able to examine was an instrument of sasine in favour of John Trumbill, "Incola, Glasgu," and Marion Finniesone, his wife, in conjunct fee and liferent, recorded in the Particular Register of Sasines on November 3, 1642. The description of the subjects ran as follows:—"Toto et integro illo tenemento terrae jacen-intra civitatem Glasguen, occidentali latere regia via ejusdem in illa parte qua itur a porta nuncupat. Stabillgreen port ad Hospitale Sancti Nicholas." John Trumbill, John Corss, John Baird, jun., Catherine Gray and others are mentioned as occupants of the house. It will thus be seen that as far back as 1642 the house is called a tenement, and is described as occupied by a considerable number of tenants. The belief that the building was a prebendal manse arose from a statement of M'Ure's that the manse of the Prebendary of Balernock, or, as he was called, the "Lord Provan," "was at the large house near the Stablegreen port that now belongs to Mr. Bryson of Neilsland." Now, the old house in Cathedral Square at the time M'Ure wrote did belong to John Bryson of Neilsland, whence it has been somewhat too hastily assumed that it was the manse in question. But it will be observed M'Ure (who, moreover, was writing in 1736, when, even according to Mr. Honeyman's theory, the edifice was not far from a century old) does not say that Mr. Bryson's house was the manse, and his statement may be quite fairly taken to mean that the former was at or on the site of the Prebendary of Balernock's residence.

Most of the manses fell into decay and disrepair very soon after the Reformation. Some of them were included among the "sumptuous buildings of grite antiquitie," whose decay formed the burden of the petition to Parliament in 1587 mentioned by your correspondent. The animosity of the Reformers against the former dwellings of the Romish ecclesiastics was specially bitter, and when we recall the scant respect with which the cathedral itself was treated, it is only natural we should expect to find that the manses of the prebendaries were destroyed and treated by the citizens as convenient quarries and storehouses of building material. It is besides an extraordinary circumstance that, if the house in Cathedral Square was a manse, no mention of its former dignified condition should occur either in the titles of the ground on which it stands or those of the adjoining subjects. I could add other arguments, but I think I have said enough to show that the theory of the ecclesiastical origin of the edifice in the fifteenth century cannot be maintained. I should like to know your correspondent's authority for the statement that it was used at one time as a town prison.

While, however, I differ from his estimate of the antiquity of the building, I quite agree with him that an effort should be made to prevent the disappearance of an old landmark which, while far from being "the most ancient inhabited house in Scotland," must be one of the oldest pieces of domestic architecture in Glasgow which the ravages of time and the vandalism of past generations have spared to us.

A vast concourse of people assembled on Sunday, the 15th inst., to assist at the inauguration by the burgomaster of the monumental fountain erected on the Place de Brouckère, Brussels, to the memory of Jules Anspach, who became burgomaster in 1854, and to whose memorable administration the Belgian capital owes so much.

STRENGTH OF COLUMNS.

At the meeting of the British Association on Friday a paper was read by Mr. Gaetano Lanza, in which he showed that an attempt to compute the strength of any given column by the various rules and formulæ commonly found in different handbooks and books written by so-called authorities would speedily reveal considerable discrepancies, not only in the formulæ, but also in the results. Hence it became a matter of importance to make a careful study of the tests that have been made under practical conditions on columns of such sizes and proportions as are used in construction. A summary was therefore given of the principal experiments that have been made of columns of practical sizes. The greater part of the tests contained in the list were made on the United States testing machine of 800,000 lb. capacity, located at the arsenal at Watertown, Massachusetts. The details of these tests are published in special yearly reports issued by the Ordnance Department of the United States Government. Diagrams were presented showing (1) the results of the tests of cast-iron mill columns; (2) the results of the tests of wrought-iron bridge columns, and also empirical formulæ representing in each case the righthand portion of the curve, which is concave upwards; (3) the results of tests of timber columns. A perusal of all the diagrams shows that, whenever the load on a column is so applied that its resultant acts along the axis of the column, the breaking load per square inch of sectional area is practically constant up to a certain ratio of length to radius of gyration, which in wrought-iron bridge columns varies from 60 to 80, and in a corresponding way in timber columns. For higher values of the ratio of length to radius of gyration the breaking strength per square inch decreases, and the law of decrease can only be expressed empirically in each case. When, on the other hand, the load on the column is eccentric, this must be taken into account in our calculations, and the greatest fibre stress should always be computed by adding the direct stress per square inch to the greatest fibre stress arising from the bending moment due to the eccentricity of the load; and the column should then be so proportioned that the total greatest fibre stress shall not exceed a certain allowable fibre stress, which last must be a sufficiently small fraction of the breaking strength per square inch corresponding to the ratio of length to radius of gyration of the column. In the paper the results of the tests and the modes of computation, both for central and for eccentric loads, were treated in detail, and a discussion was given of the theories and formulæ commonly found in the handbooks which are, for the most part, based on the results of Hodgkinson's tests on small samples. Fuller attention was also called to the disagreement of these latter with the facts.

NEWCASTLE INFIRMARY COMPETITION.

THE competition for the new Royal Infirmary, Newcastle, is limited to thirteen architects, who are requested to send in designs for an infirmary containing 400 beds, complete in every respect and standing on the site a plan of which is furnished to the competitors. It may be necessary to retain for the present the part of the hospital known as the Dobson wing, containing about 146 beds; but the plans must provide for the eventual removal of this wing and its replacement by equivalent accommodation corresponding with the rest of the hospital, and must show how it is to be utilised in the meantime so far as its ward arrangements are concerned. It will be necessary to construct the new building step by step, and so as at all times, if possible, to maintain during the construction not less than the present number of 270 patients' beds, and the necessary accommodation for the working staff at present residing in the hospital. The accommodation for nurses, as required in the schedule, though it may be necessary to place it under the same roof as the rest of the building, must be, with the exception of the dining halls and ward sisters' rooms, separated from the working part of the hospital. Special care must be taken to preserve as much open space as possible between the buildings, and to arrange the pavilions so that the intermediate space lies, for the most, open to the south-east. The principal large wards must be built upon the pavilion system, each bed having a window on either hand. The proposed system of drainage (for surface-water and for water from lifts, as well as sewage) must be shown on a plan, with gullies, traps, inspection shafts and ventilators. The sum at the disposal of the committee for the new building, exclusive of that part which shall eventually be substituted for the west wing, is, up to the present time, 100,000*l*. An estimate must be given of the price per cubic foot at which the designer estimates his building and the entire cost so arrived at. To the author of the design which in the opinion of the committee and assessor is most worthy of it will be awarded the work of carrying his design into execution at the usual commission of 5 per cent. This 5 per cent. commission shall be in payment in full for all services usually rendered by architects, *i.e.* all plans, specifica-

tions, estimates, detail drawings, contractors' working drawings, superintendence, attendance and other expenses, and all other matters and things connected with the erection and completion of the building. To the authors of the three designs which in the opinion of the committee and assessor are next in order of merit will be awarded the respective premiums of 150%, 100% and 50%. The committee reserve to themselves the right to adopt any feature from any of the premiated designs. No distinguishing mark, motto or device is to be put on the drawings, description, statement, envelope or case by the competing architects or their agents. The designs will be submitted to Mr. Alfred Waterhouse, R.A., who will advise the committee in their selection.

A schedule accompanies the instructions as to the requirements of the new infirmary, on the understanding that the Dobson wing is not to be retained as a permanent part of the new infirmary. The following are extracts from it:—400 beds, 180 medical and 220 surgical. The medical department to consist of four large wards of twenty-two beds each, two wards of four beds, and four wards each of one bed for males, 100; one ward of ten beds, with two separation wards of one bed each, for children, 12; two wards of twenty-four beds each, with each one separation ward of one bed for females, 50; two wards of eight beds each, with each one separation ward of one bed for females, 18; total medical, 180. The surgical department to consist of four wards of twenty-four beds each, with each one separation ward of one bed, for males, 100; four wards of four beds each, for males, 16; two wards of two beds each, for males, 4; two wards of twenty-four beds each, with each two separation wards of one bed for females, 52; two wards of ten beds, with each a separation ward of one bed for females, 22; six wards of one bed each, for females, 6; two wards of eight beds each, with each two separation wards of one bed each, for children, 20; total surgical, 220. Each large ward or group of small wards to be provided with a sisters sitting-room, a duty-room or ward kitchen, a room for patients' clothes, a storeroom for bread, milk, &c., lavatories, foul sinks, urinals, and w.c.'s in proportion, a bathroom (but in medical large wards two bathrooms), a closet for ward linen, earthenware, &c., and a patients' dayroom for each flat. A room for photography. Reasonable accommodation for the examination of secretions, &c., suitable also for electrical treatment of patients. An office for receiving and passing applicants. A large waiting-hall for patients, provided with benches that admit of arrangements into groups for male and female surgical and medical patients, convenient for the respective consulting rooms. The hall is also to be available as a recreation room or room for large meetings. A small operating room, with lavatory basins, sinks, &c. Operating theatres, easily accessible by lift—one large, to accommodate sixty students, to have the following annexes: anæsthetic room, waiting-room with bed, sterilising room, microscopic room; second small, near the female surgical wards, to have waiting-room and anæsthetic room. Lecture theatre to hold 100 students. Library, the size of the present library and staff-room together (57 feet by 20 feet). Staff-room, with lavatory, &c. Arrangements for students:—A common room, cloak-room for 120 coats, hats, &c., cloak-room for lady students, bicycle standing room for fifty bicycles. Resident medical and surgical officers:—Senior house physician's sitting and bedroom, four sitting-rooms and eight bedrooms for house physicians and house surgeons, a sitting-room for assistant house surgeon, near the accident-room, two spare bedrooms, two bath-rooms. Mortuary, with view-room attached. Post-mortem room, communicating with mortuary with double doors. Two post-mortem tables; benches for sixty students.

The accident and reception-room department should be easily accessible by carriages from the public road; the door, if possible, protected by a porch and away from public curiosity and on a level with the outside, or at any rate without steps; a waiting-room for about thirty people, two bedrooms of two beds each for noisy or drunken patients.

The remainder of the schedule is devoted to requirements for general administration, kitchen, laundry, &c.

TESSERÆ.

Greek Influence.

THE Greek dominion over the realms of thought was as undisputed as the Roman over the realms of earth. Almost every field of literature and science the Greeks may claim as their own by the right of prior discovery. Few are the directions in which the modern explorer does not find traces of Greek settlement and occupation. Even when they did not penetrate into the interior, as in the case of Sicily, they at least colonised the coast. Even in mathematical and physical science and in mechanical arts, the rapid extension of which is the boast and glory of modern times, the Greeks took the first

steps. In all the forms of literature, in the fine arts, in the modern sciences, modern nations—counting together a population perhaps twenty times more numerous than that of Hellas and its colonies, with their manifold advantages in accumulated knowledge, increased experience and extant models—have scarcely equalled and never surpassed the unaided efforts and spontaneous developments of Greek skill and Greek genius. Time and chance, the blind workers—abetted by the no less blind workers, ignorance, barbarism and bigotry—have too often conspired to involve in one common destruction the temple and the library, the statue and the picture; and probably the extant remains of Greek literature bear no larger proportion to the whole mass than the ruins of Athens bear to the thick clustered glories which delighted the eye of Hadrian; still, enough remains to prove by an infallible test the right of Homer, Sophocles, Plato, Aristotle, Phidias, and others to rank for ever among the foremost names of time. Who, having seen, can forget, or who, not having seen, does not desire to see, those columns of Phidias, as they stand high above the modern city alone in their beauty, and white against the sky, the despair of the architect and the wonder of the world? And there are other works wrought by the Greeks of old which shall stand forth conspicuous in undiminished splendour long after the Parthenon has crumbled into dust.

Columns as Piers.

One very great advantage attending the combination of the arch with the column as its support is that it allows the openings to be considerably wider than they otherwise could be, because such intervals as would produce a poor and straggling effect in a colonnade become well proportioned and agreeable when spanned by arches. Such columnar arcades have frequently been employed by the Italians with happy effect in cortili and places of that kind, where piers of the usual kind would obstruct the view too much, and where intercolumns of the same proportions between pillars supporting a horizontal entablature would have a poor and disagreeable effect, particularly if, as is generally the case, other storeys of the building rested upon the porticoes below. In fact, ordinances composed of arches and pillars constitute the best specimens of Italian columniated architecture. That in the cortile of the Palazzo Piccolomini at Siena, the work of Francesco di Giorgio, is singularly beautiful in its distribution, remarkable for the richness of its details, and also for the variety which it presents in perspective, as may be judged from the view of it given in Grandjean and Famin's "Architecture Toscane." The interior of St. Martin's-in-the-Fields contains an example of arches upon columns, and St. Bride's, London, furnishes another, but neither is a favourable one. A more satisfactory example may be found within the loggia of the Strand portion of Somerset House, where, though the arches spring from entablatures over the columns, yet, as the latter are placed in pairs, those horizontal parts are more than mere upright blocks over the capitals. The quadrangle of the old Royal Exchange, London, had arches springing immediately from the capitals of the columns, but their breadth was excessive in proportion to the height of the latter, and their elliptical form was a great defect, and certainly did not at all contribute to beauty. All that we contend for is the principle on which the practice is founded, for as to the merits of the buildings in which it is adopted, that must, like everything else in architecture, depend upon the taste shown in the particular application of it, which may be exceedingly good or altogether the reverse.

Memorial Brasses.

In the time of Herodotus edicts and public records were sometimes inscribed on brass tablets—a striking instance of which occurs in the preservation down to the present time of the will and acts of the Emperor Augustus. In the eighth century by a law of Kenneth, king of Scotland, it was enjoined that a cross should be put on every gravestone (*i.e.* coffin lid); and this appears to have been done in three ways—(1) by the use of incised lines drawn round the object; (2) by producing the form in low relief; and (3) by a wholly excised figure. The use of sepulchral brasses appears to have originated with the general revival of art in the thirteenth century. One of the earliest specimens is that of Sir Roger de Trompington, who died in 1289. The brasses of the fourteenth and fifteenth centuries contain, besides the effigies of warriors, churchmen, ladies and civilians, many examples of beautiful decoration—derived from the architectural practice of the time. Different combinations of the letters I.H.S., composing the sacred monogram, appear in the brasses of the fifteenth and beginning of the sixteenth century. In the sixteenth century, at the time of the Reformation, these sacred monuments appear to have become obnoxious and were accordingly swept out of the churches with an unsparing hand, comparatively few having escaped destruction. It is desirable for the nation to possess a complete collection of the rubbings of the brasses which have survived as illustrative of the costume and history of bygone times, and the propriety of such a collection being deposited in the British Museum.

NOTES AND COMMENTS.

AMERICAN manufacturers appear to be eager to supply the British market with the most delicate tools, and one firm is likely to be able to claim the position of tool-makers to the British Association. At the meeting of the Association last year a special committee in Liverpool reported that sufficiently accurate gauges of the Association screw threads were not generally procurable. Methods were described of exactly measuring male threads, and a form of gauge for male threads was proposed which they anticipated could be more accurately produced and more easily verified than the forms in common use. In continuation of this course the committee have been in correspondence with some of the principal tool-makers in England and America, with a view to procuring accurate gauges of the different screw threads of the British Association system constructed on the lines indicated in their last report. It was found that a company in Hartford, Connecticut, had already begun to construct tools for these threads, and are giving close attention to their accurate production. The company have kindly promised to communicate with the committee of the Association as soon as the work is sufficiently advanced to allow them to make proposals for the supply of the gauges, and the committee hope that exact gauges will soon be obtainable from this source.

STUDENTS of geology who are no longer young may remember the interest excited when they first read of the experiments of GREGORY WATT on basalt. He melted some blocks. Those which were cooled quickly formed a sort of glass resembling slag. Those which were cooled more slowly assumed first the form of globules, which increased in size and became balls of equal sizes. A layer of the balls was subjected to pressure in every direction, and it was found that every ball became squeezed into a regular hexagon. It was concluded that the columnar structure of basalt was due to immense forces operating similarly. Experiments no less interesting have been conducted by Messrs. ADAMS and NICHOLSON in McGill University, and some of the results were brought under the notice of the meeting of the British Association at Toronto. The object was to ascertain whether it is possible, by subjecting rocks artificially to pressure under the conditions which obtain in the deeper parts of the earth's crust, to produce in them the deformation and cataclastic structures exhibited by the folded rocks of the interior of mountain ranges or of the older formations of the earth. The experiments have been made chiefly with pure Carrara marble. Columns of the marble 2 centimetres and $2\frac{1}{2}$ centimetres in diameter and about 4 centimetres in length were very accurately turned and polished. Heavy wrought-iron tubes were then made, imitating the plan adopted in the construction of ordnance, by rolling long strips of Swedish iron around a bar of soft wrought-iron, and welding the strips to the bar as they were rolled around it. The core of soft iron composing the bar was then drilled out, leaving a tube of welded Swedish iron 6 millimetres thick, so constructed that the fibres of the iron run around the tube, instead of being parallel to its length. This tube was then very accurately fitted on to the column of marble. This was accomplished by giving a very slight taper to both the column and the interior of the tube, and so arranging it that the marble would pass only about halfway into the tube when cold. The tube was then expanded by heating, so as to allow the marble to pass completely into it, and leave about 3 centimetres of the tube free at either end. On allowing the tube to cool a perfect contact between the iron and marble was obtained, and it was no longer possible to withdraw the latter. Into either end of the tube containing the small column an accurately fitting sliding steel plug was inserted, and by means of these the marble was submitted to a pressure far above that which would be sufficient to crush it if not so enclosed. Under the pressure, which was applied gradually and in some cases continued for several weeks, the tube was found to slowly bulge until a very marked enlargement of the portion surrounding the marble had taken place. The tube was then cut through longitudinally by means of a milling machine along two lines opposite one another. The marble within, however, was still firm, and held the respective sides of the iron tube, now completely

separated, so tightly together that it was impossible without mechanical aids to tear these apart. By means of a wedge, however, they could be separated, splitting the marble through longitudinally. The column in one experiment was reduced from 40 millimetres to 21 millimetres in height. The deformed marble differs from the original rock in having a dead white colour, the glistening cleavage faces of calcite being no longer visible, and although not so hard as the original rock, it is still firm and compact, and especially so when its deformation has been carried out very slowly. The experiments show that limestone, even when dry and at ordinary temperatures, does possess a certain degree of plasticity, and can be made to "flow," the movements set up developing many structures which are characteristic of rocks which have been squeezed or folded in the deeper portions of our earth's crust. It is to be hoped Messrs. ADAMS and NICHOLSON will continue their experiments, for in addition to their geological interest they suggest that much remains to be known about the strength of marble under constant pressure, and, it may be, about other materials also.

THE Eighth Chamber, or police court, in Paris has given judgment in the charge brought against Le Baron de MACKAU and the two men who worked the cinematograph, as the alleged authors of the catastrophe of the charity bazaar in the Rue Jean Goujon. The Baron was fined 500 francs and the others 200 and 300 francs, with eight and twelve months' imprisonment respectively, but all three escaped in virtue of the Béringer law, which favours first offences. There was no doubt the fire originated with the photographic apparatus. The Baron was charged with a general neglect of precautions. It appears that the structure was used a few weeks before for the representation of a sort of Passion play. On that occasion firemen were on the spot. For the charity bazaar some of the doors were closed, and a cooking apparatus was introduced. The photographic apparatus was also placed in a wooden enclosure covered with "carton bitumé" and hung with light drapery. M. BUNEL, an architect, has calculated that on the day of the catastrophe there were four persons per square metre in the assembly. There were three doors, he said, which would have sufficed if the people had retained their self-control. It was found that nearly eighty victims had been deceived by supposing that some painted doors were realities, and they were found in a heap before them. M. BUNEL expressed the opinion that the "carton bitumé" was less dangerous than a covering in zinc. Another fact which came out in the evidence was that the prefecture of police insisted on a preservative wash being applied to the decorations to make them fireproof, but it was omitted from the awning or covering of the bazaar. The defendants have appealed, and it is by no means clear what law or regulation they offended against. Officialism meddles with all things, but the bazaar was not noticed. The arrangements for the erection of a mortuary chapel on the site are not completed. A part of the ground has been purchased, but it is in contemplation to acquire the whole of the area. In that case a much larger building could be erected.

ILLUSTRATIONS.

CATHEDRAL SERIES:—CANTERBURY: NORMAN DOORWAY IN CLOISTERS.—CRYPT UNDER TRINITY CHAPEL, LOOKING WEST.

NEW PREMISES, STEELHOUSE LANE AND UPPER PRIORY, BIRMINGHAM.

THIS shop and warehouse is now being built for Mr. FELIX CHAPMAN by Messrs. SAMPSON & SONS, builders, of Birmingham. The premises comprise shop on the ground floor, show-room on the first floor, and warehouse in basement and on the upper floors, with a manager's house over the gateway.

The elevations are of red brick and buff and red terracotta, and the roofs will be of red pantiles.

The architects are Messrs. ESSEX, NICOL & GOODMAN, of Birmingham.

DESIGN FOR CHURCH OF THE SACRED HEART, (RAMOND, N.B.)

The Architect, Aug. 27th 1897





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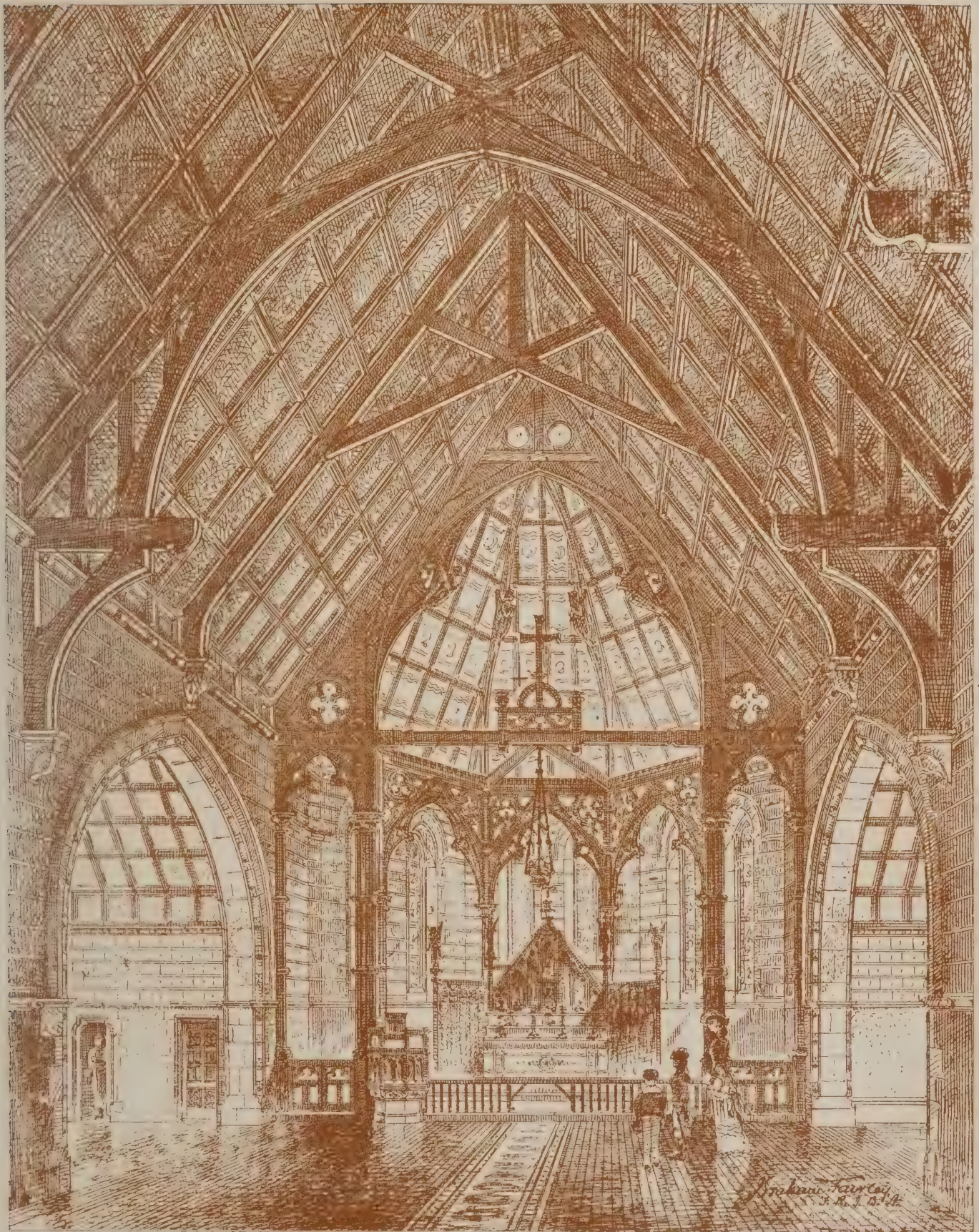
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CATHEDRAL SERIES, No. 69.—CANTERBURY: NORMAN DOORWAY IN CLOISTERS.

The Architect, Aug. 27th 1897.



DESIGN FOR CHURCH OF THE SACRED HEART, CRAMOND, N. B.
J. GRAHAM FAIRLEY, F.R.I.B.A., Architect.

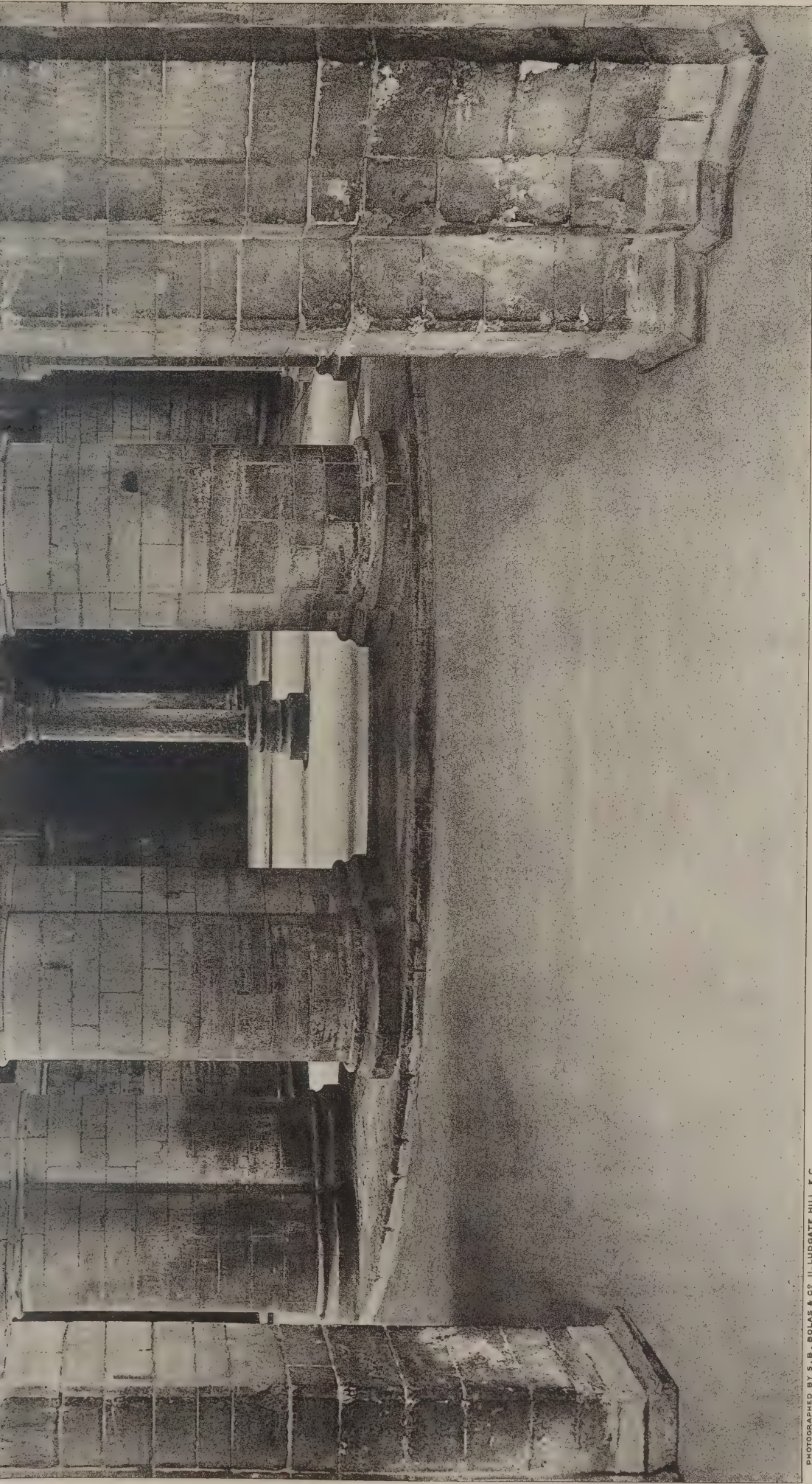


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DESIGN FOR CHURCH OF THE SACRED HEART, CRAMOND, N. B.
J. GRAHAM FAIRLEY, F.R.I.B.A., Architect.

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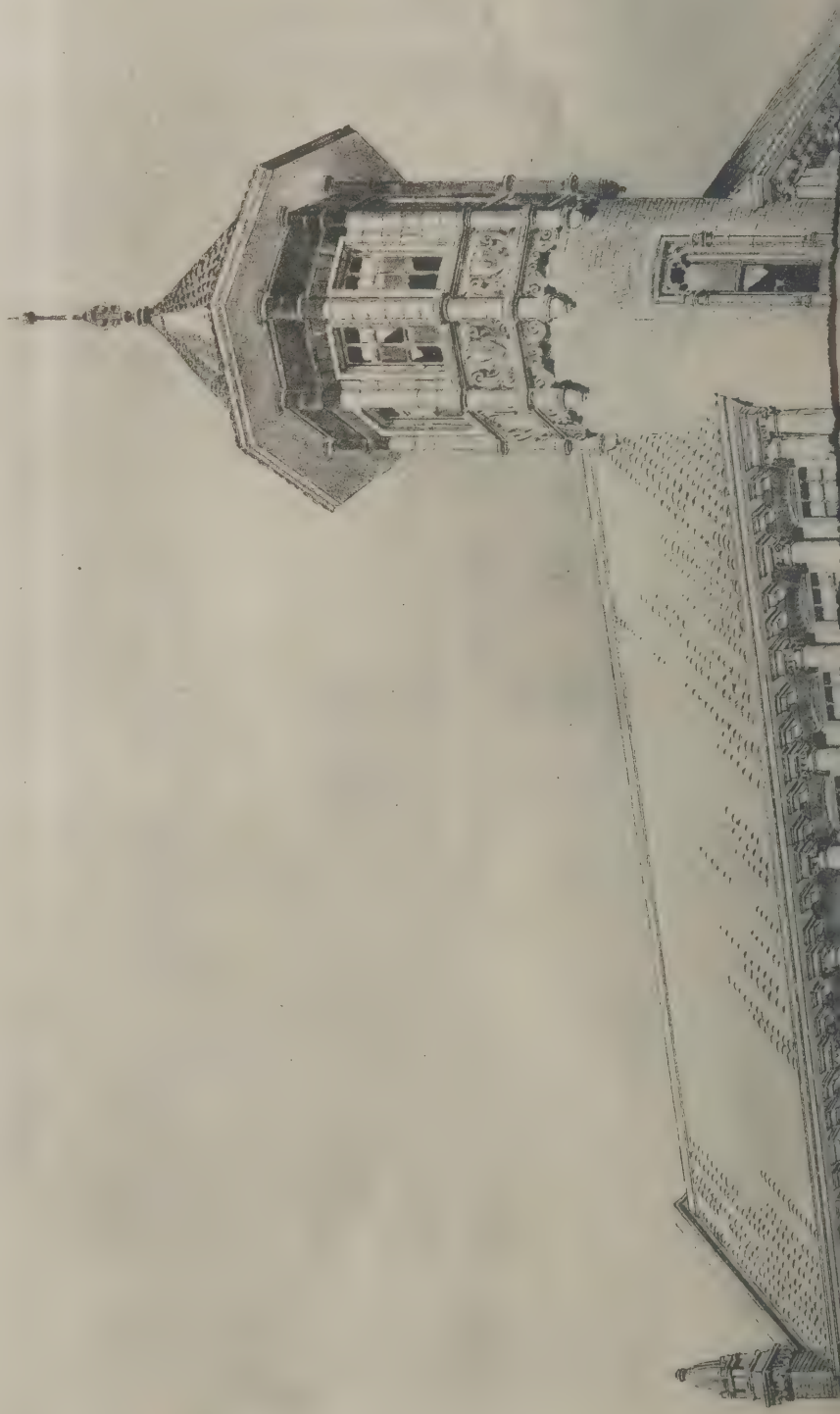


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CATHEDRAL SERIES, No. 70.—CANTERBURY: CRYPT UNDER TRINITY CHAPEL, LOOKING WEST.

The Architect, Aug. 27th 1897.





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ARCHÆOLOGY AND PHYSICAL SCIENCE.*

IT is no doubt hard to define the exact limits which are to be assigned to archæology as a science, and archæology as a branch of history and Belles-Lettres. A distinction is frequently drawn between science on the one hand and knowledge or learning on the other, but translate the terms into Latin and the distinction at once disappears. In illustration of this I need only cite Bacon's great work on the "Advancement of Learning," which was, with his own aid, translated into Latin under the title "De Augmentis Scientiarum."

It must, however, be acknowledged that a distinction does exist between archæology proper, and what, for want of a better word, may be termed antiquarianism. It may be interesting to know the internal arrangements of a Dominican convent in the Middle Ages; to distinguish between the different mouldings characteristic of the principal styles of Gothic architecture; to determine whether an English coin bearing the name of Henry was struck under Henry II., Richard, John, or Henry III., or to decide whether some given edifice was erected in Roman, Saxon, or Norman times. But the power to do this, though involving no small degree of detailed knowledge and some acquaintance with scientific methods, can hardly entitle its possessors to be enrolled among the votaries of science.

A familiarity with all the details of Greek and Roman mythology and culture must be regarded as a literary rather than a scientific qualification, and yet when among the records of classical times we come upon traces of manners and customs which have survived for generations and which seem to throw some rays of light upon the dim past, when history and writing were unknown, we are, I think, approaching the boundaries of scientific archæology.

Every reader of Virgil knows that the Greeks were not merely orators, but that with a pair of compasses they could describe the movements of the heavens and fix the rising of the stars; but when by modern astronomy we can determine the heliacal rising of some well-known star, with which the worship in some given ancient temple is known to have been connected and can fix its position on the horizon at some particular spot, say, three thousand years ago, and then find that the axis of the temple is directed exactly towards that spot, we have some trustworthy scientific evidence that the temple in question must have been erected at a date approximately 1,100 years B.C. If on or close to the same site we find that more than one temple was erected, each having a different orientation, these variations, following as they may fairly be presumed to do the changing position of the rising of the dominant star, will also afford a guide as to the chronological order of the different foundations. The researches of Mr. Penrose seem to show that in certain Greek temples, of which the date of foundation is known from history, the actual orientation corresponds with that theoretically deduced from astronomical data.

Sir J. Norman Lockyer has shown that what holds good for Greek temples applies to many of far earlier date in Egypt, though up to the present time hardly a sufficient number of accurate observations have been made to justify us in foreseeing all the instructive results that may be expected to arise from astronomy coming to the aid of archæology.

The intimate connection of archæology with other sciences is in no case so evident as with respect to geology, for when considering subjects such as those I shall presently discuss, it is almost impossible to say where the one science ends and the other begins.

By the application of geological methods many archæological questions relating even to subjects on the borders of the historical period have been satisfactorily solved. A careful examination of the limits of the area over which its smaller coins are found has led to the position of many an ancient Greek city being accurately ascertained; while in England it has only been by treating the coins of the Ancient Britons, belonging to a period before the Roman occupation, as if they were actual fossils, that the territories under the dominion of the various kings and princes who struck them have been approximately determined. In arranging the chronological sequence of these coins, the evolution of their types—a process almost as remarkable, and certainly as well defined, as any to be found in nature—has served as an efficient guide. I may venture to add that the results obtained from the study of the morphology of this series of coins were published ten years before the appearance of Darwin's great work on the "Origin of Species."

When we come to the consideration of the relics of the Early Iron and Bronze Ages, the aid of chemistry has of necessity to be invoked. By its means we are able to determine whether the iron of a tool or weapon is of meteoritic or volcanic origin or has been reduced from iron-ore, in which case considerable knowledge of metallurgy would be involved on the part of those who made it. With bronze antiquities the nature and extent of the alloys combined with the copper may

throw light not only on their chronological position, but on the sources whence the copper, tin and other metals of which they consist were originally derived. I am not aware of there being sufficient differences in the analyses of the native copper from different localities in the region in which we are assembled for Canadian archæologists to fix the sources from which the metal was obtained which was used in the manufacture of the ancient tools and weapons of copper that are occasionally discovered in this part of the globe.

Like chemistry, mineralogy and petrology may be called to the assistance of archæology in determining the nature and source of the rocks of which ancient stone implements are made; and, thanks to researches of the followers of those sciences, the old view that all such implements formed of jade and found in Europe must of necessity have been fashioned from material imported from Asia can no longer be maintained. In one respect the archæologist differs in opinion from the mineralogist, namely, as to the propriety of chipping off fragments from perfect and highly-finished specimens for the purpose of submitting them to microscopic examination.

I have hitherto been speaking of the aid that other sciences can afford to archæology when dealing with questions that come almost, if not quite, within the fringe of history, and belong to times when the surface of our earth presented much the same configuration as regards the distribution of land and water, and hill and valley, as it does at present, and when, in all probability, the climate was much the same as it now is. When, however, we come to discuss that remote age in which we find the earliest traces that are at present known of man's appearance upon earth, the aid of geology and palæontology becomes absolutely imperative.

The changes in the surface configuration and in the extent of the land, especially in a country like Britain, as well as the modifications of the fauna and flora since those days, have been such that the archæologist pure and simple is incompetent to deal with them, and he must either himself undertake the study of these other sciences or call experts in them to his assistance. The evidence that man had already appeared upon the earth is afforded by stone implements wrought by his hands, and it falls strictly within the province of the archæologist to judge whether given specimens were so wrought or not; it rests with the geologist to determine their stratigraphical or chronological position, while the palæontologist can pronounce upon the age and character of the associated fauna and flora.

If left to himself the archæologist seems too prone to build up theories founded upon form alone, irrespective of geological conditions. The geologist, unaccustomed to archæological details, may readily fail to see the difference between the results of the operations of nature and those of art, and may be liable to trace the effects of man's handiwork in the chipping, bruising and wearing which in all ages result from natural forces; but the united labours of the two, checked by those of the palæontologist, cannot do otherwise than lead towards sound conclusions.

It will perhaps be expected of me that I should on the present occasion bring under review the state of our present knowledge with regard to the antiquity of man; and probably no fitter place could be found for the discussion of such a topic than the adopted home of my venerated friend, the late Sir Daniel Wilson, who first introduced the word "prehistoric" into the English language.

Some among us may be able to call to mind the excitement, not only among men of science, but among the general public, when, in 1859, the discoveries of M. Boucher de Perthes and Dr. Rigollot in the gravels of the valley of the Somme, at Abbeville and Amiens, were confirmed by the investigations of the late Sir Joseph Prestwich, myself and others, and the co-existence of man with the extinct animals of the quaternary fauna, such as the mammoth and woolly-haired rhinoceros, was first virtually established. It was at the same time pointed out that these relics belonged to a far earlier date than the ordinary stone weapons found upon the surface, which usually showed signs of grinding or polishing, and that in fact there were two Stone Ages in Britain. To these the terms neolithic and palæolithic were subsequently applied by Sir John Lubbock.

The excitement was not less when, at the meeting of this Association at Aberdeen in the autumn of that year, Sir Charles Lyell, in the presence of the Prince Consort, called attention to the discoveries in the valley of the Somme, the site of which he had himself visited, and to the vast lapse of time indicated by the position of the implements in drift-deposits 100 feet above the existing river.

The conclusions forced upon those who examined the facts on the spot did not receive immediate acceptance by all who were interested in geology and archæology, and fierce were the controversies on the subject that were carried on both in the newspapers and before various learned societies.

It is at the same time instructive and amusing to look back on the discussions of those days. While one class of objectors accounted for the configuration of the flint implements from the gravels by some unknown chemical agency, by the violent

* Presidential address by Sir John Evans, K.C.B., D.C.L., LL.D., &c., delivered at the opening meeting of the British Association for the Advancement of Science in Toronto, on August 12.

and continued gyratory action of water, by fracture resulting from pressure, by rapid cooling when hot or by rapid heating when cold, or even regarded them as aberrant forms of fossil fishes, there were others who, when compelled to acknowledge that the implements were the work of men's hands, attempted to impugn and set aside the evidence as to the circumstances under which they had been discovered. In doing this they adopted the view that the worked flints had either been introduced into the containing beds at a comparatively recent date, or if they actually formed constituent parts of the gravel then that this was a mere modern alluvium resulting from floods at no very remote period.

In the course of a few years the main stream of scientific thought left this controversy behind, though a tendency to cut down the lapse of time necessary for all the changes that have taken place in the configuration of the surface of the earth and in the character of its occupants since the time of the Palæolithic gravels, still survives in the inmost recesses of the hearts of not a few observers.

In his address to this Association at the Bath meeting of 1864, Sir Charles Lyell struck so true a note that I am tempted to reproduce the paragraph to which I refer:—

"When speculations on the long series of events which occurred in the glacial and post-glacial periods are indulged in, the imagination is apt to take alarm at the immensity of the time required to interpret the monuments of these ages, all referable to the era of existing species. In order to abridge the number of centuries which would otherwise be indispensable, a disposition is shown by many to magnify the rate of change in prehistoric times by investing the causes which have modified the animate and inanimate world with extraordinary and excessive energy. It is related of a great Irish orator of our day that when he was about to contribute somewhat parsimoniously towards a public charity, he was persuaded by a friend to make a more liberal donation. In doing so he apologised for his first apparent want of generosity by saying that his early life had been a constant struggle with scanty means, and that 'they who are born to affluence cannot easily imagine how long a time it takes to get the chill of poverty out of one's bones.' In like manner we of the living generation, when called upon to make grants of thousands of centuries in order to explain the events of what is called the modern period, shrink naturally at first from making what seems so lavish an expenditure of past time. Throughout our early education we have been accustomed to such strict economy in all that relates to the chronology of the earth and its inhabitants in remote ages, so fettered have we been by old traditional beliefs that even when our reason is convinced and we are persuaded that we ought to make more liberal grants of time to the geologist, we feel how hard it is to get the chill of poverty out of our bones."

Many, however, have at the present day got over this feeling, and of late years the general tendency of those engaged upon the question of the antiquity of the human race has been in the direction of seeking for evidence by which the existence of man upon the earth could be carried back to a date earlier than that of the Quaternary gravels.

There is little doubt that such evidence will eventually be forthcoming, but, judging from all probability, it is not in Northern Europe that the cradle of the human race will eventually be discovered, but in some part of the world more favoured by a tropical climate, where abundant means of subsistence could be procured, and where the necessity for warm clothing did not exist.

Before entering into speculations on this subject or attempting to lay down the limits within which we may safely accept recent discoveries as firmly established, it will be well to glance at some of the cases in which implements are stated to have been found under circumstances which raise a presumption of the existence of man in pre-Glacial, Pliocene or even Miocene times.

Flint implements of ordinary Palæolithic type have, for instance, been recorded as found in the eastern counties of England, in beds beneath the chalky boulder clay; but on careful examination the geological evidence has not to my mind proved satisfactory, nor has it, I believe, been generally accepted. Moreover, the archaeological difficulty that man, at two such remote epochs as the pre-Glacial and the post-Glacial, even if the term Glacial be limited to the chalky boulder clay, should have manufactured implements so identical in character that they cannot be distinguished apart, seems to have been entirely ignored.

Within the last few months we have had the report of worked flints having been discovered in the late Pliocene forest bed of Norfolk, but in that instance the signs of human workmanship upon the flints are by no means apparent to all observers.

But such an antiquity as that of the forest bed is as nothing when compared with that which would be implied by the discoveries of the work of men's hands in the Pliocene and Miocene beds of England, France, Italy and Portugal, which have been accepted by some geologists. There is one feature

in these cases which has hardly received due attention, and that is the isolated character of the reputed discoveries. Had man, for instance, been present in Britain during the Crag period, it would be strange indeed if the sole traces of his existence that he left were a perforated tooth of a large shark, the sawn rib of a manatee and a beaming full face carved on the shell of a pectunculus.

In an address to the Anthropological Section at the Leeds meeting of this Association in 1890 I dealt somewhat fully with these supposed discoveries of the remains of human art in beds of Tertiary date, and I need not here go further into the question. Suffice it to say that I see no reason why the verdict of "Not proven" at which I then arrived should be reversed.

In the case of a more recent discovery in Upper Burma in beds at first pronounced to be Upper Miocene, but subsequently "definitely ascertained to be Pliocene," some of the flints are of purely natural and not artificial origin, so that two questions arise, first, Were the fossil remains associated with the worked flints or with those of natural forms? and second, Were they actually found in the bed to which they have been assigned, or did they merely lie together on the surface?

Even the *Pithecanthropus erectus* of Dr. Eugène Dubois from Java meets with some incredulous objectors from both the physiological and the geological sides. From the point of view of the latter the difficulty lies in determining the exact age of what are apparently alluvial beds in the bottom of a river valley.

When we return to Palæolithic man it is satisfactory to feel that we are treading on comparatively secure ground, and that the discoveries of the last forty years in Britain alone enable us to a great extent to reconstitute his history. We may not know the exact geological period when first he settled in the British area, but we have good evidence that he occupied it at a time when the configuration of the surface was entirely different from what it is at present, when the river valleys had not been cut down to anything like their existing depth, when the fauna of the country was of a totally different character from that of the present day, when the extension of the southern part of the island seaward was in places such that the land was continuous with that of the Continent, and when in all probability a far more rainy climate prevailed. We have proofs of the occupation of the country by man during the long lapse of time that was necessary for the excavation of the river valleys. We have found the old floors on which his habitations were fixed; we have been able to trace him at work on the manufacture of flint instruments, and by building up the one upon the other the flakes struck off by the primæval workman in those remote times we have been able to reconstruct the blocks of flint which served as his material.

That the duration of the Palæolithic period must have extended over an almost incredible length of time is sufficiently proved by the fact that valleys, some miles in width and of a depth of from 100 to 150 feet, have been eroded since the deposit of the earliest implement-bearing beds. Nor is the apparent duration of this period diminished by the consideration that the floods which hollowed out the valleys were not in all probability of such frequent occurrence as to teach Palæolithic man by experience the danger of settling too near to the streams, for had he kept to the higher slopes of the valley there would have been but little chance of his implements having so constantly formed constituent parts of the gravels deposited by the floods.

The examination of British cave-deposits affords corroborative evidence of this extended duration of the Palæolithic period. In Kent's Cavern at Torquay, for instance, we find in the lowest deposit, the breccia below the red cave-earth, implements of flint and chert corresponding in all respects with those of the high level and most ancient river gravels. In the cave-earth these are scarcer, though implements occur which also have their analogues in the river deposits, but what is more remarkable, harpoons of reindeer's horn and needles of bone are present, identical in form and character with those of the caverns of the Reindeer period in the south of France, and suggestive of some bond of union or identity of descent between the early troglodytes, whose habitations were geographically so widely separated the one from the other.

In a cavern at Creswell Crags, on the confines of Derbyshire and Nottinghamshire, a bone has moreover been found engraved with a representation of parts of a horse in precisely the same style as the engraved bones of the French caves.

It is uncertain whether any of the river-drift specimens belong to so late a date as these artistic cavern-remains, but the greatly superior antiquity of even these to any Neolithic relics is testified by the thick layer of stalagmite, which had been deposited in Kent's Cavern before its occupation by men of the Neolithic and Bronze periods.

Towards the close of the period covered by the human occupation of the French caves there seems to have been a dwindling in the number of the larger animals constituting the Quaternary fauna, whereas their remains are present in abundance in the lower and therefore more recent of the valley

gravels. This circumstance may afford an argument in favour of regarding the period represented by the later French caves as a continuation of that during which the old-river gravels were deposited, and yet the great change in the fauna that has taken place since the latest of the cave deposits included in the Palæolithic period is indicative of an immense lapse of time.

How much greater must have been the time required for the more conspicuous change between the old Quaternary fauna of the river gravels and that characteristic of the Neolithic period.

As has been pointed out by Professor Boyd Dawkins, only thirty-one out of the forty-eight well-ascertained species living in the post-Glacial or River-drift period survived into pre-historic or Neolithic times. We have not, indeed, any means at command for estimating the number of centuries which such an important change indicates, but when we remember that the date of the commencement of the Neolithic or Surface Stone period is still shrouded in the mist of a dim antiquity, and that prior to that commencement the River-drift period had long come to an end, and when we further take into account the almost inconceivable ages that even under the most favourable conditions the excavation of wide and deep valleys by river action implies, the remoteness of the date at which the Palæolithic period had its beginning almost transcends our powers of imagination.

We find distinct traces of river action from 100 to 200 feet above the level of existing streams and rivers, and sometimes at a great distance from them; we observe old freshwater deposits on the slopes of valleys several miles in width; we find that long and lofty escarpments of rock have receded unknown distances since their summits were first occupied by a Palæolithic man; we see that the whole side of a wide river valley has been carried away by an invasion of the sea, which attacked and removed a barrier of chalk cliffs from 400 to 600 feet in height; we find that what was formerly an inland river has widened out into an arm of the sea, now the highway of our fleets, and that gravels which were originally deposited in the bed of some ancient river now cap isolated and lofty hills.

And yet, remote as the date of the first known occupation of Britain by man may be, it belongs to what, geologically speaking, must be regarded as a quite recent period, for we are now in a position to fix with some degree of accuracy its place on the geological scale. Thanks to investigations ably carried out at Hoxne in Suffolk, and at Hitchin in Hertfordshire, by Mr. Clement Reid, under the auspices of this Association and of the Royal Society, we know that the implement-bearing beds at those places undoubtedly belong to a time subsequent to the deposit of the great chalky boulder clay of the Eastern counties of England. It is, of course, self-evident that this vast deposit, in whatever manner it may have been formed, could not, for centuries after its deposition was complete, have presented a surface inhabitable by man. Moreover, at a distance but little farther north, beds exist which also, though at a somewhat later date, were apparently formed under glacial conditions. At Hoxne the interval between the deposit of the boulder clay and of the implement-bearing beds is distinctly proved to have witnessed at least two noteworthy changes in climate. The beds immediately reposing on the clay are characterised by the presence of alder in abundance, of hazel and yew, as well as by that of numerous flowering plants indicative of a temperate climate very different from that under which the boulder clay itself was formed. Above these beds characterised by temperate plants comes a thick and more recent series of strata, in which leaves of the dwarf Arctic willow and birch abound, and which were in all probability deposited under conditions like those of the cold regions of Siberia and North America.

At a higher level and of more recent date than these—from which they are entirely distinct—are the beds containing palæolithic implements, formed in all probability under conditions not essentially different from those of the present day. However this may be, we have now conclusive evidence that the palæolithic implements are, in the eastern counties of England, of a date long posterior to that of the great chalky boulder clay.

It may be said, and said truly, that the implements at Hoxne cannot be shown to belong to the beginning rather than to some later stage of the Palæolithic period. The changes, however, that have taken place at Hoxne in the surface configuration of the country prove that the beds containing the implements cannot belong to the close of that period.

It must, moreover, be remembered that in what are probably the earliest of the palæolithic deposits of the Eastern counties, those at the highest level, near Brandon in Norfolk, where the gravels contain the largest proportion of pebbles derived from glacial beds, some of the implements themselves have been manufactured from materials not native to the spot but brought from a distance, and derived in all probability either from the boulder clay or from some of the beds associated with it.

We must, however, take a wider view of the whole question, for it must not for a moment be supposed that there are the slightest grounds for believing that the civilisation, such as it was, of the Palæolithic period originated in the British

Isles. We find in other countries implements so identical in form and character with British specimens that they might have been manufactured by the same hands. These occur over large areas in France under similar conditions to those that prevail in England. The same forms have been discovered in the ancient river gravels of Italy, Spain and Portugal. Some few have been recorded from the north of Africa, and analogous types occur in considerable numbers in the south of that continent. On the banks of the Nile many hundreds of feet above its present level, implements of the European types have been discovered; while in Somaliland, in an ancient river valley at a great elevation above the sea, Mr. Seton-Karr has collected a large number of implements formed of flint and quartzite, which, judging from their form and character, might have been dug out of the drift deposits of the Somme or the Seine, the Thames or the ancient Solent.

In the valley of the Euphrates implements of the same kind have also been found, and again farther east in the lateritic deposits of Southern India they have been obtained in considerable numbers. It is not a little remarkable, and is at the same time highly suggestive, that a form of implement almost peculiar to Madras reappears among implements from the very ancient gravels of the Manzanares at Madrid. In the case of the African discoveries we have as yet no definite palæontological evidence by which to fix their antiquity, but in the Narbadá Valley of Western India Palæolithic implements of quartzite seem to be associated with a local fauna of Pleistocene age, comprising, like that of Europe, the elephant, hippopotamus, ox, and other mammals of species now extinct. A correlation of the two faunas with a view of ascertaining their chronological relations is beset with many difficulties, but there seems reason for accepting this Indian Pleistocene fauna as in some degree more ancient than the European.

Is this not a case in which the imagination may be fairly invoked in aid of science? May we not from these data attempt in some degree to build up and reconstruct the early history of the human family? There, in Eastern Asia, in a tropical climate, with the means of subsistence readily at hand, may we not picture to ourselves our earliest ancestors gradually developing from a lowly origin, acquiring a taste for hunting, if not indeed being driven to protect themselves from the beasts around them, and evolving the more complicated forms of tools or weapons from the simpler flakes which had previously served them as knives? May we not imagine that, when once the stage of civilisation denoted by these Palæolithic implements had been reached, the game for the hunter became scarcer, and that his life in consequence assumed a more nomad character? Then, and possibly not till then, may a series of migrations to "fresh woods and pastures new" not unnaturally have ensued, and these following the usual course of "westward towards the setting sun" might eventually lead to a Palæolithic population finding its way to the extreme borders of Western Europe, where we find such numerous traces of its presence.

How long a term of years may be involved in such a migration it is impossible to say, but that such a migration took place the phenomena seem to justify us in believing. It can hardly be supposed that the process that I have shadowed forth was reversed, and that man, having originated in North-Western Europe, in a cold climate where clothing was necessary and food scarce, subsequently migrated eastward to India and southward to the Cape of Good Hope. As yet our records of discoveries in India and Eastern Asia are but scanty; but it is there that the traces of the cradle of the human race are, in my opinion, to be sought, and possibly future discoveries may place upon a more solid foundation the visionary structure that I have ventured to erect.

It may be thought that my hypothesis does not do justice to what Sir Thomas Browne has so happily termed "that great antiquity, America." I am, however, not here immediately concerned with the important neolithic remains of all kinds with which this great continent abounds. I am now confining myself to the question of Palæolithic man and his origin, and in considering it I am not unmindful of the Trenton implements, though I must content myself by saying that the "turtle-back" form is essentially different from the majority of those on the wide dissemination of which I have been speculating, and, moreover, as many here present are aware, the circumstances of the finding of these American implements are still under careful discussion.

Leaving them out of the question for the present, it may be thought worth while to carry our speculations rather further, and to consider the relations in time between the Palæolithic and the Neolithic periods. We have seen that the stage in human civilisation denoted by the use of the ordinary forms of Palæolithic implements must have extended over a vast period of time if we have to allow for the migration of the primæval hunters from their original home, wherever it may have been in Asia or Africa, to the west of Europe, including Britain. We have seen that, during this migration, the forms of the weapons and tools made from silicious stones had become, as it were, stereotyped, and further, that during the subsequent extended

period implied by the erosion of the valleys, the modifications in the form of the implements and the changes in the fauna associated with the men who used them were but slight.

At the close of the period during which the valleys were being eroded comes that represented by the latest occupation of the caves by Palæolithic man, when both in Britain and in the south of France the reindeer was abundant; but among the stone weapons and implements of that long troglodytic phase of man's history not a single example with the edge sharpened by grinding has as yet been found. All that can safely be said is that the larger implements as well as the larger mammals had become scarcer, that greater power in chipping flint had been attained, that the arts of the engraver and the sculptor had considerably developed, and that the use of the bow had probably been discovered.

Directly we encounter the relics of the Neolithic period, often, in the case of the caves lately mentioned, separated from the earlier remains by a thick layer of underlying stalagmite, we find flint hatchets polished at the edge and on the surface, cutting at the broad and not at the narrow end, and other forms of implements associated with a fauna in all essential respects identical with that of the present day.

Were the makers of these polished weapons the direct descendants of Palæolithic ancestors whose occupation of the country was continuous from the days of the old river gravels? or had these long since died out, so that after Western Europe had for ages remained uninhabited, it was repopled in Neolithic times by the immigration of some new race of men? Was there, in fact, a "great gulf fixed" between the two occupations? or was there in Europe a gradual transition from the one stage of culture to the other?

It has been said that "what song the syrens sang, or what name Achilles assumed when he hid himself among women, though puzzling questions, are not beyond all conjecture;" and though the questions now proposed may come under the same category, and must await the discovery of many more essential facts before they receive definite and satisfactory answers, we may, I think, throw some light upon them if we venture to take a few steps upon the seductive if insecure paths of conjecture. So far as I know we have as yet no trustworthy evidence of any transition from the one age to the other, and the gulf between them remains practically unbridged. We can, indeed, hardly name the part of the world in which to seek for the cradle of Neolithic civilisation, though we know that traces of what appear to have been a stone-using people have been discovered in Egypt, and that what must be among the latest of the relics of their industry have been assigned to a date some 3,500 to 4,000 years before our era. The men of that time had attained to the highest degree of skill in working flint that has ever been reached. Their beautifully-made knives and spear-heads seem indicative of a culminating point reached after long ages of experience; but whence these artists in flint came or who they were is at present absolutely unknown, and their handiworks afford no clue to help us in tracing their origin.

Taking a wider survey, we may say that, generally speaking, not only the fauna but the surface configuration of the country were, in Western Europe at all events, much the same at the commencement of the Neolithic period as they are at the present day. We have, too, no geological indications to aid us in forming any chronological scale.

The occupation of some of the caves in the south of France seems to have been carried on after the erosion of the neighbouring river valleys had ceased, and so far as our knowledge goes these caves offer evidence of being the latest in time of those occupied by man during the Palæolithic period. It seems barely possible that, though in the north of Europe there are no distinct signs of such late occupation, yet that, in the south, man may have lived on, though in diminished numbers; and that in some of the caves—such, for instance, as those in the neighbourhood of Mentone—there may be traces of his existence during the transitional period that connects the Palæolithic and Neolithic Ages. If this were really the case, we might expect to find some traces of dissemination of Neolithic culture from a North Italian centre, but I much doubt whether any such traces actually exist.

If it had been in that part of the world that the transition took place, how are we to account for the abundance of polished stone hatchets found in Central India? Did Neolithic man return eastward by the same route as that by which in remote ages his Palæolithic predecessor had migrated westward? Would it not be in defiance of all probability to answer such a question in the affirmative? We have, it must be confessed, nothing of a substantial character to guide us in these speculations; but, pending the advent of evidence to the contrary, we may, I think, provisionally adopt the view that, owing to failure of food, climatal changes, or other causes, the occupation of Western Europe by Palæolithic man absolutely ceased, and that it was not until after an interval of long duration that Europe was repopled by a race of men immigrating from some other part of the globe where the human race had sur-

vived, and in course of ages had developed a higher stage of culture than that of Palæolithic man.

I have been carried away by the liberty allowed for conjecture into the regions of pure imagination, and must now return to the realms of fact, and one fact on which I desire for a short time to insist is that of the existence at the present day, in close juxtaposition with our own civilisation, of races of men who, at all events but a few generations ago, lived under much the same conditions as did our own Neolithic predecessors in Europe.

The manners and customs of these primitive tribes and peoples are changing day by day; their languages are becoming obsolete, their myths and traditions are dying out, their ancient processes of manufacture are falling into oblivion, and their numbers are rapidly diminishing, so that it seems inevitable that ere long many of these interesting populations will become absolutely extinct. The admirable Bureau of Ethnology instituted by our neighbours in the United States of America has done much towards preserving a knowledge of the various native races in this vast continent; and here in Canada the annual archaeological reports presented to the Minister of Education are rendering good service in the same cause.

Moreover, the committee of this Association appointed to investigate the physical characters, languages and industrial and social conditions of the North-Western tribes of the Dominion of Canada is about to present its twelfth and final report, which, in conjunction with those already presented, will do much towards preserving a knowledge of the habits and languages of those tribes. It is sad to think that Mr. Horatio Hale, whose comprehensive grasp of the bearings of ethnological questions, and whose unremitting labours have so materially conduced to the success of the committee, should be no longer among us. Although this report is said to be final, it is to be hoped that the committee may be able to indicate lines upon which future work in the direction of ethnological and archaeological research may be profitably carried on in this part of Her Majesty's dominions.

It is, however, lamentable to notice how little is being or has been officially done towards preserving a full record of the habits, beliefs, arts, myths, languages and physical characteristics of the countless other tribes and nations more or less uncivilised which are comprised within the limits of the British Empire. At the meeting of this Association held last year at Liverpool, it was resolved by the general committee "that it is of urgent importance to press upon the Government the necessity of establishing a Bureau of Ethnology for Greater Britain, which by collecting information with regard to the native races within and on the borders of the empire, will prove of immense value to science and to the Government itself." It has been suggested that such a bureau might with the greatest advantage and with the least outlay and permanent expense be connected either with the British Museum or with the Imperial Institute, and the project has already been submitted for the consideration of the trustees of the former establishment.

The existence of an almost unrivalled ethnological collection in the Museum, and the presence there of officers already well versed in ethnological research, seems to afford an argument in favour of the proposed bureau being connected with it. On the other hand, the Imperial Institute was founded with an especial view to its being a centre around which every interest connected with the dependencies of the Empire might gather for information and support. The establishment within the last twelve months of a scientific department within the Institute, with well-appointed laboratories and a highly trained staff, shows how ready are those concerned in its management to undertake any duties that may conduce to the welfare of the outlying parts of the British Empire—a fact of which I believe that Canada is fully aware. The Institute is therefore likely to develop, so far as its scientific department is concerned, into a bureau of advice in all matters scientific and technical, and certainly a Bureau of Ethnology such as that suggested would not be out of place within its walls.

Wherever such an institution is to be established the question of its existence must of necessity rest with Her Majesty's Government and Treasury, inasmuch as without funds, however moderate, the undertaking cannot be carried on. I trust that in considering the question it will always be borne in mind that in the relations between civilised and uncivilised nations and races it is of the first importance that the prejudices, and especially the religious or semi-religious and caste prejudices of the latter, should be thoroughly well known to the former. If but a single "little war" could be avoided in consequence of the knowledge acquired and stored up by the Bureau of Ethnology preventing such a misunderstanding as might culminate in warfare, the cost of such an institution would quickly be saved.

An Infirmary is to be erected by the Tendring Guardians and District Council, from the plans of Mr. F. Whitmore, Chelmsford, at a cost of 7,000*l.*

THE ROYAL ARCHÆOLOGICAL INSTITUTE.

ON the 2nd inst. the annual meeting of the Royal Archæological Institute began at Dorchester, under the presidency of Lieutenant-General A. H. L. F. Pitt-Rivers, Inspector of Prehistoric Monuments. In the course of his address (says the *Dorset County Chronicle*) he spoke on a subject which at the present moment occupies a considerable share of the attention of the archæological world.

The Palæolithic Period in Egypt.

The President said:—Mr. De Morgan, Director-General of the Antiquities of Egypt, in the preface of his great work on "Egyptian Origins" (1896), makes the complaint that the students of Egyptian history, engrossed by the enormous resources at their disposal of materials for the study of the metallic period, and the deep interest afforded by the interpretation of the papyri, and influenced also by the facility with which they are transported up and down the Nile in boats, instead of passing along the country landward, have paid less attention to the deposits on the sides of the Nile valley or to the discovery of the sites of palæolithic and neolithic man in that valley than has been done on the continent of Europe. This may have been partly true at the time when Mr. De Morgan's preface was written (1896), but since then the discoveries of Mr. Flinders Petrie and Mr. Seton-Karr have given abundant evidence of the existence of palæolithic man in the valley and the desert bordering it on the east side. Much earlier than this, however, in 1881, I claim to have been the first to discover flint flakes and cores *in situ* in the stratified gravels of the Nile valley at Koorneh, on the outskirts of Thebes, gravel in which, after having become indurated through the cementing together of the particles by calcareous infiltration, the Egyptians had cut their flat-topped tombs with square supporting pillars, that have continued perfect in the gravel-rock until the present day, thereby producing evidence of exactly the same character that had satisfied the fathers of prehistoric archæology in the valley of the Somme. Having experienced the drawbacks to careful study alluded to by Mr. De Morgan in travelling up the river as a Cook's tourist, I decided on arriving at Luxor to abandon the steamer and remain there whilst the boat went up to the cataracts and back, thereby giving me a clear fortnight for the deposits of gravel in the valley. I selected Gebel Assart, a plateau in the bottom of the valley to the north of Koorneh, consisting of a delta of hardened sand and gravel, which had been washed down by the Babel Molook, in which the tombs of kings are situated and spread over the valley below, and which, after depositing a delta in the valley between the sides of it and the river, had afterwards cut a channel through it by running water. In the sides of this channel, or waddi, the Egyptians had cut their tombs, tunnelling under the banks in the hard gravel, at that time converted into hard rock. After a careful examination of the sides of this waddi, extending over several days, I succeeded in finding unquestionable short flakes and cores, and one rough tool embedded in the matrix, which of course must have been deposited long previously to the cutting of the tombs, some of the flakes being actually chiselled out of the sides of the tombs.

This discovery was afterwards referred to at some length in a paper read before the Victoria Institute by Sir J. W. Dawson in 1884. Dr. Dawson, however, made the unaccountable mistake of saying that the flints found by me in this gravel were natural forms, and that the bulbs of percussion in them were caused by the knocking together of the fragments of stone by natural causes during the process of deposition. But he is mistaken in supposing that bulbs of percussion are formed to any extent in this way, as Professor Rupert Jones in his remarks upon the paper explained very forcibly at the time. If a single bulb of percussion could be so formed, which the examination of the constituents of the gravel show is very rarely the case, the production of all the recognised characters of a flint flake could not be obtained by this means. The production of a single bulb on the flat side of the flint, two or more facets at the backs with the impression of the bulbs of flakes previously struck off on them and the small flat surface at the top being the residuum of the flat surface of the core, on which the blow was given to flake it off, all formed by blows delivered nearly at the same spot and in the same direction, could not possibly be produced otherwise than by the hand of man. This is an axiom so thoroughly established as to be familiar to the merest tyro in prehistoric investigations. I had long experience at the time in the fracture of flint, and had been in constant communication and had worked with Sir John Evans, Canon Greenwell, Sir John Lubbock and the late Professor Rolleston, and it would have been quite impossible for me to have made a mistake upon the question of the natural or artificial form of a flint flake or core. In fact, I think that it would have been thought ridiculous by any of the well-known archæologists that I have named to suppose that I could have made such a blunder. Sir J. W. Dawson was of course a distinguished geologist, but his knowledge of prehistoric archæology was much more limited. There is nothing in his paper to show that he had ever seen the flints, of which

he spoke, and as they have always been in my possession I am aware that he could not have done so. Had he seen them I am certain that no one with the most rudimentary knowledge of the fracture of flint could have mistaken them for natural forms. It is true that my finds in these gravels did not include palæolithic implements of the tongue-shaped type that have been found in the desert and in the high plateau above the valley, from which deposits the flakes and cores were no doubt originally washed down into the delta below; but as the deposits in the bottom of the valley were as hard as rock nothing could be seen but the few specimens that were in evidence on the sides of the waddi and the sides of the tombs. Quarrying into the matrix itself would have been a very costly and laborious process, and though no doubt the usual palæolithic types would have been brought to light in abundance the flakes and cores were amply sufficient to prove them to be works of human art. A palæolithic implement of the recognised type affords no better evidence of the presence of man than a flake. The surface of the delta was covered with implements, and they had frequently been noticed on the surface by others, and after having discovered flakes and cores and one rude implement in the stratified deposits below there could be no doubt that the implements themselves would have been found in the same gravel if the rock had admitted of being dug into. Dr. Dawson himself admitted in his paper that there could be no doubt of the prehistoric period of the gravel, and all that was necessary was to show the presence of human handiwork in it to prove their immense priority to the Egyptian age.

It may be said perhaps that it sounds like ancient history to speak of discoveries made in 1881, when so much has been done since by subsequent explorers; and implements of true palæolithic type have been found both on the plateau land immediately above the Nile valley by Mr. Flinders Petrie and in the desert by Mr. Seton-Karr at some distance to the eastward of the Nile. This is quite true, but on the other hand the evidence of age afforded by the flints found by me in the deposits at the bottom of the valley so far as it goes is much better. The implements of palæolithic type found by Mr. Petrie and Mr. Karr, so far as I understand from their descriptions and their verbal communications to me, were found on the surface only. Flints found on the surface of the soil cannot be legitimately disconnected with flints of the surface period, except by form, and form alone is not conclusive in determining date. The same forms might have been used in different countries at different periods. I have little doubt from their number, and the absence generally of flints of a more advanced type amongst them, that they will eventually turn out to be of the true palæolithic age, but the evidence is as yet insufficient. And this makes it necessary for me to vindicate the character of my original finds, which have been aspersed by Sir J. W. Dawson. We have there, at any rate, evidence of the use of flint tools by man at a time long antecedent to the cutting of the Egyptian tombs, whereas in estimating the value of the surface finds above the valley we are met with the objection that there was nothing to have prevented a flint-worker from walking up the cliff with his flints and depositing them on the surface of the hills above at any period in the history of the valley. We must continue to rely on the *gisement*, as others have done before, and I have little doubt that it will be forthcoming hereafter, although the surface of the desert does not appear to favour the formation of sedimentary deposits. Mr. Seton-Karr informs me that the flints discovered by him were found lying bare on the surface of the top of a hill, from which the overlying earth had been denuded, probably by heavy rains. If so, the earth or sand so denuded must have been washed down together with some of the flints to a lower level, probably towards the bank of a stream or river which I understand passes through the ground on which the flints are distributed. It is possible that such flints may hereafter be found covered by deposits which had accumulated over them, and even that it may be possible to find with them the bones of extinct animals, which would at once show their place in the history of the district. Meanwhile a model of my finds at Gebel Assart, with the tombs and the stratification of the gravel, the original flakes and cores and a rough tool found in the deposits, has been placed in my museum at Farnham, Dorset, so that any visitor who has sufficient knowledge of the subject can estimate for himself the value of this part of the evidence relating to the antiquity of man. Mr. Seton-Karr has examined this model, and I have reason to think that when he returns to Egypt, which he intends to do in a few months, he will endeavour to obtain further evidence of the character that I have indicated.

Professor Clark proposed a hearty vote of thanks to General Pitt-Rivers for putting himself to the trouble and fatigue to come there and deliver that address. They had to thank him, not merely for his admirable paper, but also for his invaluable and continuous services to archæology, of which he might be considered as the head in England. A valuable step would have been taken towards the preservation of relics of antiquity if proprietors of land, acting upon the hint of General Pitt-

Rivers, absolutely prohibited any unscientific investigation and insisted upon scrupulous care in excavation and record.

Professor Boyd Dawkins, who seconded the vote of thanks, said he wished to acknowledge the great debt of gratitude they owed to General Pitt-Rivers. He was the first man to introduce method, accuracy and precision into those inquiries, and the result of his work, he was sorry to say, had not yet been fully grasped by the British public. He ventured to think that the work which he had carried out with pickaxe and shovel, and which was recorded in those magnificent volumes of his, had done more for the ancient history of the district than everything that had been written and done before, and he took it that the future historian of that part of the world would feel under a greater debt to his writings than to all the mere surface details which had been published before. Many years ago, more than he cared to think of, he obtained his schooling from General Pitt-Rivers in the method of working out earthworks, the use of the level, the contour and so forth; and his example, and not merely his results, would leave a profound mark on British archaeology. General Pitt-Rivers carried his method of precise investigation into Egypt, and was the very first man to trace home early flint implements in Egypt to their original parent rock. The rock-hewn tombs at Thebes yielded him full proof that before Egyptian civilisation there were rude people roaming through the valley of the Nile and using those flint implements. Until General Pitt-Rivers's researches came to the front there was no well-authenticated instance of a camp of the Bronze Age, and now they had four, of peculiar character and that curious square type. It was by no means impossible that the irregular square camp of Hod Hill might have been one of the Bronze Age fortresses, afterwards remodelled and occupied by the Romans. He could only give a faint and inadequate outline of the labours of General Pitt-Rivers, but it was a great pleasure to him, as a working archaeologist, to meet him on that platform.

General Pitt-Rivers, acknowledging the vote of thanks, said he was glad to see that in Dorchester so many people were beginning to take an interest in archaeological matters, as in these days little could be done without the support of the great masses of the population.

Round the Town.

The afternoon was devoted to a perambulation of the town under the guidance of Mr. Henry Moule. The party assembled at two o'clock at Maumbury Rings and surveyed with admiration the graceful contour of the amphitheatre. Mr. Moule observed the arena was not much smaller than that of the Colosseum. He could offer no explanation of the etymology of the word Maumbury.

Mr. Cunningham said that "maen" was the Anglo-Saxon for stone, and there used to be a large stone close by with a ring affixed to it, to which bulls were tethered. Bull-fighting was once very prevalent in the country. The rings were constructed by throwing up the chalk from all sides, the chalk being at this part about 300 or 400 feet deep.

Mr. Moule, being asked about the seating arrangements, said it was a moot point whether there were any seats at all. Some thought that the "swells" had their curule chairs brought out and placed on the ridges, and that the rest of the people stood. Stukeley and others said that the *caveæ* were on the south side, where the ground rose. That part of the amphitheatre was much damaged at the time of the Civil War, when the Parliamentary forces raised a platform and placed a battery there to command the Weymouth Road. In his early years the arena was under the plough.

Sir Henry Howorth stated that outside the circus at Lavinium a stone had been found bearing six words not devoid of humour. They were, "Circus plenus. Ingens Clamor. Janua—." The last word was obliterated. (A Voice: A standing announcement of "Full inside"—"Complet," as the French buses have it.)

Before the party left the amphitheatre Mr. Moule pointed to the line of foliage appearing over the roofs of houses and marking the site of the old walls of Dorchester. He declared that they were the first genuine boulevards in the world. He did not think any were planted in France till the end of the last century, whereas Stukeley had seen and commented upon these as early as 1723.

The party then returned to the town, and proceeded down the South Walks towards Fordington St. George Church. Mr. Moule pointed out the houses which had been built on the counterscarp of the foss, and stated that Mr. Alfred Pope, as he had anticipated, struck the foss in digging the foundations of his house. It was a remarkable section of the chalk, and there was good evidence of a glacis. Mr. Cunningham, while near All Saints Rectory, pointed out where the old wall stood. Next came a vallum 60 feet wide, then a foss 28 feet wide, a second vallum of 36 feet wide, a foss of 16 feet, and an outer vallum of 54 feet, making the process of a total width of 194 feet. Sweyn burnt the town in 1005, and threw down the

walls. Owing to frequent fires since then the lines of the old Roman streets had been lost. Durngate Street was once thought to be an original Roman road, but Mr. Thomas, a former borough surveyor, found a tessellated pavement right in the middle of the street, which clearly showed it was a mistake. Mr. Moule pointed out near Culliford House the place where the foundations of a gate, presumably Roman, were found.

On reaching Fordington St. George Church the antiquaries inspected with manifest interest the carved stone over the door representing St. George overcoming the Paynim. Mr. Moule, who expressed regret at the unavoidable absence of the vicar (the Rev. S. Boulter), made a few observations upon the church. It was, he said, very mangled, with an eighteenth-century chancel and a nineteenth-century aisle in the north. But, although mangled, it had several interesting features. By far the most interesting was the carved stone over the door, often called, but incorrectly, as he contended, a tympanum. The stone pulpit was of the Elizabethan age, its date being 1591. It was moved to its present position by his father, a former vicar, who discovered the rood-loft stairs, and shifted the pulpit in order to make the stairs serve as a means of ascending to it. Mr. Moule told how his boyish curiosity led to the holy-water stoup near the door being brought to light, and he narrated the popular story of how five of the peal of bells came from Bindon Abbey to Fordington, in accordance with the doggerel couplet:—

Wool streams and Coombe Keynes wells,
Fordington rogues stole Bindon bells.

The fifteenth-century tower was a fine specimen. Among Mr. Moule's own youthful reminiscences was the description of the member of the choir who, perched up in the old high gallery, sang the "Te Deum" as a solo in a broad Dorset voice, the congregation, who had remained seated, rising up at the close, facing the west, and singing the "Gloria Patri." In the churchyard attention was drawn to an old seventeenth-century tomb, bearing on the side the familiar epigrammatic inscription, "I was as thou art, and thou shalt be as I am."

St. Peter's Church was next visited. Mr. Moule described it as a graceful, pleasing fifteenth-century church. Close to that spot very probably stood the Roman temple, where the roads met, and there, too, when the empire became Christian, stood the first Christian basilica. He called attention to the various interesting monuments in the church—that to Lord Holles and the remarkable heraldic tomb of Sir John Williams, of Herringstone. The canopied niche inside the communion rails they might call a combined tomb and "Easter sepulchre" for the second host consecrated on Maundy Thursday. The effigies of the two knights in the windows did not belong to the church, but came from the Franciscan house at the bottom of Friary Lane. They were probably Chideocks of Chideock.

The party then walked up High West Street to see what Mr. Moule described as "the one still-standing fragment of the old wall of Durnovaria." They were next conducted by their guide down the Colliton Walks to view the remarkable scarp, where, as the low-lying ground was formerly a marsh or lake, no foss was possible or needed.

The party repaired next to the County Museum, where Mr. Moule doubtless felt himself even more than before on native ground. Alluding first and briefly to the natural history section, Mr. Moule said that their fossil collection was very fine. He had the authority of Mr. Smith Woodward, the expert on fossil reptiles and fish in the British Museum, for saying that theirs was beyond all comparison the best collection of those particular fossils to be seen outside the British Museum. Then as to their greensand fossils, Mr. Jukes Browne said that the geological world at large were quite ignorant that some fossils which were supposed to be found nowhere in England except in the greensand of Cambridge, were to be found in the middle of Dorset. Mr. Moule drew attention to the collections of Dorset birds and lepidoptera, and then proceeded to point out the most interesting antiquities, including a collection lent by Mr. Ralls, of Bridport.

The Antiquarian Section.

After the *table d'hôte* at the King's Arms, the members assembled at 8.30 in the room at the back of the hotel, where the antiquarian section was opened by Professor Boyd Dawkins with a thoughtful and erudite paper on "The Present Phase of Prehistoric Archaeology." In introducing the subject, he observed that the time was opportune and the place suitable for its consideration—the place, within the lines of a Roman fortress, surrounded by the relics of the ancient inhabitants of the ages of bronze and iron, the countless tumuli of the Downs and the fortified strongholds that kept watch and ward over Dorset. The great and as yet unbridged gulf between the Pleistocene and Prehistoric periods he instanced by asking what they knew of the Durotriges, in whose country they now were. Their place in British ethnology was a guess. Their habitations and fortresses, their manners and customs, were equally unknown to them; and that was the case in a land

called, after their name and abounding with remains which would lift the veil if explored by the scientific use of the pickaxe and the shovel. Dorset in its entrenched villages and fortresses was a veritable El Dorado from which, by the methods adopted by General Pitt-Rivers, untold archaeological wealth might be extracted. They had heard from the General that morning the story of the discovery of the fortresses of the Bronze Age, which had gone far to fill their blank in the annals of the South of England. Why not carry on the work and fill the greater blank of the prehistoric Iron Age? The scientific investigation of Hod or Hamildon hills, which might be done with comparative ease, would tell them more than anything they knew before on the matter, and would elucidate that portion of the past where the historic shaded into the prehistoric age. An interesting and often humorous speech commenting on Professor Boyd Dawkins's paper was made by Sir Henry Howorth in the course of proposing a vote of thanks. This was seconded by Professor Clark and carried with acclamation.

On the 3rd inst. Wareham and Corfe Castle were visited. The Rev. S. Blackett said that they in Wareham flattered themselves that they had in that building one of the most interesting antiquities—the relics of a Saxon church. Well, the shape of the east window viewed from the outside and the work in the quoins bore out what he said. The church consisted originally of nave and chancel, the aisle on the north having been an addition. It was said to be a twin church to St. Mary's, Bradford-on-Avon, and the proportions were exactly the same to a foot. There was an idea that that was in no sense a parish church, but a sort of missionary centre for St. Aldhelm, Bishop of Sherborne, who gathered a band of preaching monks around him and sent them about the country imitating him in his method of singing the Gospel. He had no doubt that St. Aldhelm himself often sang it there to the accompaniment of his harp. They had lately discovered the base of a group of four Purbeck marble pillars, of which the capitals remained. In 1673 about one-third of the town was burnt down, and some of the homeless inhabitants were given shelter in the church. It was even then not used for worship, and a brick fireplace was built in the corner for the people to cook their food. They were standing upon a perfect mass of human remains. He had no doubt that they used to bury there over and over again, and pushed aside the remains of one interment to make room for another. There were traces of very ancient paintings on the wall. Four distinct kinds had been traced there, and they could see the Royal Arms, the Ten Commandments, and the inscription to the Caruthers family. The east window was apparently never glazed, and outside could be seen the little holes into which the wickerwork was fitted to keep out the birds. The Society for the Preservation of Ancient Buildings considered that the western wall, close to which the cutting for the road had been made, should be underpinned to prevent it giving way. There was no intention to restore the building as a church, but he hoped to be able to preserve it, and once in every twelve months to hold a service there, so as to remind people that it was one of the ancient places of worship in the town, and was not to be kept up merely for show.

Mr. Micklethwaite said he quite accepted it as a Saxon church. It was hard to date Saxon work, but one of the criteria of late date was approximation to Norman detail. The chancel arch was not thoroughly Norman, but the jamb was. His impression was that the church belonged to the first half or middle of the eleventh century. He drew attention to the fragment of the hood of the characteristically tall Saxon door.

When the party left the church the whistle of Mr. Green, the honorary conductor, led them to a portion of the north rampart. The low-lying meadows were once all under water, and the road, which was still called the Causeway, marked the way into the town. Alfred the Great probably stood upon the very Causeway to parley with the Danes.

Mr. Blackett spoke of the frequent descents of the Danes upon Wareham, and said that Arne was their rendezvous when they harried the south of England. It was said that there were over sixteen churches in Wareham, and that the Danes were responsible for the destruction of eight of them. But it could scarcely be believed that so small a place as Wareham could have had as many as sixteen churches, and the truth probably was that eight churches were destroyed over and over again, and new names given to them when they were rebuilt, thus leading to the erroneous supposition that they were other churches. It was recorded in the Anglo-Saxon Chronicle that the Danes swore to Alfred that they would leave that part of the land. They sailed round Peverel Point and there were destroyed, partly by a storm and partly by Alfred's fleet. Near the Mowlem Institute at Swanage stood a pillar commemorating Alfred's victory, and bearing on the top a strange bit of irony, four cannon balls.

Sir Henry Howorth said it seemed to him that the walls were designed to keep out no other enemy than the sea. They were much like the ramps which surrounded many Dutch towns.

Mr. Moule objected to this theory that the walls went round three sides of the town, and that on the fourth side, where the

river flowed, and where the danger of the sea's incursion was greatest there was no wall.

Professor Boyd Dawkins also objected that the level on the ground inside the wall was so much higher than that outside that it was impossible for Wareham to have been submerged by the highest tide. He took the ramps to be for the purposes of fortification.

Mr. Blackett then led the antiquaries to the high north-west corner of the walls. He pointed out what was thought to be the old cockpit of amphitheatre, and the traces of the Roman road coming from Bere Regis. The still surviving names, North Port and West Port, indicated where two of the old gates used to stand, but the traces of the other two were entirely lost. That high and conspicuous part of the walls was called "The Bloody Bank," because the rebels taken after the Monmouth rebellion were executed there.

Mr. Cunningham said he had no doubt, after his investigations of years, that Wareham was a pastoral camp of the Durotriges, like Poundbury. To say that it was Roman was ridiculous. Stoborough, however, was the seat of a large Roman population, and there were potteries there.

Professor Boyd Dawkins said that these banks seemed to him from their irregularity not to be Roman. He should compare them with the irregular ramparts which surrounded ancient Silchester, in which they found the comparatively modern Silchester of the Roman time shrunk within the earthen rampart of the great centre of power in that part of the country before the Romans came. The ramparts, he was inclined to think, belonged to a time before the Romans came, and were intended to protect a population non-Roman and pre-Roman. From its geographical position no doubt that place must have been inhabited more or less from those days to the present time; but if Roman pottery was not found there in considerable quantity he should be inclined to think that it was not used much by the Romans. There were Roman roads there, but there were also traces of more ancient British trackways, one going due south and another running westward in an irregular line clearly marked on the 6-inch map. He therefore felt inclined to classify Wareham with such places as Poundbury, the ancient Silchester and the ancient town of St. Albans, the ramps of which were used for the Roman seat of Verulam.

Proceeding along the walls to the end, the party came to the church of St. Mary's. Mr. Blackett said that of the ancient church only the west and east end remained. The nave was destroyed and rebuilt about fifty years ago, when some magnificent Norman pillars 6 feet in diameter were, he believed, blown to pieces with gunpowder in order to make room for the present pillars. At the end of every aisle regularly was a chapel. Mr. Blackett told the well-known story of the murder and burial of King Edward the Martyr. The Twelve Apostles were carved in high relief around the lead bowl of the font. All the faces were battered to the obliteration of every feature, a piece of work for which Cromwell's soldiers got the credit. They were also said to have melted down the lead lid for bullets. The party spent some time in inspecting the recumbent effigies of Sir Edward and Sir William de Stoke, upon the armour of which, as indicating their age, Viscount Dillon made a few interesting remarks.

Mr. Blackett told how he discovered King Edward's Chapel, and led them into it. It was, he said, the church of the priory, which was close by, and the present church was built on to it for the use of the townspeople. He called attention to the groined roof and the two Roman altars. Thomas à Becket's Chapel, within the precincts of the communion rails, was afterwards seen.

Lord Dillon heartily thanked Mr. Blackett before the church was left for his painstaking and interesting description of Wareham.

Corfe Castle.

The Rev. O. L. Mansel, addressing the members under the shade of a tree, said he could tell them little which the late Mr. Thomas Bond, the great authority upon Corfe Castle, had not already told them in his exhaustive work, but he read the paper which he gave to the Dorset Field Club on their visit last year, with an apology to any of the company who might have been present on that occasion. This paper was published in the *Dorset County Chronicle* at the time. It described the history of Corfe from 690, when, as William of Malmesbury narrated, St. Aldhelm, Abbot of Shaftesbury, built a church there, down to the last and most exciting period of its existence. In 1635 the castle was purchased from Sir Christopher Hatton by Sir John Bankes, the ancestor of the present owner, whom he was sure that they would all wish to congratulate on his recent marriage. With few but vigorous strokes Mr. Mansel sketched the story of the siege heroically sustained by the little Royalist garrison under Lady Bankes against the host of Parliamentary besiegers, of how the castle was taken by treachery, and the decree for its demolition ruthlessly carried out. Mr. Mansel then led the company to the chief places of interest. He drew attention to how the ground rose by three natural slopes. It was on the highest ground that the first castle stood, pre-

sumably built by William the Conqueror, judging from its similarity in architecture to the Tower of London. The outer works were added in the reigns of Henry III. and Edward I. The company lingered some time on the site of the chapel of St. Aldhelm in the second court, and curiosity was expressed as to the reason why the fragment of wall built of herring-bone work had been left standing. It certainly was not for the purpose of defence, as the more modern curtain wall had been carried along outside it. Mr. Mansel asked whether it could have been, even at that early day, from a laudable sentiment of preserving old relics. If so, he only wished that that spirit had continued all down the ages since. Many members shared Mr. Mansel's opinion that the wall was the remains of an ancient Saxon building, and was left standing from motives of veneration; but Dr. Cox and others protested against the idea that because of its herring-bone work the wall must necessarily be pre-Norman. The party climbed to the keep and banqueting-hall, and then descended to the outer court, where tea was served. After this "refresher" the company drove back to Wareham and returned to Dorchester by train.

History and Historians.

Shortly before nine o'clock the historical section was opened at the King's Arms with a paper by Sir Henry Howorth, M.P., on "The Old and New Methods of Writing History." The paper was long, scholarly and frequently entertaining, brightened by gleams of that "sheet lightning" of wit and humour that ever seems to be playing in Sir Henry's mind. He expatiated first upon how often the functions of the poet and novelist were combined with that of the historian, and the results that proceeded from it. Whatever special branch of history was written of it should be in accordance with the rules of combined science and art as conceived by their highest votaries, and it must sweep away the crudities and amenities which crowded their book-shelves with ephemeral rubbish and marred their tempers in a search after truth where the germ of truth did not exist. History ought to be judged by the laws of evidence as observed in the courts of justice. Secondary evidence was not admissible where primary evidence was available. They must not call the copyist and compiler when they could get at the very sources, the *fontes*. He emphasised the importance of going back direct to the original sources of information, and of the stricter editing of those sources, in order to get the evidence in the purest form. To discriminate between different witnesses was the most trying part of the historian's duty. He deprecated giving a man a degree for history simply because he showed a retentive memory, and he declared that every aspirant for the honour should be required to write an original memoir. Sir Henry criticised somewhat trenchantly the work of certain well-known modern historians, and commended and recommended the methods of the German school. In conclusion, turning to archaeology, that important handmaid of history, he warmly praised and advocated the method of work adopted by General Pitt-Rivers. They all felt the enormity of the work done by old "restorers" of churches and destroyers of cathedrals, but they were apt to palliate and excuse the similar criminal who had mutilated their older, more fragile and less recorded monuments. He hoped that those having the custody of what remained would refuse to allow persons without the requisite training, knowledge and resources to tamper with those invaluable documents, the very title deeds of their earliest history, just as they would forbid a quack to treat their children or allow a person like himself to pull out their teeth.

On the motion of Professor Boyd Dawkins, seconded by Dr. Cox, a vote of thanks was accorded with acclamation to the lecturer.

(To be continued.)



The Nude in Greek Art.

SIR,—I thank you for inserting my first letter, and as this will be the last I shall write in answer to "Ronald Kelly," I shall feel greatly obliged if you can find space for it.

Since writing his first letter, "R. K." has not had much time to further study arts or morality; but you will notice that he is getting more polite, as, instead of styling us "brazen-faced apologies for girls and women," he speaks of the "new woman," and calls me "his fair opponent." How sweet of him!

He says, "I have written, believe me, conscientiously." I am sure he has, and I admire him for wishing to leave the world better than he found it. "R. K." seems to have "a bee in his bonnet," and it must be an absolutely nude one, for it worries him fearfully.

It is utter nonsense to say a nude figure, either male or female (especially the latter) is a vulgar sight. The pose of the figure may be. I have observed that men of strong animal passions when decorating (?) the walls of their own private sanctum, do not do so with reproductions of the pictures and statuary to which "R. K." objects, but with prints and photographs of ballet-girls and others *draped* in a style peculiar to themselves. Why is this? My answer is that the former, being a true and beautiful work of art, does not excite the animal passions, but the latter, being full of suggestion, does.

"R. K." makes use of the term "new woman." There are two kinds of the "new woman," the one whom a celebrated novelist styles "an understudy for a man"—she is a creature not truly admired by either sex. Then there is the "new woman" who has entered the different professions. Is she a curse? I venture to say not, for the following reasons:—It is now but a few years since the barriers which prevented her studying a profession were broken down. When she entered, what did she find?—men who through over-confidence had let "the cart run back." It did not take long for her to send many of the stronger sex to the wall, and of course these cried out; but the men possessed of grit did not fear her—they simply put their shoulders to the wheel and kept well ahead.

A clever man will always be superior to a clever woman, and in "life's race" a clever woman will experience the greatest pleasure in acting as pacemaker to a clever man, but he must be clever and able to convince others of his cleverness. "R. K." need not fear the mahl-stick; his first letter annoyed me, but his last has made me think of him "more in sorrow than in anger."

Now for that so dear to a woman, "the last word." If Mr. Kelly, when speaking of female art students, had not applied to them an expression which "thinking men" would not apply, even to members of the *demi-monde*, I should not have written these letters, because I am sure neither art nor morality will benefit thereby. A true man is by nature a gentleman. Is it therefore manly or gentlemanly to speak slightly of those you consider weaker than yourself?—I remain, yours faithfully,

A LADY ARTIST.

August 24, 1897.

GENERAL.

The Old Greek Church of St. Mary, Soho, is condemned by the London County Council as "a dangerous structure." It was the first Greek church in England, built in 1677 by the Archbishop of Samos, who recorded the fact in a Greek inscription still over the west door. It was subsequently occupied by Huguenots calling themselves "Les Grecs," and it is figured in Hogarth's picture *Noon*.

Lord Kelvin has been appointed honorary colonel of the corps of Electrical Engineer Volunteers now in course of formation.

The Late James Theodore Bent, the traveller and archaeologist, has left property valued at 21,497*l*.

The Bishop of Oxford has been re-elected president of the Bucks Archaeological and Architectural Society.

The Nelson Wesleyan Circuit's quarterly meeting has passed a resolution to erect two new chapels, each with a holding capacity for about 700 people, to cost 5,000*l*. each, one to be erected at Bradley Hall, the other in Barkerhouse Road. A Sunday-school is also to be erected at Barrowford, to cost about 2,000*l*.

Mr. Onslow Ford, R.A., has been commissioned to execute a statue of the Duke of Norfolk, in commemoration of his Grace's public services whilst Mayor of Sheffield.

M. Falguiere has completed the model of the statue of Cardinal Lavigerie which is intended to be erected in Bayonne. It is considered to be a successful likeness of the missionary bishop.

Mr. G. P. Hughes has ascertained by trial that most of the Californian and British Columbian species of coniferous trees thrive well on congenial soil and stations in Great Britain, and that as trees of ornament, shelter and commercial value they are well worth cultivating. Californian and British Columbian red wood now produces 1*s*. 11*d*. per cubic foot in the English market, the uses to which it is applied being the finer inside work of houses; yellow pine, 2*s*. 6*d*.; pitch pine, 1*s*. 6*d*. per cubic foot.

Professor Orsi announces the discovery in Sicily of several prehistoric quarries; some of them—as is shown by the numerous skeletons found on the spot—have been used as burial-places. Amongst the objects which came to light during the excavations are to be noted some stone knives, a great number of very primitive earthen vessels, showing for the most part the characteristics of the so-called first Sicilian period, a vase of the Dipylon style, and the fragments of a hydria with geometrical decorations.

The Architect.

THE WEEK.

CHICHESTER Cathedral impresses a visitor who sees it for the first time with a conviction that there is little care taken of the building. In such cases the Dean and Chapter are supposed to be indifferent; but the principal cause is the lack of money. An appeal by Archdeacon MOUNT in 1892 enabled a domus fund to be established, by means of which considerable repair has been effected. At that time the Chapter received from their surveyor, Mr. GORDON HILLS, a report upon the condition of the cathedral, most carefully drawn up, which embraced almost every matter of necessary repair which, in his opinion, should be submitted to the Chapter for their consideration. He estimated the cost of the several parts of the work at 11,555*l*. Large as is the sum, it is supposed to fall far short of what will be required to put the cathedral into a state of thorough repair. There are not sufficient funds available for so extensive a work. The executive committee propose, in the first place, to set on foot the rebuilding of the north-west tower, which has been pronounced to be necessary for the safety and preservation of the portion of the fabric originally supported by that tower before it fell. Mr. J. L. PEARSON, R.A., has been appointed as the architect to execute this part of the work. He has already furnished plans for it, and a responsible builder is prepared to carry them out for 6,250*l*. It is proposed to build so much of the tower as can be accomplished with the funds already subscribed, and to continue the work to its completion as subscriptions come in. The committee hope to be able to also undertake, as funds are supplied, the repair of the south transept, the renewing and repairing the dilapidated pavement of the nave and aisles, the re-erection of the nine pinnacles on the buttresses, which, in the opinion of the late surveyor, are required to "give weight and stability to those abutments," and the restoration of the ancient library over the chapel of St. John, but these works can only be accomplished at considerable cost. The sum of 3,606*l*. 10*s*. has been subscribed towards the general work of restoration. The committee ask all who have it in their power to assist them by donations and subscriptions, that they may be enabled to take in hand at once the rebuilding of the north-west tower and such other works of restoration as will rescue the cathedral from the injuries which it has sustained from the ravages of time and weather.

THE Sussex Archæological Society have revived the practice of visiting occasionally one or more of the ancient buildings of the county. Last week a commencement was made with Rotherfield Church, which is interesting not only on account of its history and style, but for the remains of mural paintings. Canon GOODWYN, who described the building, said there was probably some Norman work in the chancel, but the body of the church was Early English. The pillars on the north side were round, while those on the south side were octagonal, and there was no doubt that the present waggon-shaped roof had not always existed. At the door was an entrance which led to the priest's chamber, and under the floor there had been discovered a kind of stone altar, or rather part of a rude altar. The date on one of the panels of the canopy of the font was 1539, and the Canon believed it to be either the work of a French or Flemish artist. At that period the registers showed there was a considerable French colony in Rotherfield. There was another font, octagonal, like the pillars, which he had found in one of the fields in the neighbourhood, which belonged to one of the churchwardens in the year 1816. The pulpit had been placed in the church on last Palm Sunday. It was a very ancient pulpit, and had been brought from the Archbishop of York's chapel at Bishopthorpe, and erected upon a base of Crowborough stone. It bore a surprising resemblance to the pulpit in St. John's Church, Leeds. Mr. KEYSER considered the paintings possessed exceptional interest. Throughout the nave and in the lady chapel they could be found on every part of the walls. On the north splay of the window was a picture of

the Angel Gabriel, and on the south was one of the Blessed Virgin, and the other figures probably represented ADAM and EVE. In the splays of the blocked window to the right of the main entrance could be seen traces of a portrait of St. PAUL. All these pictures dated from the fourteenth century. On the south part of the east wall was a painting of the Incredulity of St. Thomas and other figures and ornaments, similar to those to be seen in Preston Church near Brighton. In some form or other the Doom, or Last Judgment, was represented in almost every church of that period in England. The Doom in Rotherfield was, with the exception of one in Clayton Church, about the most elaborate in England. The painting of the Doom to be found in the Patcham Church was the earliest example yet found. The opinion was generally expressed that some arrangement should be made between the Sussex and other societies for the preservation of such valuable remains of Mediæval wall-painting.

A NOVEL proposal was brought before the Liverpool City Council on Wednesday. Sir WILLIAM FORWOOD proposed that the right to raise rates on public buildings, and especially those devoted to education under the control of the Council, should be waived. The poor rate on the Art Gallery alone amounts to 321*l*. It was suggested that if that sum were set aside for the purchase, a good picture could be acquired for the permanent collection. The Liverpool Corporation do not advance money towards the purchase of works of art, and yet the collection is worth no less than 90,000*l*., while the buildings are valued at between 600,000*l*. and 700,000*l*. The Council's contributions towards the outlay amounted altogether to 10,000*l*. Some of the members were in favour of Sir WILLIAM FORWOOD'S proposal, others were opposed, but the debate on the subject was cut short, for the Town Clerk discovered that the proposal was contrary to law.

It is arranged that in connection with the National Home Reading Union some new courses will be introduced for 1897-98. One is a study of evolution through architectural styles; abundant references being given to the illustrations of successive types which are to be observed in Great Britain. There will be also special study of the art and archæology of Egypt. More entertaining for the majority of the members will probably be the study of the works of Sir WALTER SCOTT. They will be taken up not in the order in which they appeared, but in the chronological sequence of the periods in which their scenes are laid. A series of tableaux of English history from the twelfth to the eighteenth centuries will thus be presented to the reader, who at the same time will find in the work of the great novelist ample material for literary study. There is much else in the programme which is worth attention, and the Union deserves a large measure of support from young people and others.

THERE is no city in Europe which is more indebted to arboriculture than Paris. Take away the trees and the race of boulevardiers would be diminished, for those gentlemen believe there is no such delicate green to be found as can be seen from a chair in a café. What is no less remarkable, the trees appear to be as charming by night, and it is hard to say whether electric light or gas light is better adapted to display their beauty. But the trees have to be treated with as much attention as plants in a conservatory. This year they have fallen into "the sere, the yellow leaf" a little too soon, and "Tout-Paris" has raised an outcry against the Municipality and its officers. It was nature, however, that was to blame for an excess of precocity. The branches were covered with leaves as early as March. Early decay was therefore inevitable this year. Science has discovered no way to enable a tree to remain green in Paris for a longer term than five months. In spite of all the care bestowed on them it is equally impossible to keep off decay after a term of fifty years. That age is, however, a little in excess of what is allowed the average boulevardier, or rather what he allows to himself. The trees have acquired some of the qualities of the life of Parisians; and it is no wonder they are admired beyond those of the forest.

JACOB BURCKHARDT.

THE story about the German who evolved the idea of an elephant from his inner consciousness, and described the phantom at great length, is one of those which must always make the judicious grieve and pity the person who narrates it. Everybody who has studied works of art (and we suppose the same is true of natural history) must know, from his experience of the Germans he has met, that imagination exercises very little influence on them, for, at all sacrifices, they insist on seeing everything which is connected with their special subject. Neither engravings nor photographs are sufficient to satisfy the desire for knowing things. The originals must be familiar. Supposing, for example, a German considers there may have been some relation between architectural mouldings and those of Greek vases, he will not be satisfied until he has explored the principal collections in Europe, and has made a tour in Greece in order to obtain evidence. All his labour may never result in the production of a big folio with elaborate plates, but his conscience as a student will be at rest, for he has been able to confirm or to reject his own theory.

Among the inquirers who appear to require unceasing labour to obtain materials for a small book, JACOB BURCKHARDT, who died on August 8, deserves a prominent place. He could easily have compiled works on the history of art without departing from any of the colleges in which he taught; but if he had undertaken to write a pamphlet on the ornament of one of the South Sea islands he would consider he was incompetent for the task unless, after mastering the literature of the subject, he made a voyage to the island and lived among the inhabitants. We might even say that his love of facts and his indifference to everything that appeals to the emotions alone have had the effect of keeping his books unknown to a great many students outside Germany. While the names of WAAGEN, KUGLER, LÜBKE, RUMOHR and others are familiar in England and America, JACOB BURCKHARDT's excites little interest and his authority is rarely quoted. A few words about the late scholar will therefore not be out of place here.

He was born in 1818 at Basel, which might be described as the capital of Germanic Switzerland. Basel is a handsome town on the Rhine, and it possesses a fine cathedral, in which BURCKHARDT's father used to officiate as a minister, and other picturesque buildings. But for an incipient scholar it has another endowment in the associations with ERASMUS. JACOB BURCKHARDT exemplified in himself the influences of his birthplace. He was scholarly and owed allegiance to the lands in which the classics were produced; but he might have been, if he restricted his studies, an able architect or a painter. The modern life of Basel seems to be out of keeping with its Mediæval buildings. BURCKHARDT was too impressionable to be contented during his early years in the college classrooms. In common with many of his contemporaries he was not proof against the theories of SCHOPENHAUER, and his father's proposal to make a theologian of him did not mend matters. His only refuge from the weariness, flatness, staleness and unprofitableness of the world was in art, and to its history he devoted himself as a duty and as a relaxation. Accordingly, after going through the usual courses of training which Basel afforded, he turned to Berlin, where KUGLER was professor of the history of art in the Academy. It was also a period when great efforts were being made to create a school of painting which it was hoped would rival those of Italy in the time of the Renaissance.

BURCKHARDT applied the knowledge he had acquired in an essay on the cathedral of Basel, which was his first composition. In 1842 he wrote a little guide-book for tourists who wished to study Flemish art. The next year he selected as a subject CONRAD VON HOCHSTADEN—the archbishop who commenced the cathedral of Cologne. About that time he became acquainted with GOTTFRIED KINKEL, who a few years afterwards was an exile in London and was one of the pioneers in clearing obstacles and prejudices that impeded the progress of art among us. In his historical exercises the influence of LEOPOLD VON RANKE was apparent. The Berlin professor of history was described by MACAULAY as having “a mind fitted both for minute researches and for large speculations.” To some extent the words are applicable to RANKE's pupil, JACOB BURCKHARDT.

But fascinating as were investigations of the history of the minsters of Cologne and Basel, they could not subdue the voice which summoned BURCKHARDT to Italy. MIGNON's song, “Kennst du das Land” was always sounding in his ears, and he could hardly resist the impulse to see the columned halls, the statues and the paintings which abounded in that glorious region. Still more attractive to his scholarly mind was the vision of Rome. He succeeded in exploring the majority of places of Italy which contained a building, a picture, or a statue worth seeing, and yet his longing was not satisfied. The words with which he concludes “Der Cicerone” are almost pathetic, for, in fact, they are suggestive of that craving after the ideal which neither Classic art nor Renaissance art can assuage. Speaking of the Italian scenes of GASPAR POUSSIN and CLAUDE, and especially of the light which pervades them, “Whoever,” he says, “meets with the works of these masters outside Italy will find that they revive in him more effectually than modern works the home-sickness (Heimweh) for that unforgettable Rome which may slumber in the soul but can never die. That has been the writer's experience, and the best wish he can have for those who accept him as a guide is that they may enjoy such peace of the soul as was his in Rome, and which is revived whenever he looks on feeble imitations of the great masterpieces which once exercised their sway over him.”

“Der Cicerone,” which was the first product of BURCKHARDT's journey to Italy, which began in 1846, stands alone among guide-books. It suggests something that has been so repeatedly subjected to hydraulic pressure as to appear to have lost corporeal form. The reader feels that the author would have preferred to use formulæ in order to gain space, or to employ abbreviations for words. If with abbreviations and formulæ BURCKHARDT could have employed immense sheets on which to tabulate history and topography, so that much would be seen at a glance, he might then be happy. He was eager to present countless facts to the reader's attention, but he knew that travellers have no time for reading, and to accommodate them he has carried brevity to excess. In that way he is unique among Germans.

BURCKHARDT begins with the temple at Pæstum and ends with the imitators of CLAUDE, such as BOTH, MOLYN, ORIZZANTE and PANNINI. Between those extremes many are the revolutions in art which have to be chronicled. But the author's point of view is never changed. He has fixed principles which he applies as the works which exemplify Italian art during two thousand years are unfolded before him. He is therefore always impartial. Chronology instead of topography is the basis of his work. In architecture the order followed is Ancient, Early Christian, Romanesque, Gothic (Germanische), Early Renaissance, “Hochrenaissance”, Architecture from 1540 until 1580, Rococo (Barockstyle), Villas and Gardens. The architectural decoration of each period is considered separately. In sculpture the divisions are Antique, Mediæval, Fifteenth Century, Sixteenth Century, Rococo; and in painting Early Christian and Byzantine, Romanesque, Gothic, Fifteenth Century, Early Dutch and German, Glass-painting, Sixteenth Century, the Mannerists, Modern. It is not anticipated that guide-books are arranged on BURCKHARDT's system, and consequently “The Cicerone” is not as commonly seen in the hands of tourists as it merits. An effort is made by indices of places and artists to facilitate reference, but that is not considered enough. BURCKHARDT also wrote a “History of the Renaissance” and a treatise on “Renaissance Culture in Italy.”

A German of his type can hardly select his own method of living. As a distinguished student, BURCKHARDT was expected to teach in his turn. Accordingly in 1844 we find him holding office as supplementary professor of history in the University of Basel. In 1855 he was called to the Polytechnic Institute in Zürich, which at that time was considered to be the foremost establishment of its class in Europe. He was professor of the history of art. GOTTFRIED SEMPER was one of the professors, and both were almost sufficient to represent the Renaissance. BURCKHARDT was only allowed to remain three years, for his fellow-citizens felt they were not acting worthily in allowing another place to have the benefit of his ability. The

appointment of professor of history in the University of Basel was a tribute to his merit. Efforts were made to attract him to other universities, but he was faithful to Basel for the long period of thirty-five years. Even the offer to succeed RANKE in Berlin was rejected. He was so exact in attending to his professorial duties that his friends considered he did not do justice to the world and himself by the indifference to authorship which was displayed by the author of the "Age of Constantine." When new editions of his books were demanded he generally left the editing to one or other of his friends. In the case of "Der Cicerone" Dr. VAN ZAHN of Dresden was selected.

In 1893 BURCKHARDT, or rather his physicians, found there was risk if he continued in his onerous office as professor. He felt it was his duty to resign, although in doing so he was surrendering the delight of his life. The enforced leisure enabled him to take up some of his manuscripts, and it is understood that he completed two or three which related to his favourite subject, the Renaissance. A work by BURCKHARDT can never be superfluous, for wherever it was possible he had recourse to the original source of information, and always endeavoured to be consistent to his own principles in judging things.

ELECTRIC CABS.

OUR readers will have noticed in the daily press that electric cabs have been put on the streets lately, in such numbers as to make it evident that a really practical attempt is to be made to introduce motor carriages for other purposes than company promotion.

The outside appearance of these cabs is familiar to most of our readers, so it will be with the internal arrangements that we will chiefly deal. However, in passing, it may be well to mention that the company would be well advised to consider if the appearance of the under portion of the body can be improved, say by putting an outer casing over the battery box. This is slung under the body, is painted black, and is of such a shape that it is very conspicuous, situated as it is just under the light yellow body. However, this detail of appearance is of secondary importance at the present time. The essential point now is, Can a self-propelled vehicle be made to work noiselessly, reliably and cheaply? If the electric cab fulfils all these conditions (the first it certainly does), the rest will follow.

The cab resembles the single-seated brougham in appearance, but it is rather larger. The upholstery is really fine, being of leather. Spring cushions are used to minimise vibration, and the tyres are of rubber. Electric light is, of course, provided, both outside and inside the cab. The driver does not sit behind, but on the front of the vehicle. This is considered necessary with a motor carriage, owing to the fact that there is no horse to see where the cab is going.

The dash-board is rounded in front, and to some extent makes the cab look finished without the horse. At present, no doubt, the absence of the horse will be noticed, and for that reason the cab must appear incomplete—until one becomes used to it. When they have been running for a year or two, it will be possible to say whether they are really unsightly or not.

Each set of accumulator s consists of forty FAURE-KING cells having a capacity of 170 ampere hours at a discharge of 30 amperes, *i.e.* they will give 30 amperes for nearly six hours. The cab is said to take 24 amperes at full speed on the level if the road is good. The discharge of the cells is not supposed to exceed about 40 amperes under any conditions. The cells will thus give 80 volts and about 30 amperes for five hours—*i.e.* 2.4 kilowatts for five hours. The motor is of 3 horse-power, and this is ample for the work. The total weight of cab and passengers with motor and accumulators is said to be about 30 cwt., and the weight of accumulators alone about 14 cwt.

Any fears which might be entertained as to the commercial life of the accumulators is set at rest by the fact that the E.P.S. Company guarantee the maintenance of the cells for the sum of 10 per cent. of the first cost per annum. The Cab Company is thus relieved from anxiety and loss on the score of the accumulators. If the E.P.S. Company has made a good bargain, and if the guarantee holds good for perpetuity, there is no doubt that the FAURE-

KING cell has a great future. Ten years is rather a long life for an accumulator, and to guarantee this is a bold step under the conditions of running. It is true that the bad effect of vibration on the cells is considerably minimised by the method of suspension. The accumulator box is suspended to the cab framework by means of four springs, and there is no doubt that this is the best arrangement that could have been adopted. Another point in favour of the life of the accumulator is the excellent control arrangement for the motors. The motor is connected through gearing to the rear wheels of the cab, but there is no variable speed gear. The speed of the motor is altered, not the gearing ratio.

The motors, which have, we believe, been specially designed for these cabs, are of the JOHNSON-LUNDELL type, and are of American manufacture. The armature is wound with two distinct circuits, and there are two commutators, one for each circuit. The field windings consist of two similar series coils. This motor is then treated in the same way as the two motors are treated on a tramcar with a series parallel controller. To be more explicit, at full speed the two field windings are in parallel, and are in series with the armature, the two commutators of which are paralleled. At a slightly slower speed the field coils are placed in series, and the armature coils are still in parallel, the field and armature circuits being, of course, in series. At one-third speed the whole of the coils are in one series, *i.e.* the two armature coils are placed in series, and are in series with the two field coils. For starting a small resistance is thrown in series, being merely to ease the discharge of the cells until the cab is moving. The effect of placing the two armature windings in series is to halve the voltage on each coil, so that the natural speed is half of what it is when the windings are paralleled. The effect of putting the series windings in series is to make the full current traverse each, so doubling the magnetising force and considerably increasing the field over that which is obtained when they are paralleled and half the main current goes through each coil. The effect of increasing the field is to increase the torque or twisting force available, and it also again reduces the natural speed of the motor.

It will be seen that there are four speeds, in the slowest of which a resistance is used, but in all of the others the current is used very efficiently. The first speed is about 1 mile an hour, the second 3 miles an hour, which is about that of the well-known "crawl" of a cab, the third 7 and the fourth 9 or 10 miles an hour. At all these speeds, except the first, there is no waste, and the first is used only in starting. These connections are all automatically made by moving a lever forward; the amount the lever is moved determines the speed. If the lever is moved back from the "stop" position the first step short-circuits the motor through the starting resistance; the second completely short-circuits the motor; the third places all the coils in series and reverses the connections, making the cab run at slow speed backwards. The first step backwards makes the motor run as a dynamo and gradually brings the cab to rest; the second stops it immediately, if on the level; and the third, as before mentioned, either makes the cab run backwards or, if the gradient is very steep, tends to do so. A foot-brake of great power is used, which cuts off the current before applying the brake.

The steering is done by means of a worm-wheel and gearing, this being very simple and effective, and the worm-wheel has the great advantage of taking all strain from the handle, the wheels remaining in any position to which they are set without continuous holding of the handle.

The gearing has already been referred to. The motor pinion is of raw hide, or sometimes fibre, and this gears into the outside spur-wheel of a differential gear on a counter-shaft. This gear allows one-half of the shaft to move at a greater speed than the other while turning corners, &c. Each of the two back wheels is driven from this counter-shaft by means of the HANS-RENOULD laminating chain.

The small number of gear-wheels and absence of complication is said to make a very efficient gear, with which we fully agree.

There is no doubt that the whole arrangement of these cabs is very good and mechanical, and that they will be a success. Mr. BERSEY (the manager) is to be congratulated upon the result.

When we come to the arrangement of the works there is, perhaps, room for improvement in the future.

First, the mechanical arrangements. When a cab comes in it is run over a platform containing a trolley fitting the accumulator box. The platform is lifted hydraulically, and the battery is raised up and detached from the springs from which it hangs when on the cab. The cab is pushed away after the trolley and battery have been lowered. The trolley is then pushed on to another lift, when the battery is lifted to a higher gallery where it is pushed into its "stall" and is charged. It would be better to keep heavy accumulators on a ground-floor as much as possible, but perhaps circumstances, such as want of floor space, have made it necessary to have the gallery, but it is not a commendable feature.

The current for charging is obtained from the London Electric Supply Corporation's mains at $1\frac{1}{2}$ d. per unit. The pressure at which the electricity is supplied is 2,500 volts, alternating at 83 periods per second. This, of course, necessitated motor-transformers to convert the alternating high-tension current into a 100 volt continuous current. Two 75 kilowatt motor-transformers manufactured by the British Thomson-Houston Company are installed. These transformers give a 100 volt continuous current, which is led to the charging switchboard. From this switchboard a pair of leads go to each stall and are connected to the battery. One pole of the 100 volt circuit is connected to one lead from each stall. The other pole is connected to the other lead through an ammeter and adjustable resistance. There is a separate panel for each battery, these being provided for thirty-six sets at present. It is doubtful if this is the best arrangement that could be devised, but we await future results. Constant attention is necessary to keep the current at its correct figure, and the wisdom of putting in motor generators may be doubted by some. The electricity must cost the Cab Company at least 2d. per unit when delivered to the accumulators, owing to losses in the transformers, and there is at least a great probability that with a private plant of this size the cost would be less than this, as the work is of a continuous nature. With regard to the method of charging the accumulators, there is, we think, a better arrangement used with the Chicago accumulator trams. Three standard voltages are provided, and the discharged cells are first plugged on the lowest and subsequently on the other two; by this means there is no waste in resistances and very little attention is needed. However, the Electric Cab Company have opportunities to introduce improvements in future charging stations.

We were given an opportunity to test practically the running of the cab from the works at Lambeth to Westminster, and were agreeably surprised at the easy running and the perfect control exercised by the driver in and out amongst the traffic. We questioned him, and he said he had learned to drive the cab in a very short time—two or three days—and that he much preferred driving the motor to driving a horse. We feel sure that the company has a great future, and there is no doubt that they have produced a really practical self-propelled vehicle.

THE ART OF THE INDIANS OF BRITISH COLUMBIA.

AN investigation of the physical characters, languages and industrial and social conditions of the North-Western tribes of the Dominion of Canada is in progress by a committee of the British Association. At the meeting in Toronto Mr. Franz Boas produced a summary of the work in British Columbia. He gave the following information about the art of the natives:—

The decorative art of the Indians of the North Pacific coast differs from the arts of other primitive people in that the process of conventionalisation has not led to the development of geometric designs, but that the ornaments mostly represent animals. It is generally assumed that all the animal representations found on totem poles or on decorations of household utensils and of wearing apparel represent the totems of the various clans. While it is certainly true that in most cases the artists decorate the objects with the totem of the owner, there are a number of cases in which the reason for applying certain animal designs is founded on other considerations. This is very evident in the case of the fish-club, which is used in despatching halibut and other fish before they are hauled into the canoe. Almost all the clubs that I have seen represent the

sea-lion or the killer-whale—the two sea animals which are most feared by the Indians, and which kill those animals that are to be killed by means of the club. The idea of giving the club the design of the sea-lion or killer-whale is therefore rather to give it a form appropriate to its function, and perhaps, secondarily, to give it by means of its form great efficiency.

Another instance in which a close relation exists between the function of the object and its design is that of the grease dish. Small grease dishes have almost invariably the shape of the seal, or sometimes that of the sea-lion; that is, of those animals which furnish a large amount of blubber. Grease of sea animals is considered a sign of wealth. In many cases abundance of food is described by saying that the sea near the houses was covered with the grease of the seal, the sea-lion and whales. Thus the form of the seal seems to symbolise affluence.

Other grease dishes and food dishes have the form of canoes, and here, I believe, a similar idea has given rise to the form. The canoe symbolises that a canoe load of food is presented to the guests, and that this view is probably correct is indicated by the fact that in his speeches the host often refers to the canoe filled with food which he gives to his guests. The canoe form is often modified, and a whole series of types can be established forming the transition between canoe dishes and ordinary trays. Dishes of this sort always bear a conventionalised face at each short end, while the middle part is not decorated. This is analogous to the style of the decoration of the canoe. The design represents almost always the hawk. I am not certain what has given origin to the prevalence of this design. On the whole, the decoration of the canoe is totemistic. It may be that it is only the peculiar manner in which the beak of the hawk is represented which has given rise to the prevalence of this decoration. The upper jaw of the hawk is always shown so that its point reaches the lower jaw and turns back into the mouth. When painted or carved in front view, the beak is indicated by a narrow wedge-shaped strip in the middle of the face, the point of which touches the lower margin of the chin. The sharp bow and stern of a canoe with a profile of a face on each side, when represented on a level or slightly rounded surface, would assume the same shape. Therefore it may be that originally the middle line was not the beak of the hawk, but the foreshortened bow or stern of the canoe. This decoration is so uniform that the explanation given here seems to be very probable.

On halibut hooks we find very often decorations representing the squid. The reason for selecting this motive must be looked for in the fact that the squid is used for baiting the hooks.

I am not quite certain if the decoration of armour and weapons is totemistic or symbolic. Remarkably many helmets represent the sea-lion, many daggers the bear, eagle, wolf and raven; while I have not seen one that represents the killer-whale, although it is one of the ornaments that are most frequently shown on totemistic designs.

I presume this phenomenon may be accounted for by a consideration of the ease with which the conventionalised forms lend themselves to decorating certain parts of implements. It is difficult to imagine how the killer-whale could be represented on the handle of a dagger without impairing its usefulness. On the other hand, the long thin handles of lances made of the horn of the big-horn sheep generally terminate with the head of a raven or of a crane, the beak being the end of the handle. This form was evidently suggested by the slender tip of the horn, which is easily carved in this shape. The same seems to be true in the cases of lances or knives, the blades of which are represented as the long protruding tongues of animals; but it may be that in this case there is a complex action of a belief in the supernatural power of the tongue, and in the suggestions which the decorator received from the shape of the object he desired to decorate.

To sum up, it seems that there are a great number of cases of decoration which cannot be considered totemistic, but which are either symbolic or suggested by the shape of the object to be decorated. It seems likely that totemism was the most powerful incentive in developing the art of the natives of the North Pacific coast, but the desire to decorate in certain conventional forms once established, these forms were applied in cases in which there was no reason and no intention of using the totemistic mark. The thoughts of the artists were influenced by considerations foreign to the idea of totemism. This is one of the numerous ethnological phenomena which, although apparently simple, cannot be explained psychologically from a single cause, but are due to several factors.

The treatment of the animal design is very peculiar. We may distinguish two principles which govern the form of representation—first, the animal is characterised by a number of symbols; secondly, the artist does not endeavour to render a perspective view of the animal, but rather to show the whole animal.

The first of these principles is probably founded largely on the difficulty encountered in designing realistic representations

of various animals which would be clearly recognised as specific animals. For this reason the most characteristic peculiarities of each species become the symbols by which it is recognised. Thus the beaver is always symbolised by two large incisors and a scaly tail; the dog-fish by an elongated forehead, a mouth with depressed corners and five curved lines (the gills) on each cheek; the killer-whale by its tail, flippers and its large dorsal fin; the sculpin by two spines which rise over the forehead; the thunder-bird by a large beak, which is turned backward so that it touches the chin. Probably all these symbols were originally applied to characterise a portion of a quadruped, bird or fish, but in course of time they came to be considered as sufficient to call to mind the form of the whole animal. We find therefore that gradually the symbols were to a great extent substituted for representations of the whole animal. A dorsal fin worn on the blanket of a dancer, or painted on his face, indicates that the person so decorated personates the killer-whale. A strongly-curved beak painted on a gambling-stick symbolises that the stick is meant to represent the thunder-bird. A protruding tongue painted on the chin symbolises the bear.

The second principle seems to be quite opposed to the first one. When the artist decorates any object with the representation of an animal, he distorts and dissects the animal in such a way as to show the whole body on the decorative field; but a closer examination of this tendency proves that it originates mainly in the necessity felt by the artist of introducing all the symbols, which are distributed over the whole body of the animal, in the decoration. To give a few instances, bracelets are decorated in such a way that the animal is split along its back, and then represented in such a manner as to make it appear as though the arm were pushed through the opening. On tattooings the animals are shown as split through along their backs or along their chests, and then flattened out, so that a symmetrical design results. Carvings on totem poles must be interpreted in the same way, the animal being represented as bisected along the rear side of the totem pole, and extended so that the two margins of the cut appear on the borders of the carved portion of the pole. The distortion and section of animals is nowhere carried further than in representations on boxes, on slate dishes, and on Chilcat blankets; but in all these decorations we recognise the endeavour to bring such forms of the animal into view as are essential for an understanding of the design; that is to say, all those parts of the animal are represented which serve as its symbols.

So far as I am aware, the process of conventionalising has not led to the formation of geometrical designs, which are exceedingly rare on decorated objects from the North Pacific coast. They are found only in certain kinds of basket-work and in mattings.

SAM BOUGH.

IT is understood that a book on the late Sam Bough, the Northern landscapist, is in preparation by Mr. Pennington. The author's competency to deal with so perplexing a subject is suggested by an article in *Good Words*. The following extracts from it will reveal Mr. Pennington's sympathy with the wayward artist, while he is not oblivious of the shortcomings of his character. That Bough raised or lowered himself to the level of his companions for the moment, and in consequence was sometimes unfairly judged, is plain from what Mr. Pennington says:—

As in the case of Burns, Bough has been and is yet misunderstood, because the measure applied to him is, as a rule, too small. Many who flatter themselves upon knowing him intimately never in reality saw more of him than the clothes he wore. We do not speak of Bough's duality, but of his multiplicity, his well-nigh infinite variety. He could be rude in both manner and speech, and his acquaintances were habituated to sarcasm and *brusquerie*. He had, in consequence, many friends, but a multitude of enemies, who have passed into currency many stories of his wild conduct. These have led others who only knew by hearsay one, and that the worst, side of his character, to invent many cruel and repulsive fictions about him and his ways. These may safely be discounted to the extent of about 90 per cent. Mr. William McTaggart, R.S.A., tells of a sketching excursion which he had with Bough. It lasted three days, during which they were hardly ever separate, either night or day. On starting Bough opened what proved a sustained flow of informing, high and often eloquent discourse. The natural gentleman had left his clown's mask at home, and the broad humourist was supplanted by the suggestive and brilliant conversationalist. They had done little more than reach Edinburgh when they were met by two or three of his boon companions, and in an instant Bough was transformed. He knew what was expected of him, and he stepped down into the gutter and ministered unto them. It may be said that he should have made a better choice of associates, and he may not have been blameless. It is, nevertheless, unfortunate that men can always be found willing to drag down a meteor wherewith to light their parlours. That may be said of Bough and of

them which the farmer of Covington Mains said of Burns and his apologists:—"One-half of his good and all his bad divided amang a score o' them would make them a' better men." It is worth remembering that men do not talk who have no listeners.

Some of the peculiarities of Bough's early life are thus described:—Sam was a Bohemian by heredity, a born humourist and an artist by divine endowment. After leaving the service of the Gilpin family, James Bough turned clogger—maker of clogs—and shoemaker. He was a man of quiet temperament, fond of having the poets read to him while he worked. Sam's Bohemianism came to him through his mother. Describing him lately to the present writer, one of his school companions said he was a "wild, mischievous and dilapidated youngster." He rarely went out through the door if the window was conveniently open. He cared less about dress and appearances than even the laxity of his mother could tolerate. He was much addicted to giving chase to young girls and frightening them. His education, however, grew apace and when he was old enough he entered the office of Mr. Nanson, town clerk, with a view to qualifying for the legal profession. Two years satisfied him that the law was not his vocation. He was drawing when he ought to have been copying and vastly preferred the open book of nature to the pages of Blackstone and Coke. Imparting his love of art to Mr. Nanson, that worthy gentleman declared him to be "the biggest fool he had ever set eyes on." Whether Sam took his liberty or got it from Mr. Nanson is not clear. He was still a youth when he went touring through the country in gipsy fashion, with donkey cart and tent. His companion, sutler, groom, chancellor of the exchequer and man Friday in general was John McDougall, a native of Oban, who had been a soldier in the 91st Argyshire Regiment. John was a Peninsular veteran, who finished his fighting at Waterloo. Sam sketched and painted, and, when the treasury ran low, it was John's high function to sell the sketches and paintings to the best advantage. Long afterwards, when a member of the Royal Scottish Academy and settled in Edinburgh, Bough often looked back longingly to the free life of his youth. His happiest days were passed, he said, when he rambled about Cumberland, sleeping either in barns and out-houses or under canvas with McDougall.

Of Bough's life in Edinburgh it is said:—The key to Bough's later life and mature character is now in our hands. Take this athletic and rambling painter, who loved nature with a devotion too deep to plumb, away from the tent pitched among the fells and dales of Cumberland, and from the only less free life of the theatre, and transplant him to the cold, chaste reserve and rigid formality of Edinburgh, and what was he likely to find but ice atop and ice-water under? He was too full of life to care for the lifeless fabric called society. His heart was too great, and its beat too strong, for him to obey loveless social law. Hence he openly ridiculed the stately ceremony which society had stamped with the sacred seal of its approval. He laughed at convention, set at defiance the laws devised for the regulation of social intercourse, and swept aside every restraint upon individual freedom. It requires an effort to picture Bough sitting "mim-mou'd" and trying to be proper and mannerly, in kid gloves and starch, wearing the orthodox broadcloth and stiffened breastplate of social righteousness. When, therefore, he wished relaxation, he unbraced himself in a section of society where men at least met each other face to face, without either mask or disguise.

The following examples of Bough's good-nature are given:—No friend in need ever appealed to Bough in vain. None of his kindred, whether remote or near, suffered want while he had anything to share. The ties of blood he held sacred. Once he resumed a discarded suit of clothes, parcelled up his new suit, and carried it under his arm to his studio to give it to a wandering mason-sculptor from Carlisle. Again, when going home from a late party he was once accosted by a theatrical acquaintance in poverty. Bough dropped behind, and the two men disappeared in an entry. When Bough rejoined his friends he was minus his overcoat. In evening dress he faced the bitter wind of the winter morning for sweet charity's sake. Why multiply instances? "Brave, generous and good, kind and gentle"—such, in truth, was Bough.

In conclusion, Mr. Pennington says:—Speaking in more general terms, Bough bore himself in art as he did in society. He rose above the conventions of his predecessors, and painted not only what he saw but what he thought and felt. In rendering atmospheric effects, particularly those prevailing in broken weather, when the sunshine is dashed on sea and land in flakes, when the wind is high and mists are gloomy and dank, he had for many years no rival. And, further, in suggesting what no artist could paint, he filled the great blank in the earlier landscape art of Scotland. Looking for affinities, we assort him with Constable, David Cox, Muller, Copley Fielding and Cattermole, and yet we never lose sight of Bough. He was so versatile, that while he painted strange scenery in a manner at once magnificent and broad, he could turn his brush to the most delightful treatment in water-colours of the portrait of a

Skye terrier. His style changed from canvas to canvas, from theme to theme. It was not small and stereotyped, but large and elastic. He came to Scotland with the turn of the tide from mannerism to the higher impressionism—the expression of individuality, the painted outcome of the artist's self—and when he passed the source was dried up of an influence which had always made for the exaltation of art.

ELSTOW CHURCH.*

WE are visiting to-day a place of no common interest. It is not indeed situated within the county of Hertford, to which some would desire to confine the researches of this Society, but while not far from our borders, it forms a subject respecting which no members of a society like our own can afford to be ignorant. The historical interest of the place is twofold; the antiquarian will remember that it is one of the most valuable relics of a Royal Foundation for Ladies assuming the rule of St. Benedict, and will note every fragment of a church and its surroundings bearing on the history of so interesting an establishment, while some will view Elstow with another though later interest, as the home of the pious mechanic who has left to the Christian world, in the "Pilgrim's Progress," an allegory which no less an authority than the late Lord Macaulay has declared to be a masterpiece. We saw in passing the cottage in which John Bunyan lived, much altered indeed, but containing the beam, I am told, from which chips have been dispersed throughout the world, as sacred relics in many lands. We have seen the green (now through the late drought all too yellow) on which as a youth the yet unconverted man sported, and where he believed his conversion to have taken place. We are near the tower where he rang the bells till a serious dread of them seems to have possessed him. For we are told that he loved in his youth of all things best dancing and ringing. The first he discontinued after marriage, and if church ringers then were what unhappily some of us can remember such to have been before the late reform in our belfries began, it is easy to understand why a religiously-minded man objected to their companionship. We too have lately crossed the river formerly spanned by an ancient bridge on which stood a chapel, as we see to this day lower down the course of the Ouse at St. Ives, turned at Bedford into a house of detention, and familiarly believed, though the circumstance has since been doubted, as the place where the first inspiration of the "Pilgrim's Progress" seized Bunyan's mind when in brief captivity there, and which he describes thus:—"As I walked through the wilderness of this world I lighted on a certain place where was a cave and laid me down to sleep, and as I slept I dreamed a dream." Before leaving the thoughts of one whose name is inseparably connected with this place and neighbourhood, I may remind you that we possess in our own county and in my own parish a picture believed on the best authority to be an original likeness of John Bunyan. It was discovered by the late Rev. John Olive in a very bad condition in a cottage in the village of Codicote. He purchased it and had it carefully restored. This portrait has been seen on the occasion of one of the excursions by our Society in Wheatthampstead House, while it was also carefully studied I understand by those who had charge of the erection of the monument which we hope to see at Bedford this afternoon. I may mention again that under the guidance of the late Dr. Griffith, some few years ago our Society visited the remains of a cottage at Coleman Green in the parish of Sandridge, where it is generally believed Bunyan lodged and preached, for the labours of this good man, though far extended, took him generally to quiet places, though we may well hope that his efforts for good were treated with a more liberal toleration by those who must needs differ from his teaching than the efforts of some others in nonconforming history. For Bunyan appears to have had friends and even admirers in the Church, and to have been finally released from restraint by the aid of Thomas Barlow, afterwards Bishop of Lincoln.

I have touched on the life of this marvellous man, because it is impossible to visit this place without thinking of it, but beyond ringing in the detached campanile of this church, and occasionally worshipping within its walls, his history is unconnected with that more ancient history in which an archaeological and architectural society must find its chief interest. Let me then for a few minutes touch on this. The name Elstow, spelt Elnestow in the Domesday survey, is a corruption of Helenstow, and the place is so named in consequence of the dedication of the conventual church to St. Helen, the mother of the Emperor Constantine, her name being associated in the dedication with the Holy Trinity and that of St. Mary. The Countess Judith, niece of William the Conqueror and widow of Waltheof, Earl of Northumberland, Northampton and Hunt-

ingdon, here founded a conventual establishment for Benedictine nuns. The days following that terrible Conquest were days of great Church activity; the spoilers had seized great wealth, and it has been regarded as a fact by high authority that many of their buildings were works of expiation. Those were troublous times; many fair lands were wasted by fire and sword, and refugees were frequently to be found alone in the houses of the religious. It might have been that there was some sanctuary here before, but the authentic history of the place begins with the foundation of Judith, who became its first abbess. We cannot view the interior of this stately fragment without being certain that we are within no ordinary church. There is a height and dignity about it which marks it as a remnant of a great abbey church, though one of but two stages, for we must observe that the triforium stage is absent. There can be little doubt, too, that the easternmost bays are part of the structure of Judith, and that in accordance with the decoration of that date they were once richly coloured. It is stated by those who have studied the structure and had some means of excavation that the constructive nave extended one bay further eastward than we now see, and they believe that a central tower, transepts, apsidal choir and lady chapel completed the church in that direction. What we see now here of Norman work is suggestive of the usual Benedictine arrangement; for the ritual choir, as at St. Albans, would extend two bays into the constructive nave, and one more westerly bay would be provided for a procession path. It often happened that this was as much as one generation of abbey builders could accomplish, and if so much was done, the church was complete as far as its choral requirements went, and was structurally sufficiently supported to stand. This is about what has been accomplished at the new Truro Cathedral in our own times, though there the choir follows the more usual cathedral arrangement, and its fittings do not extend beyond the eastern piers of the central tower, which they usually did in the Benedictine churches. If we are correct in our views, here we shall find the western limb of the Norman church before us, while the rich Early English extension, dating from, say, early in the reign of Edward I., would form a short nave. I put its conjectural date, for we have no documentary evidence, I fear, during the reign of Edward I., for we find curious examples before us of the buckle ornament, which a great authority, the late Mr. Hartshorne, has regarded as a certain indication of the time of that king. These arches are a beautiful study, and their massive piers are well adapted to carry on the lines of their Norman and more eastern predecessors. There is an elegance and peculiarity in the foliage arrangement here which is suggestive of ladies device; it is seen in the junction of mouldings, on their springing from the caps, as at the western portal. At this west front were apparently porches something like, though much smaller, than those at St. Albans, for the arcading which appears to have enriched them is to be seen upon the adjoining buttress. One most beautiful and remarkable feature is that which is believed to have been the chapter-house, a vaulted building with central Purbeck shaft constructed very shortly after the Early English extension of the church. The vaulting is remarkable and the shaft is peculiarly beautiful. Here probably the ladies of the monastery sat with the abbess in council. Some writers speak of the usual cloister adjoining, but I confess I see no traces of it, or find head room for its construction as the south windows of the nave are now. The cloister was the scriptorium of monks; but did nuns need such places of literary labour? I speak for inquiry and correction. From the chapter-house a covered way would doubtless lead to the domestic buildings of the nunnery, which must have occupied the site of the fine house which the receiver of the abbey property at the dissolution built out of its dishonoured stones. One relic of extraordinary interest and value of a religious house of unusual fame is the brass of one of its latest abbesses, the Abbess Elizabeth Hervey. We see her in the robes of her office and holding her pastoral staff; but one other example remains in brass, and one only of a Benedictine abbess in stone. For a full description I must refer you to a most interesting paper by the late Mr. Bloxam, published in the Bedford Architectural Society's Transactions, included in the reports and papers of the Associated Societies for the year 1863, and I also find in these reports a very valuable paper on the church of Elstow by Mr. George Hurst. We have these in our St. Albans library, and I had them at hand in writing my paper. Mr. Hurst's paper was apparently read here in 1855, and its illustrations show the state of the church before its restoration in 1880, for we miss now a screen which appeared formerly to mark the limits of the ancient choir; the old pulpit, too, now consigned to a corner, there appears *in situ*. The restoration of 1880, under the care of Mr. T. J. Jackson, architect, of Bedford, appears to have been very carefully done, and the present condition of the church bears witness to much reverent love. Would that more of it had existed at the time when it was wholly robbed of its many possessions and not even a pittance left for the ministrations of religion within it. One remaining and unusual feature I must

* A paper read by the Rev. Canon Davys to the members of the St. Albans Architectural and Archaeological Society in Elstow Church, and published in the *Herts Advertiser*.

notice in the massive detached bell tower. It belongs chiefly to so late a period of architecture that it has been supposed to have been erected after the dissolution of the abbey with its old materials. It has been thought, however, to rest on the foundations of an older campanile of large proportions, which would account for the width of its base and the contractions at its various stages. It must be, however, considered as a remarkable tower, for except at Chichester we have but few detached campaniles remaining out of a good many once provided at our cathedrals and large abbey churches.

THE STATUE OF RAPHAEL IN URBINO.

A CORRESPONDENT of the *Daily News*, writing from Urbino, says:—

On Sunday morning, August 22, at half-past ten, a beautiful statue of Raphael was unveiled here in the presence of the Minister of Public Instruction and a large concourse of people. The ceremony of unveiling was most imposing. Besides the Minister Gianturco there were present the Syndic of Urbino, the communal councillors, the representatives of scholastic institutes and of other public bodies. The monument is the work of the sculptor Belli, of Turin. The figure of Raphael, which stands upon a massive granite pedestal, is represented in his working dress, and is a graceful and lifelike portrait of "the divine painter." He stands in the attitude of contemplating from afar the effect of one of his works. In his left hand he holds a palette, a paint-brush being in his right. The pedestal is in the cinque-cento style, the ornamentation somewhat resembling the decoration of the Ducal Palace at Venice. At the front and at the back of the pedestal are beautiful groups taken from the works of Raphael; the little angels from the pictures of the Madonna di Foligno, of the Baldacchino and of the San Sisto. One group symbolises painting, the other sculpture. Upon the dado of the pedestal are bas-reliefs, one of which represents Raphael at the Pontifical Court painting the portrait of Leo X. with two cardinals. The other one represents him intent upon directing the decoration of the Loggie of the Vatican. On either side of the pedestal is seated a figure; to the right is a woman of Greek outline in the act of divesting herself of a mantle which enfolds her, and who symbolises the Renaissance of Art; to the left is a Genius, of Michelangesque pose, who holds on high a crown of laurel. Festoons of laurel on the dado bind together the coats-of-arms of the cities of Urbino, Perugia, Florence, Siena and Rome. The medallions at the base reproduce, from authentic documents, the portraits of Bramante, Timoteo Viti, of Perugino, Giovanni da Udine, Pierino del Vaga, Francesco Perroni, Giulio Romano and Marcantonio Raimondi. The statue of Raphael, together with those of the Renaissance and of the Genius of Art, as also the medallions, are all in bronze. The groups of angels, the ornamentations and bas-reliefs are executed in Carrara marble. In unveiling the statue, the Minister for Public Instruction made an excellent speech, which was frequently interrupted by applause. He spoke of Raphael's love for his country, and of the happiness of his life in having near him his idol Michel Angelo, as Mozart had Beethoven. The orator spoke of Raphael as poet as well as painter, and, recalling to mind his great dream of restoring the classic Roman monuments, he said that under the auspices of King Humbert that dream would be realised. Signor Gianturco afterwards inspected the monument, accompanied by the sculptor Belli, whom he cordially congratulated upon his beautiful work.

A splendid bronze wreath has been sent to Urbino by the Municipality and Academy of Fine Arts of Perugia, to be laid upon the monument of Raphael. The International Exhibition in honour of Raphael was inaugurated at Urbino on Sunday. In the evening the city was illuminated, and gala performances were given in the principal theatres. The Minister of Public Instruction attended the opening of the exhibition.

CAMBRIAN ARCHÆOLOGICAL ASSOCIATION.

THE members and visitors of this Association on the 18th ult. repaired to St. David's and its district. The country visited abounds with objects of surpassing interest to the archæologist, and, it being impossible to examine all, attention was confined to objects more recently discovered. The first stopping-place was Brawdy Church. At St. David's the Rev. Chancellor Davey read a paper on "The Architectural Sequence of the Cathedral Building." After luncheon the Ven. Dean of St. David's took a party through the cathedral, and explained points of interest in detail. Later in the day the Dean took a party round the chapel and Holy Well at St. Non's, the traditional birthplace of St. David. Mr. H. W. Williams conducted a party to St. David's Head, where he explained the alignments, the unique features in the hitherto undescribed outer wall which Mr. Henry Owen and he

discovered last year, and the village within the well-known "Clawdd y Milwr." He showed that this wonderfully-preserved stone-walled camp was built by the people of the Neolithic Stone Age, dressed stone having been found within the walls under circumstances which settled this question once for all. In the walls, which are now for the most part lines of fallen stones, Mr. Williams showed portions of the original cyclopean masonry, and he pointed out the curious little stone-built cells which, for want of a better name, have been called sentry-boxes. One of these was marvellously preserved, considering that it must have stood the buffets of time for many thousands of years. Upon the party returning to St. David's the members and visitors became the guests of Dean Howell. The return journey was begun at 6 P.M., Haverfordwest being reached at 9.30 P.M.

The next morning (Thursday) was devoted to an inspection of the objects of interest at Haverfordwest. The castle claimed attention first, and St. Martin's, St. Mary's and St. Thomas's Churches and the Priory were each in turn visited. At 12.30 a start was made for St. Leonard's Rath. This was described by Mrs. Allen and Mr. H. W. Williams. It is a British rath, with earthen vallum and fosse in very perfect condition, including an inner court. It is one of the largest and most perfect raths in the county and is unique, inasmuch as it has a water supply, and consequently must have been a very strong position. Wiston Castle and Church were next visited. This castle is evidently built upon an earlier foundation and was the scene of some of the bloodiest battles which were fought between the Welsh and English. It was described by Mr. E. Allen. Going thence towards Llayhaden the Association passed through Colby Moor, which was the scene of a battle during the Civil Wars. Llawhaden Castle, which is situated on the banks of the eastern Cleddau, presented a number of most interesting features. It was built by Bishop Beck about the thirteenth century. Llawhaden Church was also visited. A stop was made on the way back at Picton Castle, the residence of Sir Charles Philipps, who invited the members to partake of tea. Various objects of interest in and around the castle were examined. Among the more interesting objects were a beautiful groined ceiling supporting one of the bastions, and a dungeon under the keep. Near the dungeon is a small room having a window. It is stated that during the Civil War, when this castle was besieged, a nurse holding one of the children of the then occupier at the window was observed by one of the enemy, who ran up, snatched the child from the arms of the nurse, made it prisoner, and took it to the camp of the besiegers. In order to ransom the life of the child, the holders of the castle were obliged to capitulate. The armoury of the castle contains a number of the firearms used by the Cromwellian troops. The portion of the building now used as a hall is magnificent in its structure. Above the main entrance is a room now used as a chapel, which forms one of the most interesting features of this Mediæval fortress. The fortress is itself in a very perfect state of preservation, and its interior has been little changed from the days when it was used as a defence. After votes of thanks to Sir Charles and Lady Philipps, the company drove back to Haverfordwest.

A general meeting was held at night under the presidency of Archdeacon Thomas, when it was decided to hold the annual meeting next year at Ludlow, Shropshire.

UNIVERSITY COLLEGE, LONDON.

THE following prizes and certificates have been awarded in the courses of architectural lectures and architectural and constructional drawing and quantity surveying at University College, as the result of the work and examination of the session 1896-97:—

Architecture.—Professor T. Roger Smith, F.R.I.B.A. *Fine Art*.—Donaldson Medal—M. H. West, of Maidenhead. Prize—G. G. Lean, of Isleworth. Third Class—E. Martineau, of Hastings.

Construction.—Donaldson Medal—C. F. Dawson, of Barking. Prize—F. J. Freeman, of Blackheath. Second Class—H. S. R. Boyajian, of Kharput; G. G. Lean, of Isleworth. Third Class—E. Martineau, of Hastings; W. P. D. Stebbing, of London.

Classes Maintained by the Carpenters' Company—Architectural Drawing.—1st Prize—J. Porter, of London. 2nd Prize—P. H. Pape, of London. Certificate—E. C. Desch, of London.

Construction Drawing.—1st Prize—A. E. Stump, of London. 2nd Prize—W. Smalley, of London. Second Class—A. S. Kilby, of London; A. Pethybridge, of London; A. Thwaite, of London.

Quantity Surveying (Elementary Class).—Prize—W. B. Payne, of London. (*Advanced Class*)—Prize—H. C. Simmons, of London. Second Class—T. A. Burr, of London; W. Smalley, of London. Third Class—H. B. Ward, of London.

NOTES AND COMMENTS.

PHOTOGRAPHY alone can render justice to the myriad details which are to be found in some buildings. With no less truth we may say that only by its help are the phenomena of geology to be represented. It has, however, one shortcoming, as it cannot render the colours of rocks. The committee of the British Association for obtaining photographs of geological interest have already succeeded in obtaining 1,751 examples. Among the more notable donations of the year are a large series of views in Wealden strata, some in the Nottingham district, a very instructive series from North Staffordshire, a set from the Sgurr of Eigg, a series of Yorkshire caves, sets from County Dublin, Yorkshire, and the Isle of Man, several from North Devon and the Isle of Wight, and a most useful group from the North of Ireland was also given. There still remain many areas of great geological interest in England, Scotland and Ireland which, as yet, are not represented in the collection. Photographs of areas of large and typical physical features, such as the Pennine and Pendle Ranges, the South Wales coalfield and its borders, the district of the Arans, Arenigs and Cader Idris, the Harlech Mountains, the Yorkshire Dales, the Cotteswolds and South Downs, the Malverns and the Silurian ground of the Welsh border, the Yorkshire Moors, Lincolnshire, the area of the Northampton Oolites, the Oxford district, Seaton and Blackdown, Central Wales and Anglesey; in Scotland, the North-west and Central Highlands, the Outer Hebrides, Mull, the Sidlaws and Ochil Hills and the Southern Uplands; in Ireland, the Carlingford and Slieve Gallion areas, Kerry, Cork, the Limerick Basin, Waterford and Wicklow are much desired by the committee. The collection now contains photographs of the more sensational geological phenomena. What is required is the steady surveying of ordinary, and especially temporary, features and phenomena. Picked points on retreating and advancing shore lines should be photographed at regular intervals; sections in variable deposits should be taken as the excavation of them proceeds; and out-of-the-way districts should also be registered, even if they only yield ordinary phenomena. Important as it is that fossils should be accurately and faithfully figured, it is equally essential that phenomena in the field should be figured in a way that is not only accurate, but includes, without accentuation, the interpretation of the investigator, while it registers facts which may have escaped his observation. The collection is deposited in the Library of the Museum of Practical Geology, Jermyn Street. The hon. secretary of the committee is Professor W. W. WATTS, Mason College, Birmingham.

It is proposed to hold a "Pan-American" exhibition in 1899. The site proposed has novelty in its favour. It is Cayuga Island, containing about 175 acres in the Niagara River and a few miles above the Falls. From its proximity to Niagara it is in communication with many parts of the United States, which send about half a million of people yearly to visit the cataracts. The neighbourhood of so vast an amount of power has suggested to the promoters that electricity should predominate in the exhibition, including the restaurants, where the products of electrical cooking will be obtainable in a variety of forms.

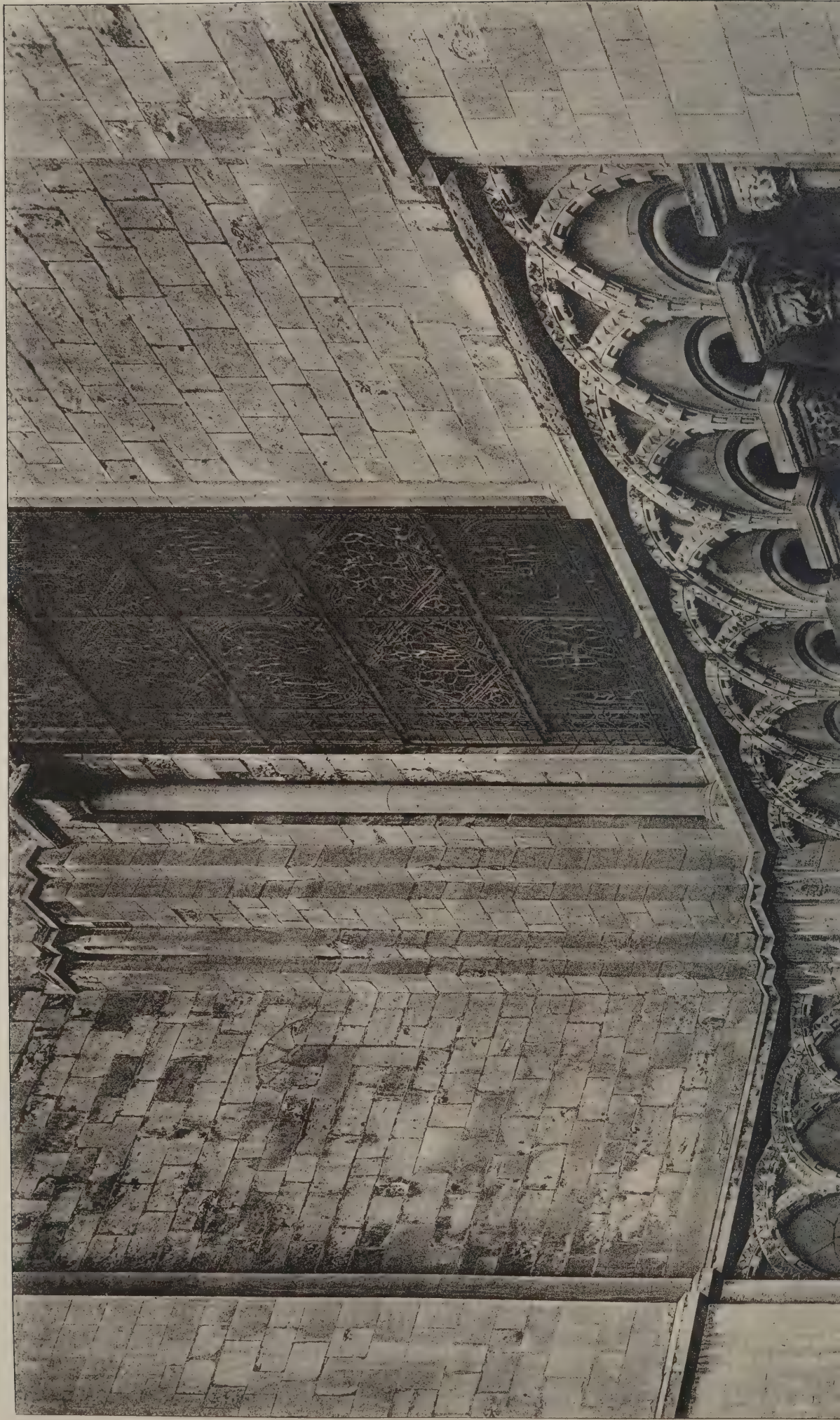
THE public library at Strasburg was famous for examples of early printing, as became a city where a press was set up in 1436. It also contained several illuminated works by Mediaeval and Byzantine artists. Altogether there were about 100,000 volumes in the building. The destruction of the library in 1870 has not added to the credit of the Germans. But there was, it appears, not the least intention to make war on books and librarians. According to M. VICTOR ELBEL, who was engaged in defending Strasburg, the original cause of the burning of the library and its treasures was a draughtsman's error. On a plan of the city which had been prepared for siege purposes in Berlin, the group of buildings in the Rue de la Mésange, consisting of the New Temple, Gymnase and Library, were described by the word Rathhaus, a building which is in the Brandgasse. It is not to be expected that war should be free from errors, and although the error in naming has had lamentable consequences, it is not one which is unknown on ordinary maps.

Hardly a year passes but instances of draughtsmen's oversights are brought under the consideration of the Parliamentary examiners under standing orders.

ALTHOUGH tendering is a familiar process, there appears to be no recognised rule about the liberty to make alterations in tenders prior to acceptance. Two recent cases suggest the difference of opinion on the subject. On Monday in Stourbridge the tenders for the decoration of the town hall were considered. The highest tender amounted to 686*l.* 14*s.* 6*d.*, the lowest was 244*l.* 4*s.* There is perhaps nothing extraordinary in the variations. The committee entrusted with the work decided on the acceptance of the lowest tender. Subsequently they were informed that the amount should have been 284*l.* 4*s.*, if it were not for a clerk's blunder. When altered the tender remained about 75*l.* below one which stood next in amount. The contractor said he was prepared, if the Council insisted, to carry out the work at the unaltered price. Another competitor wrote to say if revision were allowed in one case it would be unfair unless the privilege were extended to all. The committee considered they were bound to accept the revised tender, as it was the lowest; and the Council adopted that view. In Colchester a similar case occurred last week. But one of the aldermen was a brother to a member of the firm that had sent in the erroneous tender, and he insisted on the principle that alterations should not be allowed in tenders, and the work therefore was entrusted to another firm, although at a higher amount. It seems to us that the Stourbridge Council were more equitable. The fairest way of getting work done is to pay according to schedule prices; and accordingly there is more or less speculation and uncertainty in tendering for a lump sum. No employer should wish to have a contractor work at a loss, or to bind one to an amount that is unquestionably wrong. It is, however, well to remember that an erroneous tender can be made binding on a contractor, unless there is an understanding that the signing of some contract or other deed is an indispensable condition.

ONE effect of the catastrophe in the Rue Jean Goujon is to make the authorities unusually anxious about the condition of the theatres in Paris. The Prefect of Police has announced that he must have at least a fortnight's notice concerning the time when theatres can be examined, in order to ascertain whether all the alterations ordered by the Commission on Theatres are carried out. Until his certificate is obtained the reopening of a theatre will have to be postponed. The responsibility for delay and loss is therefore cast upon the managers.

SOME sort of impetus is needed to make the occasional exhibitions in the Manchester Art Gallery successful. Mr. J. E. PHYTHIAN told the Manchester Council on Wednesday that while the permanent collection had been steadily growing, they had been endeavouring to hold the annual exhibitions, until now it was impossible to have a satisfactory exhibition in the autumn without doing injustice to the pictures in the permanent collection. Last spring they offered the public a Tudor exhibition, which they did not care for, and, so far as the attendance was concerned, it was a failure. Then the attendance at the autumn exhibition had been steadily going down, until instead of 50,000 or 60,000 people visiting it, the attendance had dropped to something like 20,000, or even less. The committee had had before them a proposal to so modify the autumn exhibitions that they would lose altogether their present character and importance. The matter lay very largely in the hands of the public. In view of the exhibition about to be held, the committee would be guided to some extent in the decision they came to by the interest shown by the public in that exhibition. The Art Gallery, which is used for permanent and occasional exhibitions, is not worthy of a city like Manchester. But while the Corporation are liberal in purchasing pictures, they will not expend money on building. At present the works of art appear of inferior value on account of their setting, and as long as there is not a fine and capacious gallery visitors will not take the trouble to glance at the pictures, although they are costly.





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CATHEDRAL SERIES, No. 71.—CANTERBURY: NORMAN ARCADE, SOUTH CHOIR TRANSEPT.



INK PHOTO. SPRAGUE & CO 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

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GROUND PLAN

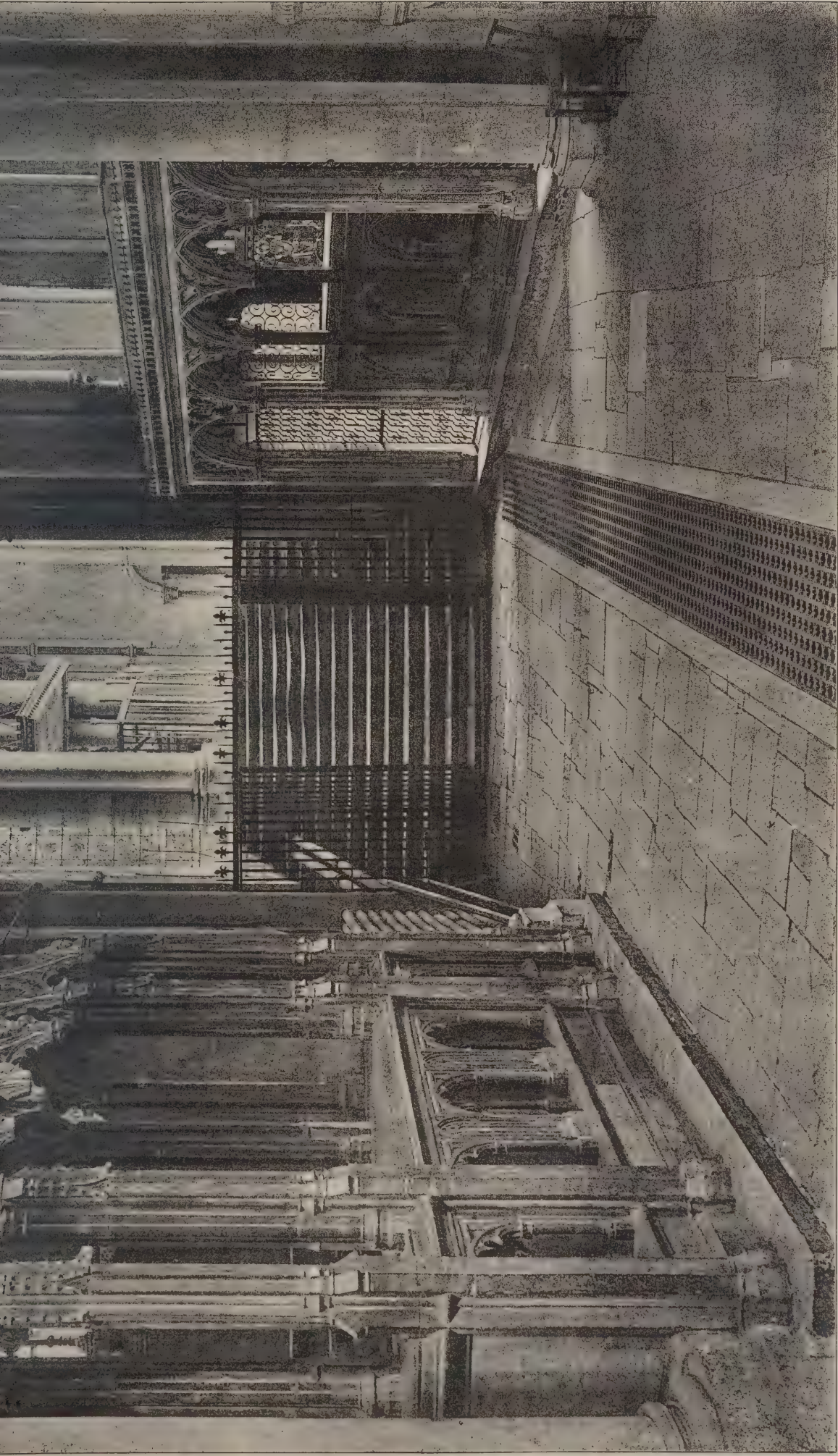


Printed by Sprague & Co. 445 East Harding Street, Fetter Lane, E.C.

NEW PREMISES FOR THE OLDHAM BREWERY COMPANY, LIMITED.

CHARLES T. TAYLOR, A.R.I.B.A., Architect.

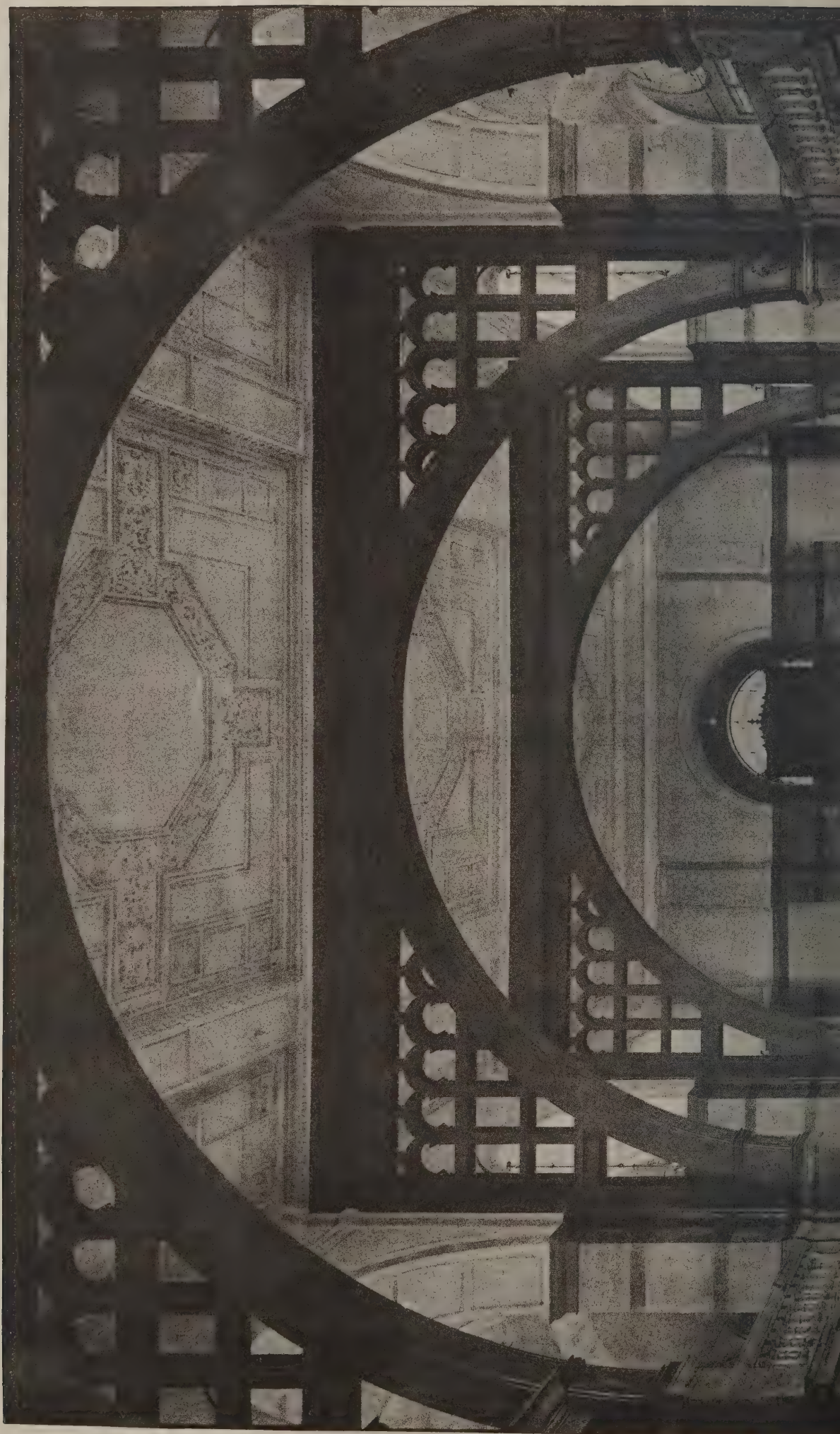


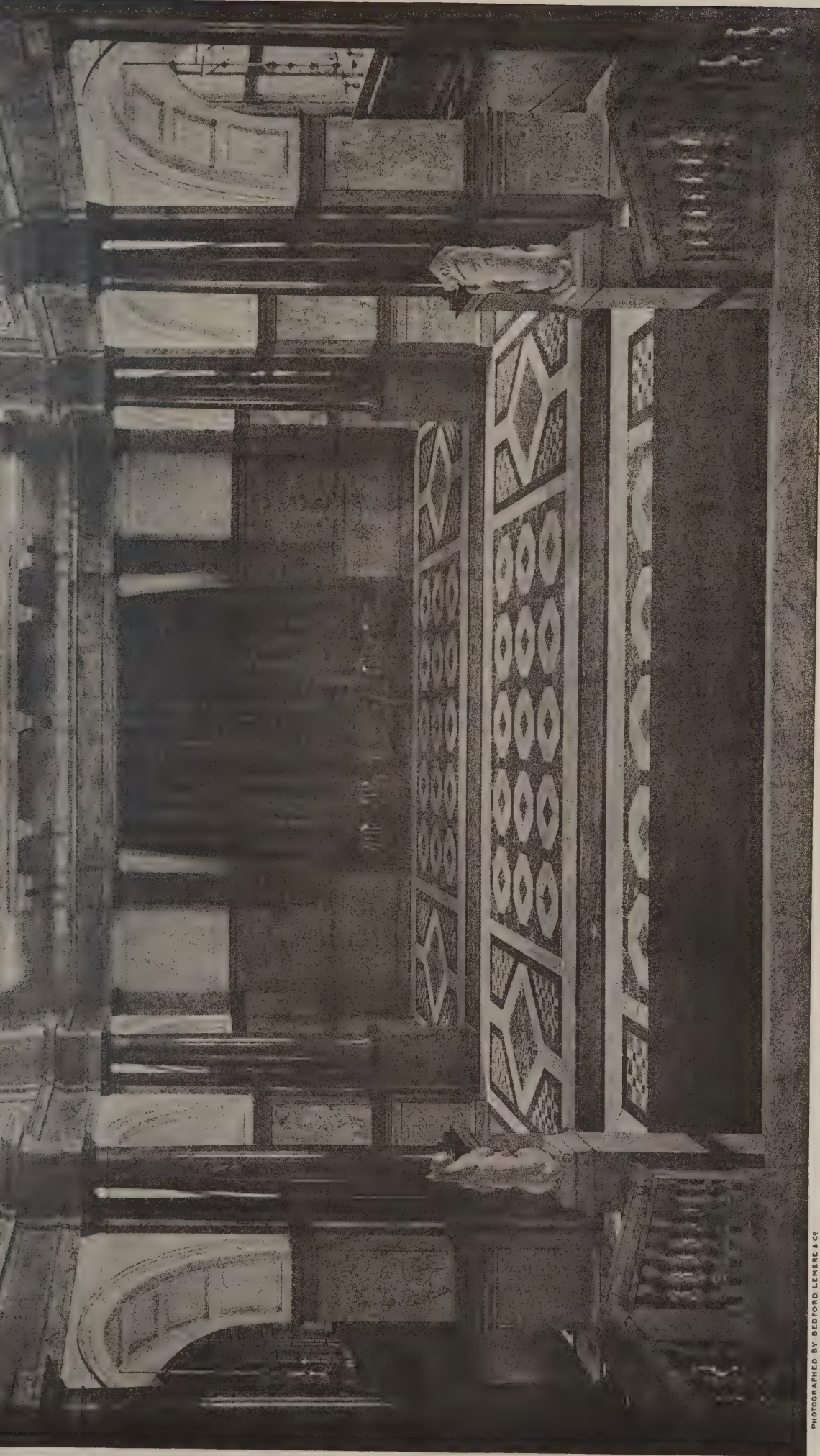


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CATHEDRAL SERIES, No. 72.—CANTERBURY: PILGRIMS' STEPS.





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ENTRANCE HALL: IMPERIAL INSTITUTE.
T. E. COLLCUTT, Architect.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: NORMAN ARCADE, SOUTH CHOIR TRANSEPT.—PILGRIMS' STEPS.

IMPERIAL INSTITUTE.—ENTRANCE HALL

BRIXTON FREE LIBRARY.

BOTTLING AND MINERAL WATER DEPARTMENT, ETC., FOR THE OLDHAM BREWERY COMPANY, LIMITED.

THESE premises have a frontage to Coldhurst Street of 129 feet, and are 58 feet deep. They are divided absolutely in two departments, one being for beer-bottling and the other for manufacture of mineral waters. Each department is complete in itself, having separate wash-houses, loading docks, &c.

In the basement it is divided into two large and lofty cellars, the boiler-house being in centre and under washhouse. The cellar on left hand is used as bottling cellar, the other as storage for bottled beer. The top floor is devoted to syrup-rooms and rooms for storage of empty bottles, &c.

Small office and hoist are provided, the latter having WORRALL'S patent hoist gates, which open and shut automatically, worked by the mechanism of the hoist itself. The hoist was provided and fixed by Messrs. BARKER, of Oldham, who also fixed travelling crane in bottling cellar used for lifting barrels of beer on and off the stillages. There is a chimney 30 yards high.

Cellar floor is formed of concrete, finished with granite face. Centre floor is fireproof, having steel girders and joists filled in with concrete, and finished with patent rock asphalt, rendering same waterproof. Top floor consists of 3-inch tongued and grooved planking, fixed on strong joists and iron beams.

The whole of the ceilings are boarded with pitch-pine boards and varnished. Roofs to washhouses have continuous lantern lights with strong glass louvres, and are glazed on top with patent glazing. Glazed bricks from JOSEPH BROOKS & SONS have been largely used in bottling-rooms and wash-houses.

All staircases throughout are entirely of cast-iron, made by J. HALL & SONS. The areas in front are finished with HAYWARD'S patent prismatic lights. All rain-water pipes are of strong lead, and are fixed inside recesses in walls, being arranged to receive same, and covered with movable boards, the bottoms of each stack being provided with patent trap and inspection chamber for cleaning out.

The whole of inside walls, also front outside, are faced with Messrs. S. & J. SMETHURST'S bricks. The contractors for the building were Messrs. J. & D. BLUNN, of Oldham, the architect being Mr. CHARLES T. TAYLOR, A.R.I.B.A., 10 Clegg Street, Oldham.

THE ROYAL ARCHÆOLOGICAL INSTITUTE.

(Concluded from last week.)

PROMPTLY at nine o'clock on the 4th August a train of brakes left the King's Arms bearing the members of the Institute to the monastic shades of Sherborne. The weather was again fine and hot. Short halts were made at Cerne and Middlemarsh.

Sherborne Castle.

About noon the vehicles pulled up outside the Old Castle, to which Mr. Wingfield Digby, M.P., had granted admission. Here the party were received by Mr. W. B. Wildman, one of the masters of Sherborne School, and an enthusiastic student of the antiquities of the town, on which he is doubtless the best authority. Mr. Wildman, who had kindly undertaken to conduct the party over the various buildings of archæological interest, expressed Mr. Digby's regret at being called away from Sherborne that day. The company entered the delicious shade thrown by the trees in the turf-carpeted castle court, and Mr. Wildman described the buildings and told their history. He thought that the Saxon bishops of Sherborne had their dwellings on the platform which existed there before the castle. The Norman castle was built by Bishop Roger, of Sarum, between 1107 and 1139. The tower was of close-jointed Norman masonry, and as Bishop Roger was the first man who built in that style, they were at the very spot where it was first used. It was not, strictly speaking, a fighting castle, but rather a fortified palace, and the chief house of the bishops of Sherborne. When the bishopric was transferred to Salisbury the castle continued to be the great house of the bishops of Sarum till Queen Elizabeth

took it away and gave it to Sir Walter Raleigh. About 400l. a year was still paid to the Bishop of Salisbury out of the manor of Sherborne, and that was the only relic of his lordship of the place. When Sir Walter Raleigh was attainted for high treason the whole estate passed to the king. The first Earl of Bristol, the first of the Digbys, was ambassador in Spain, and King James, being unable to pay him his salary, let him have the estate. The castle was taken and destroyed by Cromwell. After inspecting the principal parts of the old ruin the company were conducted to the dairyhouse adjoining the new castle, and shown the fine Roman tessellated pavement. It was unearthed at Lenthay, about two miles west of Sherborne, during the laying of the railway, and taken up and relaid in its present position, in a room where old china and other curiosities are displayed. The middle of the pavement represents two figures, one standing and blowing a double pipe and the other sitting and playing a six-stringed lute. The bordering is elaborately ornamental. The party made the circuit of the modern castle, Mr. Digby's residence, and then walked to the Digby Hotel and had luncheon.

The Abbey Church.

After luncheon the party reassembled at the abbey church, which was inspected outside and inside under the guidance of Mr. Wildman. He observed that it looked like a fifteenth-century building with a few Norman details; but really there had been three churches there—first, the church of St. Aldhelm, which must have been founded at the end of the seventh or beginning of the eighth century; secondly, the Norman building of the twelfth century; and thirdly, the present Perpendicular church built in the fifteenth century, and practically a restoration of the Norman church. Of the Saxon church only one small portion was left. It ended westward where the west wall now stood. It had a porch at the west end and two slender unbuttressed towers. In the fourteenth century a parish church was built on at the west end of the abbey church. The north aisle still remained with the six bays. In 1540 the parishioners bought the abbey church and began to sell the parish church for building stone. The whole line of buildings must have presented an imposing appearance, comprising, going from west to east, the parish church with a western tower, the abbey church nave, tower and choir, and then the lady chapel, an Early English building. Within the abbey church Mr. Wildman expressed great admiration of the vaulting in the choir. He had seen the chief Perpendicular buildings of England, and had observed nothing more beautiful. The vaulting of the north transept was even finer. Abbot Bradford he believed to have commenced the work.

The School Buildings and Alms-house.

The buildings of Sherborne School close by were next visited. Mr. Wildman led the party to the middle of the cloister court of the abbey, and showed the spot where once stood the conduit, now removed to the Parade. He pointed out the dormitory coming from the north transept of the abbey church, the chapter-house, the refectory on the north side of the cloister court, the guesting room on the west, and the building now used as the school chapel, which was the abbot's own hall, and had been considerably enlarged. At the lady chapel Mr. Wildman pointed to the site where King Alfred must have been educated, and observed that no place had anything like the same claim to Alfred's boyhood as Sherborne had. Mr. Wildman then conducted the antiquaries through the dining hall, on the site of the original abbey schoolroom, the twelfth-century Norman undercroft, which was the oldest part of the school, and then the library and schoolroom. He observed that the history of Sherborne School came down from 705, with a break of eleven years from 1539 to 1550. The last place visited was St. John's Hospital. Mr. Wildman stated that it was founded in 1437, the very year the church was built, by four pious individuals of the neighbourhood, with the commendation and support of the Bishop of Sarum. It originally accommodated twelve old men and six old women, but the inmates were now eighteen men and nine women, elected by the master and brethren. The hospital possessed a good deal of valuable house property in the neighbourhood, and had an income from endowment of close on 800l. a year. The plan of the building was originally the same as that of the great alms-house at Lübeck. It was early fifteenth-century work, but very good. On leaving the building Lord Dillon warmly thanked Mr. Wildman on behalf of the Institute for having in so able and interesting a manner shown and described the antiquities of his town, about which he displayed so much enthusiasm.

Mr. Wildman, acknowledging the noble President's remarks and the acclamation of the company, declared that it had been a great pleasure to him, for there was no place of which he was prouder than the town in which he lived.

Judge Baylis moved and Professor Clark seconded a vote of thanks to Mr. Digby for admitting the Institute to his grounds.

At 4.30 the carriages left Sherborne, homeward bound.

Soirée at the Museum.

In the evening a brilliant and successful social gathering took place at the County Museum.

The annual business meeting of the Institute was held on the 5th ult. The six members of the Council retiring by rotation were re-elected, and all the officers continue in office. At two o'clock brakes started for the two fine earthworks which the neighbourhood of Dorchester boasts of—Poundbury and Maiden Castle. A fresh breeze was blowing, and after the sultriness of the previous days proved very pleasant, and made walking quite exhilarating on the grassy heights.

Poundbury.

The company having seated themselves in a sheltered part of the western foss, Mr. Green, the hon. director, stated that Professor Boyd Dawkins, who was to have spoken on both earthworks, had been unavoidably called away. Professor Boyd Dawkins thought the camp pre-Roman—in effect the pre-Roman town of Dorchester. In shape it had something of pre-Roman irregularity and something of Roman squareness, the latter suggesting that the Romans occupied it after the prehistoric men had left it. He pointed out the track of the early British road, and stated that hut circles had been found in the bottom below, from which the inhabitants doubtless moved into the camp in time of danger. Dr. Boyd Dawkins had called his attention to the curious fact that Dorchester, in Oxfordshire, had exactly the same kind of surroundings as Dorchester, Dorset—the river camp, distant camp, and trackways in all directions.

Mr. Moule, who was asked to speak, said that when the railway was made it took all the antiquarian influence of the day—Mr. Warne, Mr. Barnes and others—to save the camp from being cut right through, and to get a tunnel substituted for a cutting. But when the cutting leading to the tunnel on the east side of the camp was made, it was proved to be, not the simple earthwork that it now looked, but a remarkably elaborate one, for outside the foss and vallum were found three more fossæ. Mr. Robert Hunt had told him that twenty-three years ago, when his cousin, Mr. Arthur Legg, was tenant of Poundbury Farm, they came to break up a piece of Fordington down, about a mile or a mile and a half west. When the furze was being cleared away they found from 200 to 300 hollows in the ground, about 6 or 8 feet in diameter, and a large number of them in two parallel rows. There were flints lying in the bottom of them, and they were undoubtedly hut circles. An enclosure half a mile west was a cattle pound, showing that the occupants were a cattle keeping tribe.

Mr. Cunningham informed the company that they were now within the old town of Dunium, mentioned by Ptolemy in the second century. He had dug from end to end of the western foss, and found plenty of Durotrigian material—flints, and very old ones, and British pottery. It was refreshing that the Danish origin of the camp was now given up for good. When the Romans came and conquered they threw down the southern and eastern valla, as he had found Roman material covered up in them. The whole history of the place had been written by him and was ready for publication. In expressing the thanks of the Institute to the three speakers, Lord Dillon observed that an interesting feature of all very early earthworks, as General Pitt-Rivers was one of the first men to point out, was the great knowledge they had of the proper system of fortifying the ground. It was left for General Pitt-Rivers first to vindicate the engineering art of their early ancestors. If they reconstituted the original position, making allowance for the sinking of the valla and the silting up of the fossæ, they would find that there was, in military parlance, no "dead ground," that is, no spot close by where an opposing force could rally in numbers preparatory to making a final rush. Mr. A. Pope said they should impress upon Mr. Cunningham the importance of not delaying the publication of his history of Poundbury. Dorchester people had looked forward to it with great interest, being aware that Mr. Cunningham knew more about the place than any living person. He hoped that the Institute would use their influence to persuade Mr. Cunningham to give them the benefit of his work in print. Mr. Moule said he had seen Mr. Cunningham's manuscript, and the drawings and sections illustrating it, and he thought that if the Institute put on two or three more turns of the screw it would be done.

Maiden Castle.

Leaving the breezy height of Poundbury the party drove to Maiden Castle, gained the inner camp by the old western entrance, and walked right round the rampart, stopping here and there for a little description and comment. Mr. Green again expressed regret at the absence of Professor Boyd Dawkins, whose observations they had all been expecting with interest. He declared it to be the finest fortification of its kind in England, and drew attention to its size, its deep trenches and strong traverses. At the middle of the south rampart Mr. Cunningham pointed out what he said was originally the principal entrance and the road leading to it. This road he

had traced as far as Jordan Hill, near Weymouth, the basis of the Roman operations against the Celtic inhabitants. General Lefroy was there in 1865 and said that the earthwork was made by men who had large resources in immense variety at their beck and call. Only disciplined forces could have constructed the wonderful demi-lunes and traverses. An entrance eastward took one to the amphitheatre. Mr. Moule called attention to the ramp dividing the camp into two unequal portions. He said that the late Mr. Warne had an idea that the eastern half was an old Celtic encampment, and that when the Romans penetrated so far west several Celtic tribes forgot their tribal differences and united against the common foe. They said, "We cannot hope to keep our little camps, like Chalbury and Poundbury, but we will combine to defend this and make it larger and stronger." Before they could finish their work Vespasian was upon them, and the use and occupation of the place by the Celts was at an end. He did not discountenance the idea that the depression near the middle of the south ramp marked the site of the well. At Mr. Moule's request Mr. Robert Hunt, who had joined the party at Maiden Castle, told in his own words the story of the finding of the hut circles near Poundbury. The spot was shown where Mr. Cunningham had found the remains of a Roman villa. It having been brought to the knowledge of some of the leading archaeologists present that Mr. Cunningham believed in a Roman origin to the camp, he was sounded on the subject and led to make an unequivocal declaration. He maintained that the whole was Roman work *de novo*. The Celts would never have thought of making anything there with an ascent of only one in an hundred, for if those massive ramparts were put back in their places they would come to that gradient. General Pitt-Rivers, who came there with him, expressed the same opinion—that it was the work of disciplined forces. He asked the General what he thought of the place, and he answered, "I will not tell you, Cunningham, until I have dug thoroughly into it." The late Mr. Warne, when he was dining with him once, said he would give anything if only he could convince him (Mr. Cunningham) that Maiden Castle was a British work. He answered, "Nothing shall convince me." The Romans were there without doubt under the leadership of Vespasian, who in 67 was called away to undertake the siege of Jerusalem, and they knew what great works he constructed there. Sir Talbot Baker stoutly opposed Mr. Cunningham's conclusion that the earthwork was Roman, and asked what in the world could be the use of such castrametation to soldiers who had catapultæ and other projectile engines as the Romans had. Dr. Cox declared that 99 out of 100 of all who had the least experience of earthworks would take that to be undoubtedly a pre-Roman work. A mere tyro would come to that conclusion. It was, however, impossible to decide as to the origin of the work by merely digging here and there, and, as Sir Henry Howorth and Professor Boyd Dawkins had said, without systematic investigation. At the business meeting of the Institute that morning the opinion was expressed that there was no place in England which so demanded or would so thoroughly repay systematic investigation as Maiden Castle, which is the most gigantic and magnificent earthwork that the country possessed. The finding of Roman remains, or even of a small Roman villa, only proved that the Romans occupied the camp, not that they made it. Mr. Cunningham was inconsistent, because at Wareham, where Professor Boyd Dawkins found an intelligent man who had a collection of Roman things discovered there, he declared that the Romans never had a finger in making the works. "Disciplined forces," too, need not necessarily be Roman, but existed long before the time of the Romans. Sir Talbot Baker: Is any camp of this construction Roman? Is not the Roman method of castrametation as straight as he can make it, with north, south, east and west gates? Here we have an extraordinary convulsion of mounds and ditches. Lord Dillon, in thanking Messrs. Green, Cunningham, Moule and others for their remarks, said he hoped that they would not agree too well. Too much agreement resulted in idleness, and he trusted that they would continue to pick holes in one another's theories until the truth had been found.

The party then returned to Dorchester, but this was not the end of the animated debate. It was resumed the following day, when the company were sitting upon the grassy hill at Abbotsbury, in front of St. Catherine's Chapel, and commanding a glorious view of the Chesil Beach and the West Bay. Professor Boyd Dawkins, whose opinion is justly valued so highly by the Institute, and whose absence was so felt the day before, was now present. He expressed regret at being unable to be with them at Maiden Castle the day before, owing to having to attend a Local Government Board inquiry in London, and to state that Maiden Castle was one of a large series of fortresses which were occupied in the prehistoric Iron Age, long before the name of Roman was known on that side of the Channel. Professor Boyd Dawkins had risen to speak on the Chesil Beach, but at the urgent request of several members he added a few remarks about Maiden Castle. He considered that it was pre-Roman because in camps of that class things prior to

the Roman occupation had been found, and he considered that it was not Roman because the Romans, wherever they made a fortress of their own *de novo*, made it more or less four-square in right lines. Maiden Castle had no rectangular lines whatever in its construction. It must be classed with the ordinary hill-top camps, but the chief feature of it was its most remarkable entrances. There were no entrances like them in any Roman camp in the world, and as far as he knew there was nothing in Europe to approach the north-western double entrance. The military engineering of the camp was simply perfect. There were strong labyrinths, and where the camp was weakest—that is, where it adjoined the main mass of the down—the entrance was protected by about seven traverses of one sort or another. The eastern end was also wonderfully strong, but not so complicated. On the whole, the labyrinthine flanking entrances and the platforms to allow of the defenders collecting and annihilating bodies of the attacking force coming in through the narrow entrances, all, as he had learnt from General Pitt-Rivers, represented the perfection of the military system of the times. When they remembered the missiles of the period—bows and arrows and sling stones—and noticed how perfectly the glacis was covered by them, they saw that these earthworks were constructed with the same engineering skill as the greatest fortresses of modern times, making allowance for the necessary changes due to arrows and sling stones being supplanted by cannon and rifle fire. Frequently a fortification was not placed actually on the crest of the hill, the object being to get rid of the dead ground—that ground which was not covered by the missiles of the defenders on the ramp. Probably the ramparts were covered with palisades.

On Friday evening the architectural section was opened at the King's Arms with a paper by Dr. Cox on "The Treatment of the Cathedral Churches of England during the Victorian Age." In the course of his paper Dr. Cox indulged in some trenchant criticism. Among those who afterwards spoke was Dr. Jex Blake, dean of Wells. It had been announced in the programme that Canon Raven, D.D., would also read a paper on "The Church Bells of Dorsetshire," but time did not suffice.

Abbotsbury.

For the 6th inst. the little fishing and agricultural village of Abbotsbury, with its monastic ruins, botanic gardens and swannery, was chosen by the Institute for visitation. The party drove down the Weymouth Road and through Upwey and Portesham. On arriving at their destination they went first to the church, the principal objects in which were indicated by the incumbent, the Rev. B. Neville. He stated that Mr. Penny, a former incumbent, considered that the north part of the church was by far the oldest, and probably anterior to the old abbey church. He pointed out the handsome carved wood Jacobean pulpit, with a sounding-board, and the reredos, also of carved wood, which he thought was put up about a hundred years ago. Two holes by which the back of the pulpit were pierced were made by bullets. There were two stone coffins outside the porch; one was found ten years ago under the porch when the church was restored, and the other, which had been about for a century, was supposed to have been brought out from underneath the abbey. In the porch was the effigy of an abbot and a little crucifix. On the outer wall of the west tower was a representation of the Trinity—the Father sitting, with the Son on the cross between His knees, and the Dove, emblematic of the Holy Ghost, at the Father's right ear. He pointed out the spot where the body of Orc was said to be buried. Orc was the steward of King Canute. He bequeathed all his property to the monastery and founded an order of canons, but in 1044 he turned them out and brought in the Benedictine monks. It was then that the monastery was really founded. There used to be a screen and a rood-loft. Mr. Micklethwaite said it looked to him that the tower was built before the nave. He expressed admiration of the reredos (date 1751), which was a thing to be cherished, the beautifully carved Jacobean pulpit, and the brass chandelier in the nave, which he suggested should be transferred to the chancel.

The Abbey Ruins.

The company then went to inspect the site and remains of the old Abbey. The Rev. B. Neville produced a plan of the Abbey Church showing the excavations made in Mr. Penny's time. He pointed out the foundation of the north aisle of the Abbey Church, which was 192 feet long, 54 feet broad, with a chancel of 27 feet, and was thus nearly twice the length of the parish church. Mr. Neville then led the party to a building which he thought was the infirmary, but which his predecessor, Mr. Douglas, took to be the Abbot's house. After viewing the undercroft they went into the Abbot's garden, and next into a building adjoining, which Dr. Hawkins said had always been described as the bakehouse and brewhouse. Mr. Micklethwaite expressed the opinion that it was the buttery, or serving place between the kitchen and the dining-room, but added that without a more complete plan it was impossible to say much about

the buildings. The members then walked to the huge monastery barn, with its series of massive buttresses. With regard to the division into two it was suggested that one barn was for the tithes and the other for the monks' own produce. Mr. Cox declared that it was all one barn. The next place visited was the Ilchester Arms Hotel, where an excellent luncheon was served. After luncheon the party climbed the hill capped by the beautifully preserved little chapel dedicated to St. Katherine. Mr. Micklethwaite briefly described the building, with its high-pitched stone roof with a lofty parapet all round, pierced with apertures to let out the rain-water. An elderly native pointed out the finger-holes and knee cavity in the wall of the entrance, by means of which the young maidens of Abbotsbury are said to suspend themselves, while, looking towards the east end, they breathe a prayer to St. Katherine to give a partner for life. As it is difficult to hang on in this position the prayer must needs be short. The approved formula of it was said by Mr. Ralls, of Bridport:—

A husband, St. Katherine,
A handsome husband, St. Katherine,
A rich husband, St. Katherine,
And a husband soon, St. Katherine.

The Chesil Beach.

The party walked a little way over the brow of the hill towards the sea, and there sat down on the grassy slope giving a fine view of the Chesil beach, the fleet, swannery and duck decoy. Professor Boyd Dawkins said that the Chesil bank travelled according to the laws of all pebble beaches on sea-shores. The pebbles were driven by the current, the set of the tide and the force of the wind from west to east, until the Isle of Portland formed a natural barrier against further moving of the mass of shingle eastward. As the pebbles travelled along the beach from west to east they became ground together more and more, and yet, contrary to expectation, the largest pebbles were at the Portland end. Although the drift from west to east was continually going on, yet the infinite changes in wind and currents combined to produce such an equilibrium that the beach was nearly always in the same position as now. He pointed out the futility of groynes running at right angles for the protection of beaches, which only caused the sea to make great ravages on the leeward side of the groyne, and advocated instead the simple expedient of uprights raised on beaches in a line with the beach, which collected and retained the shingle and soon increased the bulk of the beach. Professor Boyd Dawkins then made the remarks on Maiden Castle which have already been reported under that head. On returning to the hotel the party took tea on the lawn, fresh and cool with the playing of a fountain. At 4:15 the carriages left for Dorchester, returning by way of Hardy's Monument. The wide-spreading and magnificent view from Blackdown was much admired, embracing as it did the Devon coast to the west, the Needles to the east and the greater part of the country of Dorset.

The first rain that the Institute had experienced during their stay in Dorchester fell on Sunday, when fortunately there was no excursion to be marred by the sharp showers. In the morning the annual sermon to members of the Institute—a powerful and interesting discourse—was preached at All Saints Church by the Rev. Dr. Cox, of Holdenby. He also occupied the pulpit at Holy Trinity in the evening, and gave a long and eloquent address, which was listened to with deep attention.

Promptly at 10 o'clock on Monday, the 9th ult., the "cavalcade" left the King's Arms for Cerne Abbas and for one or two places of interest on the way.

Wolfeton House.

The first halt was made at the charming old seat of Wolfeton, the residence of Mr. Albert Bankes, a member of the local committee, who received the party with courtesy and cordiality, showed them over the house, and gave an interesting account of its history and chief features. He explained that the word "Wolfeton" came from "Wulph," the name of the first Saxon owner, and "tun," meaning house. He read Hutchins's description of the house, and distributed a number of pamphlets prepared for the bazaar held there two years ago. The entrance to the courtyard was by an east gateway flanked by large circular towers, clad in ivy, with conical stone roofs. This was the oldest part of the buildings. The house, which was bought by Mr. Bankes in 1874, was the ancient seat of the Trenchards. In rebuilding the house Sir Thomas Trenchard appeared to have incorporated some portions of an older edifice. Leading the party out to the lawn before the south front, Mr. Bankes pointed out that the outer part was rich Tudor Gothic of the time of Henry VII., and the western part Gothic of Queen Elizabeth or James I. In the former part he drew attention to the rich labels over the windows with hollow mouldings carved with fruit and foliage, and finished with spirited corbels. Up till 1742 all the windows were filled with tinted glass containing coats of arms giving almost a complete pedigree of the Trenchard family; but at present not a vestige of the Trenchard painted glass remained. There seemed to

have been four pleasaunces similar to that in which they then were, one for the ladies, another for the gentlemen, a third for the maid-servants and a fourth for the men-servants, in which they could take air and exercise in troublous times without going outside the walls of the house. The party were then conducted into the drawing-rooms and shown the ceilings adorned with an arabesque in plaster and the splendid carved doorway and chimneypieces. Tradition said that this carved work was presented by the King and Queen of Castile to Sir John Trenchard in acknowledgment of his hospitality. Early in the sixteenth century their majesties, setting forth with a great armada to surprise the King of Aragon, had scarcely left the coast of Flanders when they were encountered by a violent storm and put into Weymouth, and Sir John Trenchard, being High Sheriff of the county at the time, entertained them at Wolfeton House. Mr. Banks told the story of how the fortunes of the house of Bedford dated back to this occasion, and when in the dining-room he narrated in an interesting manner the legendary lore of the house—the portentous fall of the sceptre from the effigy of Charles I., the apparition of Lady Trenchard immediately before her suicide and the imprisonment and execution of the Catholic priest (an educated French gentleman) in Queen Elizabeth's reign. The fine tapestry on the staircase was admired, and before leaving the house the party inspected the winding staircase in the south tower of the gateway, composed of as many as forty-one steps in solid oak built into the masonry.

Charminster Church.

From Wolfeton House the antiquaries walked to Charminster Church, which, in the absence of the vicar, was described by Mr. Banks. It consisted of a nave, two aisles of equal length, and a tower 90 feet high. The original chancel, which was 28 feet long, was demolished during the Civil Wars. The present chancel was of the worst kind of churchwarden architecture, but would have to do until the parish could see their way to rebuilding the chancel on its original foundation. The nave was wide and lofty, and appeared to have been erected at the same time as the chancel arch. It had arcades of five bays on each side with a clerestory above. Mr. Banks gave a concise account of the conservative and judicious restoration recently carried out, and drew attention to the various ancient features which were brought to light in course of it, including the Norman slits in the clerestory, the staircase which led to the rood-loft, and remains of frescoes and texts on the walls. In the churchyard Lord Dillon thanked Mr. and Mrs. Banks for their kind reception of the Institute, and Mr. Banks for his interesting description of the house and church.

Cerne Abbey Barn.

The party then betook themselves to the carriages again, and continued their drive to Cerne, where the unusually fine old barn was first visited, and an appreciative account of it given by Mr. Moule. There were nine bays, each about 12 feet 6 inches long, making a total length of a little over 112 feet. There were probably five more bays at the north end, bringing the length to 174 feet; but even that was 100 feet short of the length of the great barn at Abbotsbury which they saw on Saturday when restored. The other dimensions were:—Width within, 30 feet; width without, 35 feet; height of walls, 22 feet; height of gables from eave level, 23 feet, giving a fine pitch. There was little moulding whereby to date the barn, but the whole contour, especially of the west porch, the finial thereon, the moulding of the hood of the doorway, together with the early style of the buttresses of the main building and the high pitch, seemed to give it a second-Pointed date. The roof, which fell in about twelve years ago, was a noble one, and completed an interior not to be matched in many a great church. The timbers survived in the southern part, now made into the farmhouse occupied by Mr. Sprake. He mentioned the extraordinary goodness of the masonry of flint and ashlar. He estimated the number of flints used in its construction at 172,600. It was said that the barn would originally hold the corn crop in bulk from the farm of 800 acres. Mr. Moule concluded with a glowing imaginative picture of the scene at harvest-tide in ancient days. Mr. Micklethwaite observed that the two side doors in the porches were for regulating so as to get the best natural draught according to the direction of the wind, for winnowing the threshed corn.

Abbey Church and Remains.

After luncheon at the New Inn, the company repaired to the church, which was described by the vicar (the Rev. H. D. Gundry). The architecture of the greater part of the church was in the later or debased Perpendicular style. The tower was very handsome, with its flying pinnacles under the windows and the ornamental bands round it. Hutchins said, "The entire west front, from its numerous ornaments, has an unusually handsome appearance." He called attention to the curious east window, stone screen and the wooden pulpit with canopy, bearing the date 1640, the carving of which was con-

sidered very fine. Mr. Mill Stephenson said he hoped that every care would be taken of the most interesting tintured shields in the east window. The heraldry was exceedingly good in all of them, and he trusted that they would be releaded and protected on the outside.

The party next visited that extremely picturesque relic, the so-called Abbey gateway, and then St. Augustine's Well, to which tradition assigns a miraculous origin and marvellous curative virtue.

The Cerne Giant.

But the chief "lion" of Cerne is beyond question the Giant, and to this the party now addressed themselves valiantly to climb. Having seated themselves somewhat in the form of a halo around the giant's head, the company listened to a few words from Mr. Green, who was able to throw little light on its origin. Then Professor Boyd Dawkins observed that he was in blank ignorance about the date of "the Giant." It was, however, there in the midst of what was in the Bronze Age and the prehistoric Iron Age a centre of dense population. Above them were a hut circle, a settlement, a camp, a tumuli, showing that there was once a large population scattered over the downs. The whole of the hill slopes over against them were perfectly covered with similar remains and ramparts which might or might not be enclosures. Nine out of ten of the tumuli which had been dug really belonged to the Bronze Age. By its surroundings then that figure was in a position which would make one pause before assigning it to any particular modern time. Figures of that class were not altogether unknown in sculptures belonging to the Bronze Age, and which had been found in Scandinavia ranging down to the early Iron Age. Therefore he thought it by no means improbable that the great figure on Cerne Hill might really belong to that remote time. Professor Boyd Dawkins added some interesting observations about the habitation of the chalk downs in old days, while the low land was either forest or morass. Mr. Moule narrated some folk-lore about the Giant: One legend stated that it was a "real live giant," who was caught napping and, by the united efforts of all Dorset, pinned down as Gulliver was by the Liliputians. Then his shape was cut out in the turf, so that they saw an exact presentment of him. Another story was that it was a caricature of the last abbot of the abbey. The Dorset Field Club had been specially requested by the owner, General Pitt-Rivers, not to come near the giant or say anything about him until he could have time to dig about the figure, find out something more, and have a paper to read to them. Professor Boyd Dawkins inquired about the probability of ancient enclosures having been behind the abbey. Mr. Moule answered that the undulating ground was said to be the pleasaunce. It was still called "Beauvoir." He pointed to the delightful old house of Upcerne, which was built out of part of the abbey ruins.

Wrackelford House.

The party then descended the hill and started on the homeward journey. On the road they made a detour to visit Wrackelford House and accept the kind invitation of Mr. and Mrs. Alfred Pope to afternoon tea. The company had a most hospitable reception, and before leaving the pleasant house and grounds Lord Dillon, on behalf of the Institute, expressed his warm appreciation of the kind entertainment given them by Mr. and Mrs. Pope. Mr. Pope, in acknowledging the expression of thanks, spoke with pleasure of the visit of the Institute. They had good archaeologists living in the neighbourhood, but they were always glad to have fresh light thrown upon their local antiquities.

In the evening, when Dr. Cox presided at the sectional meeting, Sir Talbot Baker gave an account of the House of the Vestals in the Forum at Rome and the discovery of Anglo-Saxon coins in the excavation of it. A vote of thanks was passed to him on the proposition of Dr. Cox, seconded by Professor Clark. Then the Rev. A. D. Hill, of Downton, described the interesting discovery of an Anglo-Saxon church at Breamore, Hants, and was thanked on the proposition of Dr. Cox, seconded by Mr. Micklethwaite.

Research at Maiden Castle.

Professor Boyd Dawkins, referring to Maiden Castle, said he thought it most desirable that the wonderful fortresses for which Dorset was almost unique should be dug. He should be exceedingly glad if, instead of their having theories propounded to them as to the age of some of those camps, they could apply the pickaxe and shovel to reveal their true age. He for one would be glad to co-operate in any such work. It would be a fitting mark of their visit to Dorchester if they could help the Dorset Museum, adding somewhat to its contents by proving the date of some of those camps.

Lord Dillon moved the following resolution:—"That this meeting of the Royal Archaeological Institute heartily approves of the proposition made by Professor Boyd Dawkins for the systematic investigation of Maiden Castle, believing that such a step, carefully undertaken under his direction, will be of the first importance towards the elucidation of its earliest history."

Dr. Cox seconded, considering that they should try to imitate what General Pitt-Rivers had done elsewhere. It would settle the matter once for all. Mr. Micklethwaite said he thought that the Institute had enough to do already. Chancellor Ferguson asked whether they were prepared to put their hands in their pockets. Dr. Jex Blake: Is it an abstract proposition, or do we really mean to go to work? Mr. Mill Stephenson: The Institute does not do the work, but merely signifies its approval of Professor Boyd Dawkins's scheme. The motion was then put and carried *nem. con.*

On the 10th, on the occasion of their last excursion in the neighbourhood of Dorchester, the Institute took a different direction, going east and north, first to

Puddletown Church.

Here the party were received by Lieutenant-Colonel Brymer, M.P., and the vicar (Rev. F. E. Freeman). The church is one of the most interesting and beautiful that the Institute have visited in Dorset, and is replete with objects of archaeological value in architecture and furniture, monuments and heraldry. A description of the church was given by Mr. E. Doran Webb, F.S.A. It is late Perpendicular in style. The picturesque old western gallery, with open balusters and carved coat of arms, is Carolean, bearing date 1635, and the pews in the nave and the altar rails are of the same date. The gallery and pews in the north aisle and chapel are Georgian. Mr. Webb hoped that the western gallery would be left, and that none of the seats would be moved. Attention was drawn to the nicely carved wooden roof, with an elaborate cornice. There are five bells in the tower, one being cracked, and Mr. Webb said he trusted it would not be recast, as the value of the bell metal so obtained would not make amends for the loss of a valuable bit of history. Lord Dillon spoke upon the interesting collection of monuments, and expressed especial admiration of the marble recumbent effigy of a member of the Martin family lying under a stone canopy, which he said was peculiar and singularly fine. Mr. Webb said he thought the font was early thirteenth century. The character of the ornamentation was most remarkable.

Athelhampton Hall.

The party well-nigh went into raptures with the old-world charms of Athelhampton, or Adminston Hall, to which they were next introduced. Mr. A. C. de Lafontaine, the owner, received the party at the door, but delegated to Mr. Moule the duty of describing the house. Mr. Moule's description was of the briefest. The years 1487 and 1502 were variously assigned as the date of the house. The gatehouse, taken away forty or fifty years ago, was an immense loss, archaeologically speaking. Within the house Mr. de Lafontaine's careful and tasteful repairs spoke for themselves. Of the old features, besides the untouched roof with its remarkably bold cusps, might be noted the original hall doors, one *in situ*, and the curious stone and oak stairs. The garden front had been admirably completed by Mr. de Lafontaine. The company then entered the house and inspected the principal rooms, especially the fine hall, with its high chimney-piece and gallery and the library upstairs, with a plaster ceiling moulding in arabesque and the walls handsomely wainscotted. But on such a sunny summer day the surroundings of the house were more attractive even than the rich and beautiful interior. The visitors sauntered from one pleasure to another, admiring the walled-in gardens of various sizes and shape, rectangular or round, communicating with one another by archways and flights of steps. Amid well-mown lawns and bright and fragrant flower-beds are set fountains and fishponds, in which the gold fish gleam with a rich metallic lustre as the sun strikes them. The charming old dovecot, with its soft-cooing denizens, the statues and the gorgeous-plumaged parrot chained to its stand are among the details that enrich a picture that will not soon be forgotten. Wandering through this veritable palace of art it was not easy to remember that one was living in the last decade of the nineteenth century, instead of full 400 years ago, when the scene must have been little different. The members of the Institute seemed to feel the witchery of the place, and showed themselves far more loath than usual to respond to the summons of the director's horn and the secretary's equally importunate whistle. At last, however, the spell was broken, and the hindmost stragglers whipped in. When the party were reassembled in front of the house Lord Dillon expressed to Mr. de Lafontaine their warm thanks for admitting them to his lovely abode, and congratulated him on his successful preservation of so many interesting and beautiful things. Mr. de Lafontaine, responding, observed that Lord Dillon's kind words would encourage him to go on with the work of restoration as well as in his power lay.

Milton Abbey.

The carriages then drove to Milton Abbey. The undulating and well-timbered park in which the old abbey and the adjoining house stand was much admired. Luncheon having been taken the party entered the abbey church. It is said that the

abbey was founded in 938 by Athelstan, grandson of Alfred the Great, to commemorate his victory over the Britons at Brunanburh, in Devonshire. It was founded originally for secular canons, but Dunstan of Glastonbury expelled the canons and established Benedictine monks in their stead. On the dissolution of the monasteries Henry VIII. gave the abbey to Sir John Tregonwell. The church was made the parish church of Milton Abbas till the last century, when it was by Act of Parliament desecrated and became private property. Mr. Doran Webb described the church, calling attention to the beautifully vaulted roof in Ham Hill stone, the high altar, the windows with their heraldic glass, the monuments, and especially the "tabernacle," the greatest treasure which the church contains. It is of wood, made in four storeys, richly carved and painted. Its use was to hold the pix in which the Eucharist was reserved for the communion of the sick and dying. It is now attached to the west wall of the south transept beneath the triforium, but originally it was probably suspended above the high altar. To its old position it has been proposed to restore it, but Mr. Webb advised that it should be allowed to stay where it is.

Concluding Meeting.

Lord Dillon, president of the Institute, then took the chair, and the business of the concluding meeting was begun.

Bingham's Melcombe.

Passing through Ansty the party next went to that most out-of-the-world seat, Bingham's Melcombe manor-house. Here they were hospitably received and entertained to tea by Mr. and Mrs. Bosworth Smith. Mr. Moule made a few remarks been published in the *Dorset County Chronicle* during the past few years.

about the house, of which a description has more than once Mr. Doran Webb considered that the main part of the house was Elizabethan, with Queen Anne insertions.

Mr. Moule stated that Mr. Ponting, the diocesan architect, who had been there lately, assigned the gatehouse to the reign of Edward II., chiefly on account of the construction of the beams in the roof, which were undoubtedly of that time. The gable containing the oriel window, with the deeply-sculptured coat-of-arms and the beautiful work of the corner shafts, was the most picturesque feature of the house, and probably Marian. The beautiful bowling-green and yew hedge, supposed to be of the time of Henry VIII., the arbour, the fishponds and the shaded ways to them and up the stream were of the utmost loveliness and gave completeness to the place; and all, he said with emphasis, were old features, and had been there from generation to generation, from century to century. After enjoying tea, and taking a ramble through the house and grounds, which fully confirmed Mr. Moule's verdict as of "the utmost loveliness," the company gathered in the courtyard, where Lord Dillon was once again the spokesman of the Institute, in acknowledging a kind reception and generous hospitality. Mr. Bosworth Smith, in reply, said that next to the pleasure of owning a beautiful old house came the pleasure of showing it to an appreciative body such as they. A few minutes were spent in the porch, and then the homeward drive was begun.

Valedictory.

This concluded the stay of eight days made by the Institute in Dorchester and the neighbourhood. On the 11th a party of upwards of thirty members embarked at Weymouth for Jersey, to accept the invitation of the Société Jersiaise to devote Thursday and Friday to excursions in the island under the guidance of the Society. Thanks to the careful arrangements, ably carried out, to the co-operation and kindness of the local friends, and to the most favourable weather, the Dorchester meeting has been, as the members of the Institute declare, a perfect success, and one of the most enjoyable on record. We ought not to omit to mention that this happy result has also been in no small measure contributed to by the admirable way in which the large company have been catered for by Mr. and Mrs. Bilham, at the King's Arms. The accommodation, the table, the posting arrangements have all been of the highest excellence, and have evoked general expressions of satisfaction. Of Dorset, its antiquities, its beauties, its hospitality and good-fellowship, the Royal Archaeological Institute have received fresh and most favourable impressions, not easily to be effaced.

THE BIRTHPLACE OF JOHN KNOX.

MR. HALDANE'S cocksure remarks in the House of Commons the other night, says the *Glasgow Herald*, indicate very plainly that he at least is quite certain of the place where John Knox was born, and that that place is the latest of the three advocated by "authorities," Morham, one of the least, if not the very least of the parishes in Scotland. Strange if one of the greatest of Scotsmen should hail from one of the meanest of Scottish parishes. There are grave doubts as to the accuracy of Mr. Haldane's opinion—we do not say judgment. Three places have been claimed as the birthplace

of the great reformer, (1) Giffordgate, in the Nungate of Haddington; (2) the village of Gifford, four miles to the south of Haddington, the exact place being Giffordgate, described in the minutes of the Road Trustees of the parish of Yester in 1793 as distant 406 yards from Gifford Cross; and (3) the parish of Morham. The late Thomas Carlyle, whose wife was a descendant of John Knox, was in favour of the place first named—Giffordgate, Haddington—and left instructions to his trustees to have a memorial erected. In 1881 a tree—an oak, which is now flourishing—was planted by Miss Watson, the proprietress of the ground on which the famed house is supposed to have stood. After the ceremony of planting the tree Colonel Davidson spoke of his last interview with the sage, who was then very near to the hereafter. He said:—

"After a touching allusion to the grave of his loyal wife, Mr. Carlyle said he had a request to make, namely, that I would get a tree planted to mark the site of the house where Knox was born, so that it might be seen from the churchyard. I said, 'A tree will not last long.' 'An oak,' he replied, 'will last a long time.' 'Yes,' I added, 'perhaps as long as the world, which seems to be getting into its death throes.' 'Ah,' he said, 'the world will last a long time yet.' To show the necessity of planting this tree Mr. Carlyle went on to say that many years ago some ladies, visitors at Amisfield House, wishing to see the spot where the great Reformer was born, wandered into the Nungate towards the Giffordgate, and, accosting an old woman, asked if she could show them Knox's house. 'What's yur wull?' said the old woman, who was somewhat deaf. 'We want to see John Knox's house.' 'John Knox's house; that's it ower there, and yon John Knox himsel' sitting at the door.' Having told this story in his own inimitable doric, Mr. Carlyle fell back on his pillow and laughed till the couch shook under him."

In 1858 the late Mr. John Richardson, procurator-fiscal, Haddington, read a paper before the Society of Antiquaries of Scotland, which was printed in their "Proceedings," vol. iii. part i. The paper was entitled, "On the present state of the question—'Where was John Knox born?'" At this time Morham was not a candidate for birthplace honours, and Mr. Richardson was entitled to say that it was admitted on all hands that Knox was born either in the village of Giffordgate, a suburb of the town of Haddington, or in the village of Gifford, four miles distant from that town. Dr. McCrie had summed up in favour of Gifford, (1) on the authority of Beza, a contemporary of Knox, who designates him "Joannes Cnoxus, Scotus, Giffordiensis," which Dr. McCrie thought "evidently means that he was a native of the town of Gifford;" and (2) on the authority of Spottiswood, another contemporary, who says he was "born in Gifford, within Lothian." Other authorities, quoted by Dr. McCrie on the same side, were David Buchanan, who wrote in 1644; Matthew Crawford, in 1732; and Woodrow; but, according to Mr. Richardson, "these three are merely followers of the other two, and quote no other independent authority or cause of knowledge." On the other side are Archibald Hamilton, a zealous Roman Catholic, Knox's countryman, contemporary and acquaintance, who in his "Dialogue," &c., published in Paris in 1577, says he was born "in Haddingtona oppido in Laudonia," in Haddington, a town in Lothian; and another Scotsman, Laing (Mr. Richardson does not mention the name), a Roman Catholic, who in his book "concerning the life, &c., of the heretics" of his time (Paris, 1581) affirms the birthplace to have been "Prope Haddingtonam," near Haddington. Hamilton is understood to have been personally acquainted with Knox, and knew his parents also. Beza was a foreigner, and might not know all the peculiarities of East Lothian topography. Dr. McCrie, according to Mr. Richardson, was in favour of Giffordgate, Haddington, till he found among Lord Wemyss's titles a charter to "William Knox in Morham, and his wife," in 1598, of certain lands in "the territory of Nungate," and "having found by inquiring at the descendants of this William Knox and his wife that the Reformer was no relation of theirs, he rejects the authority of tradition in favour of Giffordgate as the place of his birth, and sums up in favour of the village of Gifford." Giffordgate belonged to the Marquis of Tweeddale and adjoined the property of the Earl of Wemyss, and Mr. Richardson shrewdly argues that because a certain William Knox had lands in the one, it does not follow that there was no one of the same name in the adjoining village. Tradition favours a certain spot in the Giffordgate as the birthplace, and the late Mr. James Watson, writer, Linlithgow, proprietor of the ground, has "instruments" dated in 1607 and 1611, in which certain "butts" of land are described as bounded by "Knox Walls," thus showing that the name of Knox had been remarkably connected with it. Again, Knox was educated at the Grammar School of Haddington, and Mr. Richardson infers from that that he did not reside four miles away. Still further, there is no evidence that a village called Gifford existed at the date of Knox's birth. On the contrary, at that time and till long after his death the parish of Gifford was called Bothans, and the village of the parish was likewise

so called. It is evident from Pont's map of Lothian, prepared about 1620, that no such village as Gifford or Gifford Hall then existed. These are the main points of Mr. Richardson's case for Giffordgate, Nungate of Haddington. The distinguished antiquarian, Dr. David Laing, made inquiries after the reading of Mr. Richardson's paper, and found that Knox was admitted a burghess of the city of Geneva, and in the register he is called, of course upon his own authority, a native of Haddington—"JEHAN CNOXE . . . NATIF DE HADINGTON EN ESCOSSE." Dr. Laing adds:—

"This, I presume, means the town or immediate suburb of Haddington, and extinguishes any claim for the village of Gifford, even if it could be shown that such a village was then in existence. Mr. Richardson has clearly established the fact that the suburb of Haddington called Giffordgate was so known during the sixteenth century, and that some houses there till a recent period retained the name of Knox's Walls. This removes the apparent discrepancy of Beza's styling him 'Giffordiensis,' and yet connecting him with Haddington. Knox himself in a foreign land—if Edinburgh, for instance, instead of Haddington, had been the place in question—would never have named a locality such as the Cowgate or Canongate, but the town itself, as the place of his nativity."

In 1860 the Rev. Samuel Kerr, minister of Yester (Gifford), issued a reply to Mr. Richardson, and put forward the claims of Gifford to being the birthplace of the Reformer. The styles of the lawyer and the clergyman are easily distinguishable in the two papers. Mr. Kerr says none except Hamilton assigned any other birthplace than Gifford till Knox's body had been two hundred years in the grave. The evidence of David Buchanan he considers of great importance, because he was contemporary and probably acquainted with the daughters of Knox, as well as with many who had known him in his declining years. This supposition, it may be remarked, is not strengthened by any evidence. The Gifford minister further objects to Laing's expression "Prope Haddingtonam" as favouring Giffordgate, Haddington. "Prope" means near, not very near or close to, and would not be applied in the case of places separated only by an "insignificant stream." Hamilton's "mistake" Mr. Kerr explains satisfactorily to himself on the principle that "Haddington being both the county town and the most considerable in the district, would naturally, in common conversation or by common report, obtain the credit or the discredit due to the surrounding neighbourhood as well as that which belonged properly to itself." Curiously enough, Mr. Kerr has not mentioned in support of his theory the fact that the shire is Haddington, and that people might readily in the days of Knox, as at the present time, talk of a Haddingtonshire man as a Haddington man. Later on he makes use of this argument in the Geneva extract. Mr. Richardson's argument that Knox's parents being "obscure" and poor, the Reformer would not have been sent to a grammar school four miles distant, is hardly worth refutation. Why, he was sent to the University of Glasgow. Mr. Kerr brings forward Sir Walter Scott as witness in favour of the existence of Gifford at a time contemporary with Knox. In "Marmion," canto iii. stanza 1, the following lines occur:—

The noon had long been passed before
They gained the height of Lammermoor;
Thence, winding down the northern way,
Before them, at the close of day,
Old Gifford's towers and hamlet lay.

Beza's use of the word "Giffordiensis," and Spottiswood's "Gifford within Lothian," are certainly difficult to get over. Again, it may be asked, why Gifford Gate if there was no Gifford? The most natural deduction surely is that people on their way to Gifford passed through Giffordgate, and as a matter of fact they do that yet.

So far we have given an outline of the minister's claims for the village of Gifford. Last of all come the schoolmaster's claims for Morham, the spot favoured by Mr. Haldane, M.P. Mr. David Loudon, for a number of years teacher at Morham, wrote a history of the parish (W. Sinclair, Haddington, 1889). After having startled antiquarians by the announcement that in this small parish, whose "name in all probability is unknown to the bulk of Scotsmen," was born he who "in his lifetime never feared the face of man," Mr. Loudon proceeds to explain Beza's "Giffordiensis." "Beza had heard Knox talking of Sir John de Gifford of Yester, who married Euphemia, daughter of Sir Thomas Malherb, otherwise Sir Thomas de Morham—the last heir male of the manor of Morham. This Euphemia, on her marriage with Sir John de Gifford, transferred to him the manor of Morham along with other estates, and henceforth, as was the common practice then (and in some districts is so still), the name of the estate and the name of the proprietor became synonymous terms, so that it would as frequently be called 'Gifford' as 'Morham.'" The "Gifford within Lothian" is held as of no account owing to the inaccurate statements made elsewhere by the writer. It appears that Knox, when pleading for some favour from James

Earl of Bothwell, wrote :—"My great grandfather, gudeschir, and father have served your lordship's predecessors, and some of them have died under their standards." Mr. Loudon argues that the only way this could have been done was as tenants of his farm of Mainshill, in the parish of Morham. The tombstones in Morham churchyard prove conclusively that there were Knoxes "fermers in Mainshill" for a long time after the birth of the Reformer. Replying to Mr. Richardson's argument in favour of Giffordgate, Haddington, based on the titles of Mr. Watson, Linlithgow, mentioned above, Mr. Loudon says :—

"The said William Knox died in October, 1607—the very year in which the first Sasine is dated—and his testament datative was produced by his widow on behalf of their children, William, George, James and Bessie—minors. James Knox, brother of the deceased, is named as a debtor; and the personal estate, chiefly in farm stock, is valued at 1,359*l.* Does not this clearly show that the first Knox of Haddington came from Morham, and that his relatives were 'fermers'?"

Mr. Loudon fortifies himself with a tradition. He tells how in 1883 "an aged patriarch named Neilson, from Dunbar, accompanied in a gig by one Ferguson, from New York," called on him. It is not stated whether or not this Ferguson was a friend of Mark Twain's. "The old worthy seemed delighted and hastened me to the knowe where Knox's house stood, and said he was taught from infancy, as were his father and grandfather before him—all born on Mainshill—to look with a 'reverential pride' on that spot, as it was there our Scottish reformer, John Knox, was born." The Rev. William Whitfield, an antiquarian of some note, formerly a minister in Dunbar and now in Canada, backed up Mr. Loudon. Dealing with Knox's conversation with the Earl of Bothwell, he argues that Knox's paternal ancestors were tenants of Mainshill, and his maternal ancestors, the Sinclairs, were tenants of Northrig, both in the parish of Morham, and "in the charters passed the Great Seal of Scotland and kept in the Register House, Edinburgh, we find abundant proof of the possession of these lands by Bothwell's ancestors." Thus far we have given an outline of what appears to be the more important evidence bearing on an important incident in Scottish history.

THE ORDNANCE SURVEY.

THE report of the progress of the Ordnance Survey to March 31, 1897, states that, while all cultivated districts in England and Wales were surveyed before 1890 on the 1-2,500 scale, with the exception of Lancashire and Yorkshire, the plans for all the cultivated districts of Lancashire and Yorkshire have since been published. The revision of the maps on the 1-2,500 scale was sanctioned in 1886, but the actual work of revision was not begun until 1894. This is attributed to the necessity of resurveying those counties which had been originally surveyed on the 6-inch scale. Some delay was also caused by the revisions which had been in progress in London, Plymouth, Glasgow and the Tyneside towns, but the 1-2,500 revision has now been taken up in Middlesex, Essex, Kent, Surrey, Sussex, Hampshire, Buckinghamshire, Hertfordshire, Northumberland, Nottingham, Cheshire, Derbyshire, Glamorganshire, Durham and Westmorland. The area revised during the year 1896-97 was 4,623 square miles. The rate of progress, it appears, has varied greatly, progress having been slow where great changes have taken place, as in the neighbourhood of London, and relatively rapid in the agricultural districts. Publication of the revised plans is proceeding, and 3,567 square miles have been published during the year. It is estimated that the arrears will be made up by 1910, and the intention is expressed that after that has been done no sheet shall represent a survey or revision more than twenty years old. Maps on the 6-inch scale have been published for all England and Wales. The new series 1-inch map is published in two forms—(1) outline and contours, this map being now completed, and combined maps published also for Brighton, Derby, Gloucester and Cheltenham, Plymouth, Nottingham, Chatham and Winchester; (2) hill features, the publication of which will, according to existing arrangements, be completed in 1902. The experiment is being made of having some sheets of this map engraved by the trade in order to accelerate the progress of the work. The revision of the 1-inch map is being carried out independently of that of the larger scale maps, and it is intended that all sheets should be annually brought up to date as regards railways, canals and important public works. During the revision certain alterations are being made in this map so as to bring it more into harmony with military requirements without injuring its utility for civil purposes. At the instance of the War Office an experimental 1-inch map in colours has been prepared, by transfer of zinc, of most of the district south of the Thames, and the publication has been sanctioned by the Treasury. The revision of the map issued on the scale of four miles to an inch is to follow immediately that of the 1-inch map. The plans of all towns entitled to a large scale survey have been published, and the

survey of London on the 5-foot scale has been revised and extended.

Details are also given in the report of the progress of work with regard to Scotland and Ireland and the Isle of Man. In the case of both Scotland and Wales the corrections of place-names which have been found necessary have been found to be comparatively few. Reference is made to the entire change that has been made in the system in force for the sale of the maps to the public. No comment is made on the degree of success resulting from this change, but the list of the total values of the maps sold each year show that, while from 1889 to 1893 the annual value varied between 13,100*l.* and 13,700*l.*, increasing to 14,903*l.* in 1894 and 15,497*l.* in 1895, the amount reached 17,715*l.* in 1896-97. Index maps are appended to the report showing the periods which have elapsed since the dates of the surveys of the various counties and other particulars as to revision and publication.

FOLK-LORE OF THE HOUSE.

THE late Rev. Walter Gregor, LL.D., who was an accomplished inquirer into folk-lore, died in February last while engaged on that work. The following records relating to the customs and traditions in Galloway, of which the dwelling-house is the subject, were found among his papers :—

Kirkmaiden.—When the foundation of a house is laid, the workmen are entertained with whisky. This whisky is called the "funin pint," i.e. foundation pint.

When the carpenters begin to put on the roof of a house, they receive at times whisky. This is called the "reefin pint," i.e. roofing pint. (Informant a carpenter.)

Dalry.—It is unlucky for one to build a house to live in.

Kirkmaiden.—My informant has heard it said that it is unlucky for one to build a house to live in.

Dalry.—It is not lucky for one to enter for the first time by the back door a house he (she) is to live in.

Balmaghie, Kirkmaiden.—The floor of the dwelling-house must never be swept towards the door, but towards the hearth.

Kirkmaiden.—The hearthstone is accounted the most sacred part of the dwelling-house.

Kells.—When Kirkdale House, in the parish of Anwoth, was built, the man that laid down the first load of stones for the building of it was hanged for the murder of a woman whom he had led astray, and the mason that laid the first stone of it was killed in the course of its erection. The common explanation of these fatalities was that the owner of the house had gained his fortune by unjust means.

Kenmure Castle, in the parish of Kells, was planned to be built on an island in Loch Ken, and a quantity of stones was laid down for its building. During one night before the work was begun they were all taken away and laid down on the site the castle now holds. (Told in Balmodellan.)

In a holm on the river Ken, near Kenmure Castle, there is a large block of stone. It was thrown from Cairne Edward by the devil to destroy Kenmure Castle. He put too much force into his cast, and the rock went over the castle and fell on the holm beyond it.

Rerrick.—When the old church of Rerrick was being taken down the aunt of the wife of the man that had contracted to do so remonstrated with her for allowing him to undertake the work. He or another of the workmen, she said, would be killed. A beam fell upon him and injured him.

Kirkmaiden.—In flitting into a house that has been left vacant by another, no one enters it without first casting into it a living creature, commonly a cat or a hen. If "ill has been left on the house," it falls on the animal that is thrown into it. It dies, and the lives of those that are to dwell in the house are spared.

A family at Aachliach, when removing, bore a grudge against those that were to occupy the house after them. They swept the hearth and the house clean, and put on "a stone fire." Something had been forgotten in the house, and a daughter returned to fetch it. The "ill that had been left on the house" fell on her. She became a cripple, and for many years was able to walk only on crutches.

Rerrick.—In going into a house from which another person or family has removed, it was usual to cast into the house a living creature, as a cat or hen, before any of the family entered.

If one, on leaving a house, had a grudge against those that were to live in it, the house was swept clean and a fire of stones and green thorn was placed on the hearth.

A family of the name of Burnet went into a house at Hole-house, from which had gone out another family that bore an ill-will against the new tenants for putting them from the house. The fire of stone and green thorn had been placed on the hearth. The usual precaution of casting in a living creature had been omitted. The youngest son was the first to enter the house. "He did nae guid aifter," i.e. he fell into weak health. My informant has heard the young man's brother tell the story.

My informant's daughter was removing from a house. To

leave the house as neat as she could for those that were to occupy it after her, she swept the floor of the house, lifted the sweepings and cast them out. The man that was to inhabit the house was present. Seeing what she did, he called out, "Ye —, why did ye soop awa ma luck?"

"THE BERMUDAS," STRAND.

THE mesh and labyrinth of obscure alleys and lanes running between the bottom of St. Martin's Lane and Bedford Street towards Bedfordbury were swept away by the besom of improvement in 1829, when Trafalgar Square was begun, never to be ended. In Elizabeth's or James's time, gallants who had cruised in search of Spanish galleons wittily nicknamed these straits "The Bermudas," from their narrow and intricate channels. Here the valorous Captain Bobadil must have lived in Barmecidal splendour and have taught his dupes the true conduct of the weapon. Justice Overdo mentions the Bermudas with a righteous indignation. "Look," says that great legal functionary, "into any angle of the town, the Streights or the Bermudas, where the quarrelling lesson is read, and how do they entertain the time but with bottled ale and tobacco?" How natural for Drake's men to give such a name to a labyrinth of devious alleys. At a subsequent period the cluster of avenues exchanged the title of "Bermudas" for that of the "Cribbee Islands," the learned possessors corrupting the name into a happy allusion to the arts cultivated there. Gay, writing in 1715, describes the small streets branching from Charing Cross as resounding with the shoeblacks' cry, "Clean your honour's shoes?" Improvements were made in 1829-30, when the present covered walk with a glass roof, leading from West Strand to St. Martin's Church and inhabited chiefly by German toymen, was built and named after Lord Lowther, then Chief Commissioner of the Woods and Forests. The Strand was also widened and many old tottering houses were removed. Porridge Island was the cant name for a paved alley near St. Martin's Church, originally a congeries of cookshops erected for the workmen at the new church and destroyed when the great rookery there was pulled down in 1829. It was a part of Bedfordbury and derived its name from being full of cookshops, or "slapbangs," as street-boys call such odorous places. A writer in *The World* (1753) describes a man like Beau Tibbs who had his dinner in a pewter plate from a cookshop in Porridge Island and, with only 100*l.* a year, was foolish enough to wear a laced suit, go every evening in a chair to a rout and return to his bedroom on foot, shivering and supperless, vain enough to glory in having rubbed elbows with the quality of Brentford.



The Nude in Greek Art.

SIR,—I have been very much interested in the battle of ink which has been taking place between "A Lady Artist" and Mr. Ronald Kelly. My sympathy, of course, is with the lady, otherwise I should never have earned my well-earned title of "a lady's man." It would appear that Mr. Kelly is quite upset. I am afraid from his letters that he would like to see all our statues draped in some (of course) thick material, so that under no circumstances could any line of figure be seen. Fancy the shame he must feel when he takes his walks abroad and comes face to face with some sturdy little rascal enjoying his or her dip in the village stream. Oh, the horrors of the sight, the burning blush that must come to his fair cheeks, when possibly there may be two, and not both of the same sex. The thought is too horrible, Mr. Editor, to contemplate. Mr. Kelly's plea is for the children. The natural, healthy-minded child would not for one moment have the thoughts pass through his or her head which your correspondent seems so much to fear, but that which has been created beautiful would receive that reverent admiration which is not the sole possession of a "lady" or "gentleman artist."—I am, Sir, your obedient servant,

IGNORAMUS (on art matters).

SIR,—I am much indebted to you for your fairness in giving publicity to my second communication, and was hoping that I should not have to trouble you again for a little of your space. I feel all the more loath to ask you to spare it on my behalf, not wishing to deprive "A Lady Artist" of her "last word." However, her concluding letter may well be considered as such, inasmuch as I abstain from making further propositions, but am merely writing by way of reply, and especially to explain an evident misunderstanding.

She impugns my conduct as a gentleman. What I have said respecting feminine artists was intended to apply to them collectively, or as an instrument. In replying to your

correspondent I recognised her as an individual—a female—and, therefore, was "more polite" as she expresses it; unfortunately "A Lady Artist" appears to be unable to appreciate the difference.

It is a pity she should have so much recourse to sarcasm—that weapon of the weak. It is not clever, neither is it convincing.

The old stock argument that the study of, and the portrayal of, nude figures is to be encouraged because "suggestion is worse than reality"—so to speak—will not stand, for if the principle were admitted we might as well exist in a condition which civilisation would scarcely tolerate, it being possible to be "educated-down" to anything—unfortunately far more easily than *vice versa*.

Your correspondent is quite right; I have a "bee in my bonnet" as she terms it, and the sooner that "bee" is crushed the better for all.

Her last letter is a sensible one—always excepting her "altogether" nude ideas, for which she is to be sincerely pitied.

Permit me, in conclusion, to again thank you for your courtesy, and to subscribe myself your very obliged servant,

RONALD KELLY.

16 Southampton Street, Fitzroy Square:

August 30, 1897.

[The correspondence cannot be continued.—ED.]

GENERAL.

The **Surbiton Urban Council** have received twenty-seven sets of designs for the new offices. The selection will be announced at the October meeting.

A **Newcastle** shipowner, Mr. John Hall, has offered to give 100,000*l.* for the erection of the Newcastle Royal Infirmary, on condition that a site is obtained on the Castle Leazes or Town Moor recreation-ground.

The **Dean and Chapter** of Canterbury have erected in the crypt of the cathedral a tablet "To the beloved and honoured memory of William Archibald Scott Robertson, M.A., hon. canon of this cathedral, as a mark of gratitude to one who ungrudgingly devoted to the service of the cathedral his faithful labours and his abundant antiquarian knowledge."

The **Autumn Exhibition** in Liverpool contains 1,342 works, an increase of about 100 over last year. Several pictures from the last Academy exhibition are to be seen. The Queen has lent Lady Butler's *Roll Call*.

Owen Jones Prizes have been awarded to the following competitors:—William F. Blagg, School of Art, Chelsea—design for wall-paper; Helena R. Dow, School of Art, Glasgow—design for wall-paper and frieze; Robert Paterson, School of Art, Glasgow—design for a carpet; Herbert D. Richter, School of Art, Bath—design for wall-paper; Bertha Smith, School of Art, Bloomsbury—design for wall-paper and frieze; John Wadsworth, School of Art, Macclesfield—design for carpet.

The **Coronet Theatre** in Notting Hill is the latest proposed addition to the numerous metropolitan buildings of its class.

Pluscarden Priory, near Elgin, has been purchased by the Marquess of Bute from the Duke of Fife, and is to be restored.

The **Vicar** of Stratford-on-Avon is endeavouring to raise 5,000*l.* for the further restoration of the parish church (Shakespeare's church). The restoration of the chancel has been completed, and it is now proposed to restore the nave.

Mr. Bodley, A.R.A., has prepared a design for an elaborate altar and super-altar in St. Helen's Church, Abingdon, which, with marble flooring in the lady chapel, will be the memorial of the late vicar.

Sir A. W. Franks's Bequest to the British Museum will be available, as the condition of a remission of probate duty is agreed to by the Treasury.

Mr. A. E. Brockbank has opened an exhibition of his drawings and paintings in Holland at his studio in Liverpool.

M. Munkacsy, the Hungarian painter, is recovering at Bonn from an illness which he has had to bear for ten months.

A **Tower** is to be erected on Castle Hill, Huddersfield, as a memorial of the Jubilee. Thirty-two sets of designs were submitted in the competition. A design by Mr. Isaac Jones, of Herne Hill, S.E., has been placed first; one by Messrs. Haigh, of Huddersfield, comes second; and the third is by Mr. W. R. Watson, of Glasgow.

The **Marquis of Zetland** has contributed 100*l.* towards the erection of a new church in connection with the charge recently sanctioned by the Church of Scotland in Grangemouth.

A **Congress of Architects** is being held in Brussels. Professor Aitchison, A.R.A., represents Great Britain.

Mr. W. H. Bidlake, M.A., will again be the instructor in architectural history and architectural design at the Birmingham Municipal School of Art. His assistants are Mr. H. T. Buckland and Mr. A. T. Dunn.

The Architect.

THE WEEK.

It is sometimes difficult to decide how far officials in Government and municipal offices should be allowed to engage in business of another sort after office hours. Civil servants were enabled to open stores in London, because it was supposed they were endeavouring to aid their fellow clerks to buy goods at cheaper rates than was possible when dealing with retail shops. It was not foreseen that a business would arise on a colossal scale in which the original principle was set aside, and profit-making for a few people became the sole aim of the philanthropic enterprise. A Parliamentary inquiry could not now fail to have for its result a decree against the employment of Civil servants in conducting establishments which have no higher aim than the humblest shop in the Borough. But there are cases of dual employment where finance alone must not be considered. In Dublin there is a standing order of the Corporation which declares that no officer of the Council should be at liberty to concern himself in the ownership, control, or management of any business or trade. But it was discovered lately that two officers of the public health committee were directors of a building society, and therefore were not unlikely to have to consider plans submitted for approval on the part of the society. When the case came before the Corporation it was found that twenty-three members approved of the practice in spite of the standing order, while twenty-five decided to uphold the order. The reason given was that it was preferable to have Corporation officials devoting themselves to business in the evenings than enjoying themselves in taverns. But a Corporation has a character to uphold, and should be above suspicion. Are not doubts likely to arise when officials can pass judgment on work which they executed when posing as ordinary individuals? It was also reported that one of the City architect's assistants "acted professionally for outside clients" after his office hours. The assistant considered that the standing order did not apply to the case of an official availing himself of his professional training and working for private clients after office hours. The committee, however, were of opinion that if this reading of the standing order were to hold good, it would tend to lessen the independence of the official between the Corporation and the public, and it was with a view to maintaining that independence that the standing order was framed. There was no toleration allowed in the case of the architect, and he will have to respect the standing order.

THE twenty-fourth course of lectures and demonstrations for sanitary officers will be commenced on Monday, the 27th inst., when Dr. LOUIS PARKES will give an introductory lecture on "The Outcome of Sanitation." The following lectures will follow during the term:—"Sanitary Law, English, Scotch and Irish; General Enactments Public Health Act, 1875; Model Bye-laws, &c.," by Mr. HERBERT MANLEY, M.A., Medical Officer of Health, West Bromwich; "The Law Relating to the Supervision of Food Supply," and "Sanitary Laws and Regulations Governing the Metropolis," by Mr. A. WYNTER BLYTH, Medical Officer of Health, St. Marylebone; "Objects and Methods of Inspection, Nuisances, &c.," by Mr. J. F. J. SYKES, Medical Officer of Health, St. Pancras; "Factories, Workshops and Offensive Trades," by Professor A. BOSTOCK HILL, Medical Officer of Health, Sutton-Coldfield, &c.; "Water Supply, Drinking Water, Pollution of Water," by Professor W. H. CORFIELD, Medical Officer of Health, St. George's, Hanover Square; "Infectious Diseases and Methods of Disinfection," by Mr. HENRY R. KENWOOD, Medical Officer of Health, Stoke Newington; "Diseases of Animals in relation to Meat Supply, Characteristics of Vegetables, Fish, &c., unfit for Food," by Mr. ALFRED HILL, Medical Officer of Health, Birmingham; "Principles of calculating Areas, Cubic Space, &c., Interpretation of Plans and Sections to Scale," by Mr. J. OSBORNE SMITH, F.R.I.B.A.; "Ventilation, Warming and Lighting," by Mr. JOSEPH PRIESTLEY, Medical Officer of Health,

Lambeth; "Sanitary Building Construction," by Professor T. ROGER SMITH; "Details of Plumbers' Work," by Mr. J. WRIGHT CLARKE; "Sanitary Appliances," by Mr. GEORGE REID, Medical Officer of Health, Staffordshire County Council; "House Drainage," by Mr. W. C. TYNDALE, M.Inst.C.E.; "Scavenging, Disposal of House Refuse," by Mr. CHARLES MASON, Surveyor, Vestry of St. Martin's-in-the-Fields; "Sewerage and Sewage Disposal," by Professor HENRY ROBINSON, M.Inst.C.E.

A MEETING of the Flintshire County Council was held on Wednesday, when a communication was read from the clerk to the St. Asaph Diocesan Registry on behalf of the dean and chapter. It stated that, by reason of the operations of the road authorities in tiling the footpath at St. Asaph, the foundation of the cathedral wall had been exposed. The committee were asked to order that the portion so exposed should be pointed with cement. The surveyor to the Council said that he had seen the agent to the dean and chapter, and that gentleman considered that the dean and chapter were liable, but the caputular body, on the other hand, thought that the Council were liable; so nothing had been done. In the dispute over liability, which might occupy an endless period, we hope it will not be forgotten that there is a risk to the building. Let the safety of the cathedral be secured by the Council as the operators in the transaction, and then let steps be taken to recover the outlay.

THE first light railway in England is now open. It connects Chichester with Selsey. The gauge is 4 feet 3½ inches, which enables a junction to be formed between it and the London, Brighton and South Coast Railway. There are four stations on the line, but we hope they are only temporary and that the traffic will allow of the erection of more fitting examples. The canal is crossed by a draw-bridge. At present the line terminates at a point about 200 yards distant from Selsey Church, but it will be advantageous to extend it before next summer for about half a mile in order to bring visitors nearer the sea. One of the objects of the tramway is to facilitate communication with Selsey, which is likely to become a popular watering place. The success of the experiment depends in a great measure on the locomotives. The company were wise when they gave the commission for the two required to Messrs. PECKETT & SONS, Atlas Locomotive Works, Bristol. The "Chichester" and the "Selsey" were specially constructed by this firm for mixed traffic, such as they are likely to have on this line. The "Chichester" is a six-wheeled engine (four wheels coupled), and the "Selsey" four wheels coupled, with a two-wheel "pony truck" at each end, so that the weight is distributed. In consequence a light rail is able to be used and economy is secured. The working of the line will be watched with much interest, and it is not unlikely that from other districts orders for similar locomotives will arrive.

It is proposed to purchase a hall at Pitlessie as a memorial of Sir DAVID WILKIE, R.A., the Scottish painter. A church which was altered to a hall, with a cottage and garden for a caretaker, being available, the property was purchased. The committee, in explaining their action to the subscribers, who anticipated that the memorial would take the form of a statue of the artist, say:—"The amount subscribed is not sufficient for the erection of a proper statue of the artist, and the committee are of opinion that any structure, such as an ornamental fountain, would be quite out of place at Pitlessie. After being examined by an expert the hall purchased is found to be in fairly good repair, and will cost little for any alterations necessary. It has all the fittings required as a place of entertainment for Pitlessie district. The hall will of course bear the name of the great artist, and a memorial tablet—plain or elaborate, according to the funds at command—will be placed in a conspicuous position in the front. It is also proposed that a small room connected with the hall should be set apart for the purpose of preserving any picture or other article connected with WILKIE which may be either gifted or bought. The memorial is not one which is worthy of so great an artist; but WILKIE would probably consider that a painter like himself would have many an opportunity to find subjects in the hall.

VARIATION OF ELECTRICITY SUPPLY METERS.

A PAPER on this subject was read before the British Association at Toronto on August 24. Mr. RICKS's paper contains much information which confirms our remarks two weeks back on the errors in supply meters, especially those due to variations in temperature.

It has been known for some years by engineers and electricians who have had to do with supply meters in their experimental stage that the most serious error which, as a rule, has been uncorrected, is that due to temperature variations. Many inventors have admitted their inability to correct this, others have left the error uncorrected, trusting to the fact that tests of the effect of variations in temperature are seldom if ever made by purchasers. We called attention to the fact that the test for temperature error was omitted, and mentioned that it was often greater than many of the other errors.

The object of the tests described in the paper under review was "To afford a means of studying the behaviour of direct current electricity supply meters with regard to variations in the accuracy of their indications under varying conditions of temperature, current and pressure."

"The first of these tests was carried out at three different temperatures, namely, about 2 deg. C., 18 deg. C. and 40 deg. C., which may be fairly taken as the extreme and mean ordinary working temperatures."

The meters tested were of the THOMSON, SCHUCKERT, FERRANTI, PERRY and the CHAMBERLAIN and HOOKHAM types, these being taken to fairly represent the usual ones met with in this country.

The apparatus for keeping the temperature constant and for regulating and measuring the currents employed was described fully, but can have technical interest only.

Mr. RICKS spoke about the method by which he studied the variations of the speed of meters, and as it is the one which has been found reliable and convenient by many, and in fact nearly all, experimenters on meters, it may be of interest to give an abstract of what he said:—

"The accuracy of supply meters is most conveniently studied by experimentally ascertaining to what extent the constant or multiplier differs from its declared value under different conditions. By putting the result as a curve of variation one obtains a clear indication of the behaviour of the meter as regards the accuracy of its readings. The multiplier referred to is the number by which the amount indicated by the meter must be multiplied to give the true value in watt hours or ampere hours as the case may be. Hence the constant or multiplier may be defined as the ratio of the true value to the indicated value. To obtain the actual value of this constant experimentally much time and labour can be saved by observing the revolutions of the armature instead of taking the dial readings in the ordinary way, for since they are connected simply by multiplying mechanism their motions are proportional. All that is necessary is to determine once and for all the number of revolutions of the armature which corresponds to the registration of one unit on the dial."

In testing, therefore, there are in general three quantities to be measured, viz. current, potential difference and speed.

"The speed of the armature was observed by noting, by means of a stop watch, the time taken for a convenient number of counted revolutions. The intervals of time measured was never taken less than 5 minutes." This being the case, there is no doubt that the error of observation in time and revolutions would be very small.

Coming to the actual results, each meter is clearly described. As these descriptions are unusually clear and do not to any great extent depend upon diagrams, we can with advantage give extracts from them.

The ELIHU THOMSON meter "may be regarded as a form of electro-dynamometer so arranged that, instead of merely indicating power, it integrates it with regard to time, and so measures the amount of energy that has passed. The general principle of all such meters is that a small fraction of the power to be integrated is employed to produce motion in an armature. If the velocity of the armature can be made exactly proportional to the whole power, then the number of revolutions of the armature in any time is a correct measure of the total energy that has passed."

There are "two coils of thick conductor which carry the main current. The field thus produced is proportional in strength to the current, and in it is placed the armature, which is drum-wound, without any iron in its core. Its windings form part of the high-resistance pressure circuit. Since there is no iron in the magnetic circuit, the driving torque thus produced is proportional to the current and pressure. . . . Fixed to the spindle at its lower end there is a large copper disc, rotating in a non-uniform but constant magnetic field, supplied by two or three permanent magnets. The reaction between the *FOUCAULT* (or eddy) currents induced in the disc and the magnetic field producing them gives the required retarding torque proportional in magnitude to the velocity." The meter neglecting friction runs at a speed proportional to the power passing, and the number of revolutions to the amount of energy that has passed. The friction which is not quite compensated for makes the starting current, *i.e.* the current which may pass before the meter moves, about 14 ampere in a 10 ampere meter, or about 1.4 per cent. of the maximum. This makes the "constant" infinity at all currents below 14 ampere. "The constant then falls very rapidly as the current increases, not, however, reaching its normal value (that is, the correct one) till the current has risen to about 40 per cent. of its maximum value, after which it remains remarkably constant till within 10 per cent. of the maximum, when it begins to rise slightly (*i.e.* the meter runs slower again than it should do). If the solid friction is entirely compensated for, the amount of continually absorbed energy in the pressure coil would be increased, and the meter would be liable to start when no current is being used on the circuit, should the pressure increase slightly."

The effect of temperature change is shown by curves. Except for low currents, these curves (connecting constant and temperature) are practically straight lines. The constant decreases proportionally to the rise of temperature (that is, the meter runs faster at the higher temperatures). The constant in the meter tested varied from 1.06 at 0 deg. C. to .96 at 30 deg. C., or 10 per cent. variation for a range of 30 deg. C. This is a very serious error, and it must be reduced if the meter is to have any pretensions to accuracy. It is of no use to make a meter accurate within, say, 1½ per cent. for currents from one-tenth to full load, when a slight increase of temperature will make an error of 5 per cent.

The SCHUCKERT meter is next mentioned, but as it is very similar to the THOMSON there is no need to describe it fully. The meter reads more accurately than the THOMSON at the low currents, and the temperature error is less.

The FERRANTI meter is one of an entirely different character. "The action of this meter is dependent on the principle that when a current is passed radially through a fluid which is in a perpendicular magnetic field, the fluid tends to move in a direction at right angles to the directions of both the current and the field."

A disc-shaped insulated chamber contains the mercury; it is made of vulcanised fibre, and is fixed to one pole of an electromagnet, the other pole being just above it. The electromagnet is energised by the main current in a coil, and is designed so that the magnetic field is very nearly proportional to the main current. The current enters the mercury at the central part, and flowing radially outwards enters the coil by means of a metal rim, and then leaves the meter.

"The chief retarding force is that due to fluid friction of the mercury against the sides of its chamber, which are stamped with radial grooves to increase the effect and make it proportional to the *square of the speed* over as large a range as possible." The force tending to move the mercury is proportional to the current and the field, the field being approximately proportional to the current; the force is thus proportional to the current multiplied by the current—that is, the *square of the current*. Thus the speed of the mercury would be proportional to the current. "The motion of the mercury is transmitted to a very delicately-made counting mechanism by means of a vane immersed in it, and having a small vertical spindle which gears into the counting mechanism. Very pure mercury is used, and the spindle is of very small section at the part where it breaks the surface, so that skin-friction is not very great."

"The counting mechanism introduces a small amount of solid friction which is practically constant, and is compensated for by using mild steel for the magnet core, which then has a small amount of permanent residual magnetism."

The author says that the meter is made up in an extremely compact form, and has the great advantage of simplicity of construction. "It possesses, however, the disadvantages attendant upon comparatively small driving and brake forces, necessitating the employment of an exceedingly light and frictionless counting mechanism, which, owing to its very delicate construction, must require very careful handling." Pure mercury is also essential. We entirely agree with the author on these points, and would add another disadvantage, viz. the high speed of the parts.

This meter is extremely curious in its results, which differ from those obtained in any other meter.

"In the first place, the constant at low currents was found to have a low value." Thus the meter runs fast at low loads. This is no doubt due to the fact that fluid friction is proportional to the speed, not to the square of the speed at slow speeds. "Then it was noticed that for any given value of the current the constant varied according to whether the current had risen or fallen to that value." The author makes a great point of this lag of magnetism behind the current.

It has, of course, been known to careful experimenters on this meter for years. It is the effect found in all instruments in which there is iron, the magnetism of which is being varied. It is no doubt large in this instrument, because of the use of a mild steel which retains some permanent magnetism, and therefore has large hysteresis. It is, in fact, the price paid for the low-starting current. The error is no doubt a serious one, and it is more serious at light loads, it being of an amount approaching 10 per cent. at quarter load. The remedy is to get softer iron for the magnet, and either put up with a little higher starting current or find some other way of decreasing the effect of solid friction of the moving parts than by having residual magnetism. We leave this problem to Mr. FERRANTI with confidence, and feel sure that his ingenuity will overcome the difficulty.

The constant of the meter hardly alters with temperature, but the meter runs rather slower at a higher temperature.

The next meter described is the PERRY. This again is a meter which works under conditions differing from any type yet mentioned.

The meter consists of a copper cup, which rotates between concentric poles of a powerful permanent magnet, the pole pieces being cut away to form discontinuities in the magnetic field. The axis of rotation of the copper cup is vertical. The spaces cut away in the pole pieces are filled up to preserve the cylindrical form of the annular space in which the cup revolves. This space is filled up with mercury, the inverted cup being wholly immersed in the mercury, except where the spindle passes through the skin of the mercury. The inner surfaces of the pole pieces and the copper cup are painted with an enamel, except at the bottom, which in the case of the copper cup is nickel-plated, to preserve it from the action of the mercury. At the top of the spindle is a pivot in a small mercury cup, and the whole is kept central by a guide-pin fixed on the top of the inner pole piece, working in a guide inside the bottom part of the spindle. Current enters this armature through the upper mercury cup, and leaves it at the bottom rim, the current going through the mercury to the iron pole piece, which is left unpainted at the bottom, and from there to the lamps. "Solid friction is not compensated for in this meter, but is made very small compared with the other forces, by so adjusting the weight of the copper cylinder that it just floats in the mercury. There is very little skin-friction, because of the very small diameter of the spindle at the part where it passes out of the mercury."

The driving torque on the meter is proportional to the current only, the field being constant; the retarding forces are (1) solid friction, (2) fluid friction, (3) FOUCAULT current friction. Solid friction is made very low owing to the slow speed of the meter; fluid friction is reduced as much as possible, and at the slow speeds is proportional to the speed; and the FOUCAULT current is extremely large, swamping the others, and is proportional to the speed. Thus the speed of the meter is proportional to the current. The

temperature error in this meter is high. The resistance of the copper cup increases with an increase in temperature, and the effect of FOUCAULT currents decreases, the viscosity of the mercury decreases, and for these reasons the speed increases. The magnetic field decreases with increase in temperature, thus the torque or driving force decreases, therefore neutralising to some extent the tendency to run faster, but the FOUCAULT currents, being proportional to the square of the field, are decreased to a much greater extent, thus allowing the meter to run faster still. This latter, and the increase in the resistance of the copper cup, are by far the most important causes of increase in speed.

Mr. RICKS is obviously wrong when he says, "The weakening of the permanent magnets with rise of temperature would scarcely have any effect on the constant, because it would, except perhaps at very low currents, alter the driving and retarding forces in almost the same ratio." This is incompatible with the fact that the driving force is proportional to the field, and the retarding force proportional to the square of the field.

The inaccuracies in this meter due to temperature are rather large, viz. for 30 deg. C. rise in temperature the meter runs 12 per cent. faster, and this is serious. The great advantages of this meter are (1) mechanical strength; it is an engineer's rather than an instrument maker's meter. (2) The speed is low, and the energy absorbed is extremely low—only 1.32 watts at maximum load.

It is, in fact, a very good meter where the temperature does not vary much.

In the CHAMBERLAIN and HOOKHAM meter, which is very similar to the above in principle, the driving force and the brake are separated. "In this meter two metal discs are employed, rotating upon a vertical spindle in a permanent magnetic field, the direction of which is parallel to the spindle. The current in passing radially through one of the discs gives rise to a driving torque, which, since the field is constant, is proportional to itself. A retarding torque proportional to the speed is supplied by FOUCAULT currents in the other disc."

The armature field is increased by means of some series turns as the current increases, thus keeping the speed up to the normal through a greater range.

The radial grooves on the pole pieces in the brake are arranged so that the iron in them is saturated; consequently, a considerable decrease in the total field due to temperature does not affect the brake. For this reason the increase in speed due to temperature increasing is only about one-half that in the PERRY meter. The starting current is rather less than in the PERRY, the power absorbed seven times as much. The meter is not so strong mechanically.

It may be of interest to give some of the more important figures obtained in tabular form:—

Meter.	Max. Amps.	Volts.	Power Wasted at Max. Current, Watts.	Starting Current, per cent. of Max.	Temperature Co-efficient.
Thomson	10	100	12.8	1.4	-.32
Schuckert	15	110	14.67	1.93	-.13
Ferranti	25	—	8.19	.8	+.07
Perry	20	—	1.32	1.25	-.47
Chamberlain & Hookham	25	—	9.8	.8	-.22

In conclusion, we may say that the paper will serve a very useful purpose by drawing public attention to the errors in meters, which have been unknown to any but those who have very carefully tested them, and who have usually had good reasons to conceal the errors. In most cases the investigator is the inventor or his assistant.]

CANTERBURY SCHOOL.

THE following interesting paper on "The Origin of Canterbury School" appeared in the *Times* on Tuesday last:—

We have been hearing a great deal lately about Canterbury as the first seat of English Christianity; it has not hitherto been recognised as the first seat of English education. Yet there is every reason to think that it is, and that its public school may trace its origin to King Ethelbert of Kent.

The King's School, Canterbury, though it may legally date only from Henry VIII., is, in fact, a re-foundation of what existed long before him. There were at Canterbury in, or in connection with, the Church and the Archbishop, three educational establishments before the dissolution of monasteries. There was the Monastic School in the Cloister, the School of

the Novices, under one of the senior monks. It can be inferred from a few (very few) scattered notices to have existed from before 1067 to 1494, and, if it fell into desuetude then, to have been at least for a time revived in 1511. There was the Almonry School in the Almonry, on the very site of part of the King's School buildings, probably not existing before 1320, but appearing in a considerable number of documents from that date to 1450. The school of the monks was for novices only, for boys brought up in the monastery intended for monks from their tenderest years, or for those who came in at a later age to be admitted as monks. This school could never have numbered more than a score at a time, and for the most part did not exceed ten or a dozen at the outside. The Almonry School was a charity school, under a cleric, not a monk, for a few poor boys intended to serve as choir boys in the Almonry Chapel. Like the choristers of Winchester College, they waited upon the members of the foundation, though at Canterbury they only waited on the monks when the latter were in the infirmary. The number of this school did not probably exceed thirteen.

Besides these two schools, there was the school of the City of Canterbury, the school of the Archbishop, which, if Canterbury Cathedral had been held, not by monks, but by ordinary canons, would have been called the Cathedral School. It was kept by a cleric or a layman, appointed by the Archbishop, not by a monk. It was outside the precinct of the monastery, in the parish of St. Elphege, a "peculiar" of the Archbishop's. In the fourteenth century it was apparently in the church itself, but in the fifteenth in a house in the parish. It performed precisely the same office as the King's School now, serving as the public school of Canterbury and the neighbourhood, and for all who chose to come. This and not any school of monks or the dependants of monks, of a few novices or a few charity boys, was the true ancestor of the King's School. But, as on the foundation of the King's School nine of the novices were drafted into it as scholars, the King's School may claim also to represent the Monastic School; and as it inherited, through a grant from Cardinal Pole, the buildings of the Almonry, and provision was made for the boarding of its fifty poor scholars in the cathedral precincts, it may also claim to represent the Almonry School.

The Novices' School and the Archbishop's School may both claim a very high antiquity. It is just possible that they represented an eleventh-century bifurcation of one original school. For the Novices' School some very minute directions are given by Lanfranc in his "Benedictine Constitutions," which, though treated and no doubt intended as general rules for the whole Order of Benedictine monks in England, were, in fact, addressed to the Prior of Canterbury in particular. Eadmer, precentor of the monastery, who in the eleventh century wrote an elaborate description of the Saxon church as it was before it was burnt down in 1067, tells us that he himself was a boy in the school at the time of its rebuilding by Lanfranc, and informs us precisely where the monastic school was held before the rebuilding, namely, in the north tower of the church, the south tower being used as the Supreme Court of Appeal for the (Kentish) kingdom.

The record evidence of the "School of the City of Canterbury" hitherto come to light dates only from 1290. From that time to 1472 it is fairly copious. There are over thirty documents, and references to fourteen different masters between those dates. As ushers, monitors and vice-monitors are mentioned it must have been a school of considerable numbers. It enjoyed a monopoly of grammar school teaching in the city. In 1322 a rival school in another "peculiar" of the Archbishop's, St. Martin's parish, was not allowed to derogate from that monopoly to the extent of more than thirteen grammar scholars, though it might have as many as it could get in elementary subjects. No other grammar school was allowed at all. That this Canterbury School continued right up to the dissolution cannot be doubted (though in the later years the registers are silent), under prelates like Cardinal Morton and Archbishop Warham, scholar of Winchester, Fellow of New College, who made even the lazy monks learn grammar. It is said that Twyne, the first master of the King's School, had been master of the school. Though not proven by documents this is highly probable, as he, a Hampshire man, a stranger, was admitted a freeman of the city in 1538, two years before the reconstitution of the Cathedral School.

As to its upward limit of antiquity no bounds can be set. In a case in the Ecclesiastical Court of Canterbury in 1312 evidence was given of the custom of the school "for forty years and upwards," carrying us up to 1272 at least. Somner, who dedicated his well-known "History of Canterbury" to Archbishop Laud in 1640, cites a document, not now forthcoming, in which the schoolmaster appears in 1259.

Unfortunately there is small hope of more records being discovered about it. The archiepiscopal records from Lanfranc's time downwards were carried off to Rome by Archbishop Kilwardby, who resigned the see on becoming a cardinal in 1279. His successor vainly tried to recover them, and they

have not been seen since. The earlier cathedral records were, as we learn from a contemporary historian, destroyed in the fire of 1067.

Yet it cannot be doubted that the school existed from before the Norman Conquest. As the constitution of the Chapter before that date, whether it was inhabited by secular canons alone or by monks mixed with seculars, is wrapped in controversy, the exact constitution of the school must remain in doubt. What is certain is that the church was not served by monks alone, and that the school, therefore, was not simply, if at all, a monastic school. That a school existed at Canterbury before the days of Archbishop Theodore, the reputed founder, and, while certainly not diminished in efficiency by him, was equally certainly not founded by him, is beyond controversy.

The proof of this lies in a small compass. For the history of England and the English Church, and therefore of English education, from the advent of Augustine to the first quarter of the eighth century, there is only one original authority, Bede. William of Malmesbury, Florence of Worcester, the eleventh and twelfth-century biographers of saints, even the Saxon Chronicle itself, are only copyists and commentators, embroiderers and embellishers of that first great historian of the English race. Theodore, a Greek ex-monk, made archbishop (in place of an Englishman who died of the plague at Rome, with all his company), "a man instructed both in secular and divine literature, Greek and Latin," at the age of sixty-six, arrived at Canterbury on May 27, 669. He was quickly followed by Hadrian, an African, sent by the Pope to accompany him and look after his orthodoxy. Hadrian was a monk from near Naples, "diligently imbued with the sacred writings, instructed alike in monastic and ecclesiastical learning"—the distinction is notable—"and of the greatest skill equally in the Greek and Latin tongues." He was made abbot of St. Peter's and St. Paul's, afterwards St. Augustine's Abbey. Now comes the crucial passage as to Theodore:—

"Soon (mox) he journeyed through the whole island wherever the English races were settled, for he was gladly received and listened to by all, and spread abroad the right rule of life, the canonical mode of celebrating Easter, Hadrian accompanying him and working with him in everything. And he was the first archbishop whom the whole English Church consented to obey. . . . And because both—*i.e.* Theodore and Hadrian—were, as we have already said, abundantly learned both in sacred and profane literature, assembling a crowd of disciples, streams of saving knowledge daily flowed from them to irrigate their hearts; so that, with the volumes of the sacred writings, they handed on to their hearers instruction both in the art of metre and astronomy and ecclesiastical arithmetic. The proof is that even to this day there survive some of their pupils, who know Latin and Greek equally with their own tongue in which they were born."

Bede then descants on the happiness of those times in which powerful Christian kings were a terror to all barbarous tribes, and every one set his heart on the newly revealed joys of heaven, "and whoever wanted to be instructed in holy lessons had masters at hand to teach them." Not only did these masters teach languages, but also "the tones of song in church, which hitherto they had known only in Kent." And so, goes on Bede, Theodore, "inspecting everything, ordained bishops in fit places, and with their help put right what he found needing correction."

It is quite obvious from the wording and the context of the passage that Bede was not speaking of Canterbury at all. The point he was bringing out was that Theodore was the first "Primate of all England." He was the first to unite in one Church, under one head, the separate Churches of the different kingdoms into which the English were divided, "evangelised" as they had been from quite different sources—by Romans in Kent, by Scots-Irish in Northumbria, by Burgundians in East Anglia, by Franks in Wessex. To effect this he traversed the whole country, teaching and organising as he went. If Bede meant to credit Theodore with founding any schools, apart from acting as an itinerant Society for Promoting Christian Knowledge, it was not with a school at Canterbury, but with schools attached to bishoprics in Mercia, East Anglia, or Northumbria, and with introducing Greek in addition to the usual Latin. It is worth noting, too, that the special subjects of instruction by Theodore were, first, the "art of metre" or prosody, no doubt with a view to preventing those false quantities in the Psalms and lessons, to cure which Archbishop Warham long afterwards ordered the ignorant monks of Canterbury Cathedral to keep a grammar schoolmaster. Next came astronomy and ecclesiastical arithmetic, the main object of which was to calculate the calendar properly for the movable feasts, especially Easter, which the Celtic Church, adhering to the ancient method, celebrated sometimes a week before the Roman Church.

Neither astronomy nor ecclesiastical arithmetic were subjects of instruction in grammar schools for boys. It is impossible, then, upon any reasonable construction of or inference

from this passage to attribute the founding of any school to Theodore, least of all the school at Canterbury.

The other passages in Bede in which Theodore is mentioned in connection with any educational work are only three. The first occurs *à propos* of the death of Abbot Hadrian in 710. "Of his learning," he says, "and that of Theodore, amongst other evidence is this, that Albinus, his pupil, who succeeded him in the rule of the monastery, was so well taught in the study of literature that he knew the Greek tongue to no small extent, and Latin not less than that of the English, which was his native tongue." Again, of Toby, Bishop of Rochester, who died 726, he says, "a most learned man. For he was a pupil of Archbishop Theodore of blessed memory and Abbot Hadrian; whence, as has been said, together with a knowledge of literature as well ecclesiastical as general, he learnt Greek with Latin, so that they were as well known and familiar to him as the speech of his birth."

Lastly, in his preface to the whole work, Bede says that his chief authority for all that related to Augustine and Pope Gregory and his pupils was Albinus, who had collected all the materials documentary and traditional in "the province of the Kentish men." This very reverend abbot "was the most learned man of his time in everything, having been educated in the church of the Kentish men by those venerable and most learned men, Archbishop Theodore of blessed memory and Abbot Hadrian."

This is absolutely the only passage in which Canterbury is mentioned in connection with Theodore's educational work. It may be taken as going to show (what is, of course, beyond question) that Theodore taught at Canterbury as well as elsewhere. But it is one thing to teach, another thing to found a school.

We are not, however, left to negative evidence, or conclusions drawn from silence. Bede gives us a positive statement, which absolutely disposes of any suggestion of Theodore as founder. Giving an account of the Christianising of East Anglia under King Sigebert, he tells how "when he returned home and became king, wishing to imitate those things which he had seen well done in Gaul, he founded a school in which boys should be taught grammar (*litteris*), Bishop Felix, whom he had received from Kent, helping him and giving him ushers and masters (*paedagogos et magistros*), after the fashion of the Kentish folk." But instead of Sigebert coming after Theodore, as Somner in his history assumes, and Theodore's school being a pattern to him, Sigebert reigned in 631 and died not later than 644, or close on forty years before Theodore ever set foot in this country. To Bede it was so obvious that there were grammar schools for boys already fixed and developed in Kent in 631, that it was to him a matter of course that Kent was able to send forth masters to start schools in other places. For this purpose Kent, of course, means—or at least means before all places—Canterbury. But 631 is itself within forty years of the advent of Augustine. Surely, then, the casual notice of schools in Kent as things of course in 631, the absence of any mention of the foundation of a school at Canterbury by anyone else, the implied assumption that a school is a natural appanage of a bishop, justify the conclusion that, if and so far as the Christianising of Kent and the foundation of the Cathedral Church at Canterbury are rightly attributed to Augustine (and of that there can be no doubt), then and so far must the foundation of the Cathedral School at Canterbury equally be attributed to that "Apostle of the English."

But it is said by Somner and the historical sheep that follow him, that Canterbury was "so often wasted by Danes" that Theodore's school perished. This often wasting of the Danes is an historical delusion, due simply to not regarding the authorities. Its baselessness was shown by Professor Willis half a century ago when he wrote his famous architectural history of Canterbury Cathedral Church. The cathedral was supposed to have been burnt by the Danes in 1011, when Archbishop "Saint" Elphege was captured, carried off, and afterwards killed. But Eadmer, already quoted—an Englishman, and in the monastery not fifty years after the event of which he gives a circumstantial account—asserts point-blank that the cathedral, though "attacked" by fire for the sake of driving the archbishop out, was not burnt, but remained to his day.

Moreover, within ten years of the "martyrdom" of Elphege, Canute the Dane, now a Christian king, accompanied by the English Archbishop Egelnth, visited Canterbury in state and "translated" thither the remains of the martyr.

But this is the only time mentioned by the ancient historians at which Canterbury is specifically alleged to have been destroyed by the Danes, and the earliest and most trustworthy shows that it was not destroyed. The succession of the archbishops was not interrupted. Why then should the school, the grammar school, one of the chief objects of episcopal care, have been interrupted either?

In spite of Danish and Norman conquests, in spite of changes of the Chapter of Canterbury from secular clergy to monks and back to secular clergy, the regular succession of

archbishops has gone on without break from Augustine to Dr. Temple. It is no mere guess, but a well-grounded inference, that the School of Canterbury, which was under the special care and patronage of the archbishops till the reign of Henry VIII., and since then of the Chapter of secular canons, has gone on uninterruptedly too. It may claim continuity from the era of Ethelbert to the era of Victoria.

THE CASTLE OF PULVERBATCH.*

WE are standing at the present moment on the site of one of those manorial residences which are scattered along the western border of Shropshire in considerable frequency, to which the name castle has been applied with propriety, serving to distinguish them from moated manor-houses. They belong to a group of inferior importance to the large Norman and Mediæval castles such as Shrewsbury, Ludlow and Bridgnorth. We may class this one with Wooltaston, Brocards, Minton, Bishop's Moat, and such like. It stands on the edge of a ravine, the steep slope protecting it effectually on the south side, while on the other sides it was defended by artificial works, which even now, after centuries of weathering, are well marked. On the west is the conical mound on which the keep stood. East of this is an oval enclosure forming a court or bailey, divided from the mound by a deep ditch. Another ditch encloses both mound and court where not otherwise protected by a steep declivity. These works indicate the area occupied by the Saxon castle. The keep may have been originally a lofty tower constructed of solid blocks of timber bound together by cross ties, two or three storeys high, affording accommodation for the lord and his family. On the top of this tower would be in times of danger a watchman and a beacon to warn the neighbourhood of the approach of enemies.

Along the brow of the escarpment, enclosing keep and court, would be a strong palisade of timber, outside of which was the ditch—in this case not supplied with water, but having such obstructions to an enemy placed in it as the ingenuity of the defenders could devise.

Now I would especially call your attention to another large court on the north side, which I regard as the Norman addition, encircling which are also a wall of earth and a ditch. When this was made it is not improbable that stone replaced the wooden defences which I have mentioned. Eyton supposes that the whole of these earthworks is the site of a Norman castle founded by Roger Venator; but the southern portion accords so well in size and form with those now recognised as of Saxon date that it is highly probable its foundation was prior to the Norman Conquest, though doubtless enlarged and improved upon by its Norman owner, as were Hodnet and Shrewsbury castles. It is a fallacy to suppose that Saxon landowners could have dispensed with such fortified structures as these. Indeed it was the possession of such places that gave William the Conqueror so much trouble long after the battle of Senlac had put him on the English throne. Freeman, in his "Norman Conquest," says that "none knew better than the Conqueror himself how far the land still was from being conquered. William was king, but he knew well that in the greater part of his kingdom his kingship as yet hardly existed but in name." And again, he says, "The true way of looking at those important stages of the Conquest which followed William's coronation seems to be this. The opposition which William met with was in truth the stubborn resistance of a land striving to guard the last fragments of its freedom against the assaults of a foreign invader who was winning the land bit by bit." Now we cannot suppose that this state of things could have been thus prolonged unless the Saxon owners of the land were prepared to impede the conquerors by fortified positions, such as the one before us, numerous distributed throughout the country. It was this capability of obstruction to his government that necessitated the transfer of land as speedily as possible from the intractable Saxon possessors to the creatures of the Conqueror, by slow but certain steps. Twenty years after the battle of Senlac, when Domesday was compiled, nearly every Saxon in Shropshire was disinherited. Among these were two brothers Hunnit and Uluiet who possessed this castle and manor of Pulverbatch. William conferred nearly the whole of Shropshire on Roger de Montgomery, and he in turn conveyed Pulverbatch to Roger the Hunter, or, as the Norman scribes were pleased to call him, Roger Venator. One of the consequences of this change of ownership was the astonishing decrease in value of the manor, falling five-sixths in its rental.

Roger Venator held other property in Shropshire, but he made Pulverbatch the head of his barony, and on this very spot held his manorial court, and exercised those powers which made the Norman barons so hateful to the English. Those powers were comprehended in holding pleas of the Crown,

* A paper read by Mr. W. Phillips at an excursion of the Caradoc and Severn Field Club, and published in the *Shrewsbury Chronicle*.

having free-warren, a market, a fair and ways. The full meaning of these terms it would occupy too much time to explain. It was almost absolute power, for although a jury was impanelled in the court, it was not likely to be other than subservient to the lord.

Roger Venator, says Eyton, was a younger brother to Norman Venator, the ancestor of the Pitchfords. The two brothers attested Earl Roger de Montgomery's foundation charter of Quatford Church, probably in the very year when Domesday was compiled. The descendants of Roger Venator were ancestors through females of several Shropshire families of distinction, among which may be mentioned the Constantines of Eaton Constantine and Oldbury, the Uptons of Waters Upton, the Stapletons of Stapleton and Wistanstow. His family in the male line continued here as late as the reign of Henry II., the last being Reginald de Pulverbatch, who left Emma, his daughter, sole heir. Certain documents are still extant in which Emma grants to Henry, son of Eyric de Wesseleg, half a virgate of land in Wesseleg, and the whole of a certain moor called Humbermor. She also grants easements in the wood of Pulverbatch, and pannage throughout her whole fee of Pulverbatch, as well as Huggelith, the hill which stands within sight of us at this moment. The heir of Emma was John de Kilpec, a member of a distinguished family, some of which were keepers of the king's forests of Herefordshire.

Without entering more minutely into the succession to this manor, I may say that after the de Kilpecs had held it for several generations, in 1295 Pulverbatch came into the possession of Ralph de Botiler, and continued in the male line of his family till the reign of Queen Elizabeth.

It was during the minority of one of the Kilpecs, John de Kilpec, that King John in 1205 informed the Sheriff of Staffordshire that he had given the custody of John de Kilpec's land to William de Cantilupe. On February 8 following, the king informs the Sheriff of Shropshire that he has entrusted his (the king's) castle of Pulverbatch to William de Cantilupe. The sheriff is to give it up with all arms and chattels found therein. This is the first mention of the castle I have met with, though of its continued existence and occupation there is no doubt. By an escheat roll of the sixth year of Henry VI., we learn that there was a free chapel belonging to the castle in the patronage of Edward de Botiler.

I have supposed this to have been of Saxon foundation, but how far enlarged and strengthened by masonry we know not. One fragment of wrought stone built into a wall on the right-hand side of the narrow road leading down to the highway is the only fragment to be seen. This was pointed out some years ago by the late William Hill, the well-known carver, who formerly resided near here. This stone you should have seen but I could not find it, and it is all that remains to convince us that there once stood on this now desolate site a stone structure of importance dominating the manor. It may be that carefully-conducted excavations may bring to light further remains of masonry to indicate the period of its construction. I regret that we have no information as to when it became dismantled. It took no part in the civil war of Charles I., nor is there any mention of it, as far as I know, in the reign of Elizabeth, which leads to the supposition that it was abandoned as a ruin at an early date.

If I have not already wearied you, I should like to say a word or two on the derivation of the name Pulverbatch, which, although having received the attention of very able men, appears to me far from being settled satisfactorily. I will read you what Eyton has written on the subject in his splendid work "The Antiquities of Shropshire":—"As the modern *Wel-batch* figures in Domesday as *Huelbec*, so *Pulverbatch* was spelt *Polrebec* by the Norman scribes who registered the survey. About this termination, *bec* or *batch*, there are two opinions. Mr. Blakeway cannot forget that *bec*, in the North of England, is a little brook, nor that the German form, *bach*, is found in other Teutonic dialects. In Shropshire, the situation of Beckbury and other places on or near streams suggests the same etymology. However, Mr. Blakeway acknowledges that it can hardly be said there is a brook at Pulverbatch; and I cannot find in the Saxon glossaries any word like *bec* or *bach*, significant of a stream. Mr. Hartshorne, on the other hand, asserts the existence of a Mercio-Saxon word, *bach*, signifying a bottom or valley. I cannot doubt that in Shropshire and Staffordshire names the word *batch* has the latter signification. I must join Mr. Blakeway in hazarding a somewhat bold opinion as to the etymology of the other part of the name Pulverbatch. It is clear that this district was well-known to the Romans, and I cannot but see that Roman and Saxon words are compounded in such names as Pontesbury, Pontesford and Pitchford. Why, then, should not the Latin noun, *pulvis*, *pulveris*, be accepted as the component of Pulverbatch? Mr. Blakeway says that the district in summer is literally 'a bed of dust.' It is, moreover, easy to see that a Norman scribe, well knowing, as every Domesday scribe did, the meaning of the Latin part of the word *Pulver-batch*, should write it as *Polre-bec*, for *Polre* is,

within a letter, the same as *Poldre*, and this is the old French word for dust—the original, in short, of our word powder. Lastly, one fact is known to all dwellers in the neighbourhood of Pulverbatch, viz. that in the local dialect the place is pronounced Powderbatch to this day" (vol. vi. p. 188).

Now with regard to the batch in this name, few will differ with Mr. Eyton. It is so commonly used in Shropshire for depressed hollows, such as we see from this castle mound, that the very spot confirms his contention. But with regard to the place being more dusty than other places in the district, notwithstanding the high authority of Mr. Blakeway and Mr. Eyton, I must entirely differ from them, and as a consequence humbly reject their explanation.

It will be thought presumptuous on my part to offer a new and what I venture to consider a much more probable explanation of the first member of the name, and I shall probably incur severe criticism for my temerity.

You will bear in mind that the Norman scribes wrote the name Pulverbatch *Polerebec*, just as they received it from the Saxon dwellers; and further, the name probably indicated the physical features of the place. If you take the ordnance map and trace the water-courses you will see that in this *bach* several join here to form a stream which ultimately falls into Condover brook, and may have been considered the head of the brook. Now in *Polre* we have combined two members—*Pol*, meaning head, and *re*, meaning brook or stream. The first of these we have in poll-tax, a tax levied by the poll or head. Also in pollard, a tree having its top cut off. It is said to be derived from the Danish *bol*. The second, *re*, or *rhe*, we are familiar with in the name of the Rea, which rises near Marton and enters the Severn at Shrewsbury. And again in the river Rea in the south of the county. If I am correct, therefore, we have the physical features of the place condensed into a trisyllabic word *Pol-re-bec*, meaning head of the brook-bach.

The reading of this paper was listened to with great interest in spite of wind and rain. The steep mound of the keep was then examined and the entrenched inner court. Descending thence into the road, and crossing the little brook referred to in the paper, the party walked up a narrow, steep lane, and across the open hilltop to Underhill Hall, and partook of a very welcome tea. During the progress the rain cleared off, and lovely views were obtained towards the north and east. Walking down again to Castle Pulverbatch, the carriage was rejoined, and a start made homewards at 7.30. Shrewsbury was reached about an hour later, the return route being *via* Stapleton and Bayston Hill. The evening was beautiful, and the clouds and sky tinted most exquisitely with all hues of red, green and gold by the setting sun.

BIRMINGHAM BATHS.

CORPORATIONS and other local authorities have of late years to take a share in a system of mutual improvement. When a new work is contemplated it is usual to send a deputation of members to various places where similar works were executed, and besides opportunities of inspection it is expected that a large mass of information will be supplied which can be used as a basis for the report of the visit. Birmingham, being one of the most progressive of cities and having, moreover, a regard for economical expenditure in all things, is naturally among the first places sought by committees who are in quest of knowledge. As the preparation of statistics and details for visitors is an onerous task, Mr. J. Cox, the superintendent and engineer of the baths department, has by permission of the committee prepared a book which is a comprehensive history of the public baths of Birmingham and explains their acquisition, cost and annual maintenance, with copies of the Baths and Washhouses Acts, subsequent Amendment Acts and the by-laws framed for the management, use and regulation of such establishments. It also contains statistics of the number of bathers, and receipts and expenditure on account of each department from the date of opening up to the present time, with a summary of the expenditure incurred for the provision, erection and maintenance of these and similar institutions in other large towns and cities. Detailed plans, giving the dimensions and accommodation provided at each of the baths, are included in the work, with a general map of the city. Some extra copies have been printed to satisfy the demand for information on the subject, and can be obtained at cost price (3s. 9d.) by all who have an interest in sanitary affairs. The book serves its purpose so well, we suppose the heads of other departments will follow the example of Mr. Cox and prepare similar volumes relating to other branches of municipal work in Birmingham.

The oldest of the four bathing establishments in Birmingham is in Kent Street. It was opened in 1852, but there have been many changes since that time. For instance, there was one improvement in the first-class swimming-bath, as the promenades were, in 1892, paved with Edwards's Ruabon "adamantine tiles." The most important addition was probably the Turkish

bath, which was opened in 1879. The question often arises whether baths of that sort are remunerative, and from the following statement it will be observed that in Birmingham the returns almost meet the expenditure:—"The average number of bathers in this department during the three years ending March 31, 1894, was 5,306, viz. 4,448 men at one shilling, and 858 women; and the average annual income for the same period was 271*l.* 7*s.* 6*d.*, against an average working expenditure of 235*l.* 10*s.* 6*d.*" At Kent Street there is also a laundry and wash-house. The water is obtained from a well which is 25 feet deep and 8 feet in diameter. During the summer months about 700,000 gallons are required weekly. Efforts are made to make the baths popular, and Kent Street is the rendezvous of six men's swimming clubs and one ladies' club. The children attending the schools of the city are also admitted on most reasonable terms, in some cases for a halfpenny each. Kent Street baths have cost about 23,900*l.*, and already a sum of 19,926*l.* has been repaid. The original architect was Mr. D. R. Hill.

The Woodcock Street baths were made the subject of a competition, in which Mr. Edward Holmes was successful. The style adopted was Gothic. They were opened in August 1860, and consist of swimming-baths and private baths. The Northwood Street baths, opened in 1862, were designed by Mr. William Martin, and cost 12,283*l.* Messrs. Martin & Chamberlain were the architects for the Monument Road baths, which were opened in February 1883. The cost was 20,251*l.* A Turkish bath was added in 1888, which Mr. Cox describes as follows:—"The walls of the hot rooms, as in the other departments, are cased with white enamelled bricks to a height of 5 feet 6 inches; the upper part and the arches forming the ceilings are built with white brick, the hot rooms are lighted by means of double-glazed vertical windows, with cast-iron frames, and to improve the lighting they have recently been enlarged. The floors are laid throughout with encaustic tiles, and the shampooing-room is fitted up with one marble slab, a needle and shower bath, with douche, spray, and other improved hot and cold water services. The various degrees of temperature are maintained by a system of steam radiators fixed in special vaulted chambers below the hot rooms, with suitable hot-air flues communicating thereto, and the temperature of No. 1 hot room is 150 deg., No. 2 hot room 175 deg., and 200 deg. in No. 3 room. A current of fresh air is supplied to the radiators, and after being heated passes through the hot rooms to specially constructed extraction flues provided in the main walls of the building with outlets above the roof, thus securing a constant current of fresh warm air throughout the building at all times. Eight lounges are provided in the lounge-room, and the plunge bath is 14 feet by 16 feet, with a depth of 4 feet 6 inches. This bath is approached by marble steps, screened off with suitable curtains and brass rods, &c. It is worthy of mention that this department is much used by some of the principal residents of the city, and is often recommended by medical gentlemen.

The income from the Turkish bath is 234*l.* 11*s.* 6*d.*, and the annual expenditure 236*l.* 10*s.* 6*d.*

Plans have been prepared by Mr. Cox (with the co-operation of Mr. H. Martin as architect) for baths at Small Heath and Balsall Heath. The former building when completed will correspond with the following description, and exemplify the latest improvements:—

The front and principal elevation will be in Green Lane, with a total frontage of 168 feet. It will adjoin the new branch library, opened on December 30, 1893, and will be carried out in the same style of architecture as that building, and which has already been described "as a building that will vie with any other public library in any district of the city for the beauty of its design and harmony of structure." There will be three separate entrances to the new baths from Green Lane, viz. one for first-class bathers, one for second-class bathers, and the central entrance will be used for admission to the women's first and second-class departments.

The ticket office will be placed in the centre of the building immediately behind the women's baths, and there will be separate ticket windows from this office communicating with the three entrances named. A private room will be provided for the use of the resident money-taker adjoining the ticket office, and other domestic apartments will be placed on the first floor immediately over the women's bath, and will form the central elevation of the building.

The first-class swimming-bath is placed on the south side of the establishment immediately adjoining the library buildings. This department will measure about 100 feet from front to back and about 60 feet in width. The water area will be 81 feet by 33 feet wide, and will have a depth of 4 feet at the shallow end and 6 feet 6 inches at the deep end, and will contain about 90,000 gallons of water. The promenades on the four sides of the bath will be 7 feet 6 inches wide, with 47 dressing-rooms on two sides and at one end. Each dressing-room will be about 3 feet 6 inches wide and 4 feet 3 inches back to front. In addition there will be a separate

room for the use of swimming clubs, one drying-room, a needle and shower bath, with the usual lavatory accommodation. It is also proposed to construct a public gallery on the two sides and at one end over the dressing-boxes, with separate stairs and entrance from the first-class corridor.

There are seventeen men's first-class private hot and cold water baths, divided into two sections, with a 4-feet corridor between. Each bathroom will be about 7 feet 6 inches long by 6 feet 6 inches wide. An attendant's room is placed at the junction of the two departments, to enable one person to supervise both if required during meal times or on other occasions, also to overlook the first-class entrance and the ticket-office window. Separate lavatory accommodation is provided for each of the departments.

The second-class swimming-bath is placed on the north-east side of the establishment, and will measure 97 feet from front to back and 47 feet in width. The water area will be the same as the first-class bath, viz. 81 feet by 33 feet, and will also contain about 90,000 gallons of water. The promenades will be 7 feet 6 inches wide; but there will be no dressing-rooms, as seats will be fixed against the outside walls, with wood partitions between each, 2 feet apart, and fitted with clothes-shelves above, giving accommodation for about 120 persons at one time. The men's second-class private baths are placed between the swimming-bath and the first-class department, and are seventeen in number, in two sections, with corridor between them, and they will communicate with the second-class entrance passage, with an attendant's room placed as in the case of the first-class department to enable the attendant to have full control of the two departments when necessary, and also the oversight of all persons passing up and down the corridors to the ticket-office window.

As before stated, the women's private hot and cold water baths will be placed in the front part of the establishment, with a separate entrance, and will consist of five first-class baths, with an attendant's room on one side of the entrance passage, and six second-class private baths on the opposite side, the whole communicating with one ticket window, and will be easily accessible by the money-taker, whose duty it will be to attend to these baths in the winter months in addition to the issue of tickets, &c.

The engine and boiler-house is placed in the rear of the establishment, with a gateway entrance and coal yard from Little Green Lane. The boiler-house will be about 57 feet long by 24 feet wide, and separated from the engine-house and engineer's workshop by half-glass screens, thus enabling the fireman to have complete oversight of the machinery whilst attending to his boilers, &c. A large cold water reserve tank, holding from 50,000 to 60,000 gallons of water will be placed on girders, supported on the walls of the boiler-house at a height of about 25 feet, and from this tank the whole of the water services throughout the establishment will be supplied.

It is proposed to construct the heating arrangements and the hot-water supplies upon the same principle as that recently adopted at the Kent Street, Northwood Street and Woodcock Street establishments, and which has proved eminently satisfactory, viz. by high-pressure steam circulation, with suitable reserve hot water tanks. Two boilers will be required for this purpose, each about 26 feet long by 7 feet diameter, with two furnace flues and cross-tubes to each. Each boiler will be of sufficient power for doing the work of the whole establishment, so that one boiler will work on alternate months, while the other is at rest for cleaning, &c.

Birmingham has also two open-air swimming-baths at Cannon Hill Park and Victoria Park. If considered as a whole, income from the baths does not meet the expenditure. The amount received from all the bathing establishments during the past three years was 5,801*l.* per annum, but the annual working expenditure during the same period was 7,023*l.*

PETERBOROUGH CATHEDRAL.

THE Dean announces that the restoration of the north gable of the west front of Peterborough Cathedral is now completed. Those portions of the great arch and of the gable above it which have been taken down and rebuilt contained in all 2,006 facing stones. Of these 170 only were found so decayed that they had to be replaced by new ones; the remaining 1,836 have been put back again into their original positions. The scaffolding is being removed, and the completed portions of the work can now be seen. The result fully justifies the committee in the action which they have taken.

The central and southern gables, portions of which are in a very dangerous condition, will next be dealt with as the architect, Mr. J. L. Pearson, R.A., may advise, but for the completion of this work funds are urgently needed.

The Death is announced of Mr. Downwald Birch, an English painter who has lived for several years in Italy.

NOTES AND COMMENTS.

It is announced that a picture by MURILLO has been lying unnoticed in Copenhagen during several years. Originally it appears to have belonged to a church of the Jesuits in San Sebastian. The French commanders, who professed to confer liberty on Spain, carried off countless works from churches and convents, and the picture is supposed to have formed a part of the spoil of the invaders. It found its way to England, thence to Norway, and about 1820 obtained a refuge in Copenhagen. During its travels it could hardly fail to suffer, and the upper part has been restored by some northern artist who was unable to rival MURILLO in the use of glowing colours, and therefore preferred to treat his restoration in a style which cannot be mistaken. According to one French expert the picture is worth 24,000*l.* (which is 50 per cent. above the sum paid for *The Conception* in the Louvre), but the owner expects to receive 1,200,000 kroner for it.

THE awards of the jurors for the International Art Exhibition at Venice have been issued. The prize of the Municipality is to be divided. One-half (5,000 lire) is given to ETTORE TITO for his *On the Lagoon*, and the other half to A. MILESI for his *Wedding*. A part of the prize of 10,000 lire for foreign works, amounting to 5,000 lire, is awarded to LUDWIG DETTMANN for his *Evening of the Fête*; 2,500 lire go to OTTO SINDING for his *Winter Scene in Lofoden*, and a like sum to FRITZ THAULOW for his *Night at Sea*. The Italian Government's prize of 5,000 lire is equally divided between EMILIO MARILI, for a group in plaster, and A. ZORN, for a tavern scene. A sum of 2,500 lire, one-half of the prize of the Province of Venetia, is given to P. S. CROYER for his *Bourse at Copenhagen*, and a like sum to J. S. BASTIDA for *Blessing the Boat*. PIERRE BRAECKE obtains 3,000 lire for his group in plaster, *Forgiveness*, and G. ROMAGROLE 2,000 lire for his statuette *Ex Natura Ars*. The Murano prize of 2,500 lire is awarded to A. ZEZZOS for his *Venetian Girl* and other works. The prize of 2,500 lire offered by Herr LIEBERMANN, the painter, has been gained by V. BRESSANIN through his *Le Café*. A. MANCINI has obtained the Provincial prize of 1,600 lire by his *Meditation*. It will be observed that a British painter was not successful in securing any of the prizes.

SAINT-FRONT, Périgueux, we need not say, is one of the most important buildings in Europe if considered as an example of architecture on account of its plan and its cupolas. It was not, however, the scene of any important historic or ecclesiastical event, and therefore when we learn that the POPE has promoted Saint-Front to the dignity of a minor basilica we presume the reason was its architectural interest and antiquity. The sign of the distinction has been set up in one of the chapels. This is a pavillon or canopy made of red and yellow silk arranged in bands, with a globe of gilt copper on the top, which is surmounted by a cross which is likewise gilded. By the laws of heraldry the pavillon serves for the armorial bearings of kings and princes, the same purpose as mantlings for the arms of nobles, or, we venture to say, as the curtains and valance to be seen in exhibitions when it is intended to give importance to a picture or statue. When a cathedral becomes a basilica the insignia is carried in processions before the chapter, and should be preceded by a portable belfry, in which is a silver bell, which is kept ringing. The pavillon can also be introduced in the arms of the diocese, and the chief prelate has the privilege to wear the "cappa magna."

DICKENS has revealed the risks which can be incurred in England by becoming a trustee or the representative of a trustee. We suppose the examples put forth by the novelist have deterred the Combe Down Parish Council from accepting the sum of 200*l.* bequeathed by the late Mrs. ARABELLA ROXBURGH to aid in erecting a public reading and recreation-room. The lady's trustees do not consider they form a sufficiently responsible body to have charge of that particular sum, although they can carry out other conditions of the will, and they offered to transfer the duties imposed on them to the Parish Council. But, as Parliament neglected to introduce a clause in the Act which would

enable parish councils to accept legacies of the kind, the 200*l.* cannot be accepted by the Combe Down Council. Failing the Council, an offer has been made to one of the clergy to act. If an individual can legally accept charge of the money, it is remarkable that the trustees should be anxious to be relieved of their duties. They may be liable to an action for failing to act. Apparently Combe Down is likely to be in want of a recreation-room for many a day, and the case should be considered by the legislature.

BUILDING in Boston, U.S., during the past year was more extensive than was anticipated, for general business suffers there as elsewhere. The number of permits granted for first and second class buildings was 526; for third-class buildings, 1,975; for alterations, 2,331; for boilers, engines and heating apparatus, 1,552; and for plumbing, 4,442—the total being 10,826. The first and second-class buildings completed during the year numbered 388, and were valued at 9,088,000 dols. The third class buildings completed were 1,745 in number and cost 7,151,246 dols. The plumbing and repair work added to these made the grand total of the year's operations 19,906,849 dols. The construction of these buildings and improvements taxed the inspection force in spite of an increase of three additional plumbing inspectors and two additional building inspectors. The total number of examinations made by the force was 62,632, calling for 7,278 reports. The Building Commissioner advises that the inspection force be increased by three more plumbing inspectors and four building inspectors, three of the latter to be expert masons and two expert ironworkers. He also asks for the aid of two civil engineer architects, a request which seems reasonable in view of the fact that it was necessary to disapprove of 1,373 of the plans presented last year.

ACCORDING to the Latin proverb a great book is a great evil, and with busy men size has an influence on their judgment of treatises which are prepared for their special use. The "Price-Book for Approximate Estimates," just brought out by Messrs. SPON, is not much larger than a card-case, and can be made a *vade mecum* without spoiling a coat. As the information is arranged alphabetically it can be referred to instantaneously, and the prices are of the class which people who contemplate building are most likely to ask for when consulting with architects. Another small book, "The Science of Brickmaking," by Mr. G. F. HARRIS, F.G.S., and published by Mr. H. GREVILLE MONTGOMERY, is worth having; as it explains the nature of clays which are best adapted for conversion into bricks. The author has a talent for clear exposition. The lists of marks on timber published by Messrs. W. RIDER & SON, could not be better arranged or in a handier form, and they will be found invaluable to all who sell or purchase timber.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: NORTH AMBULATORY, LOOKING WEST.—CRYPT, NORTH TRANSEPT.

BUSINESS PREMISES, ST. PAUL'S CHURCHYARD.

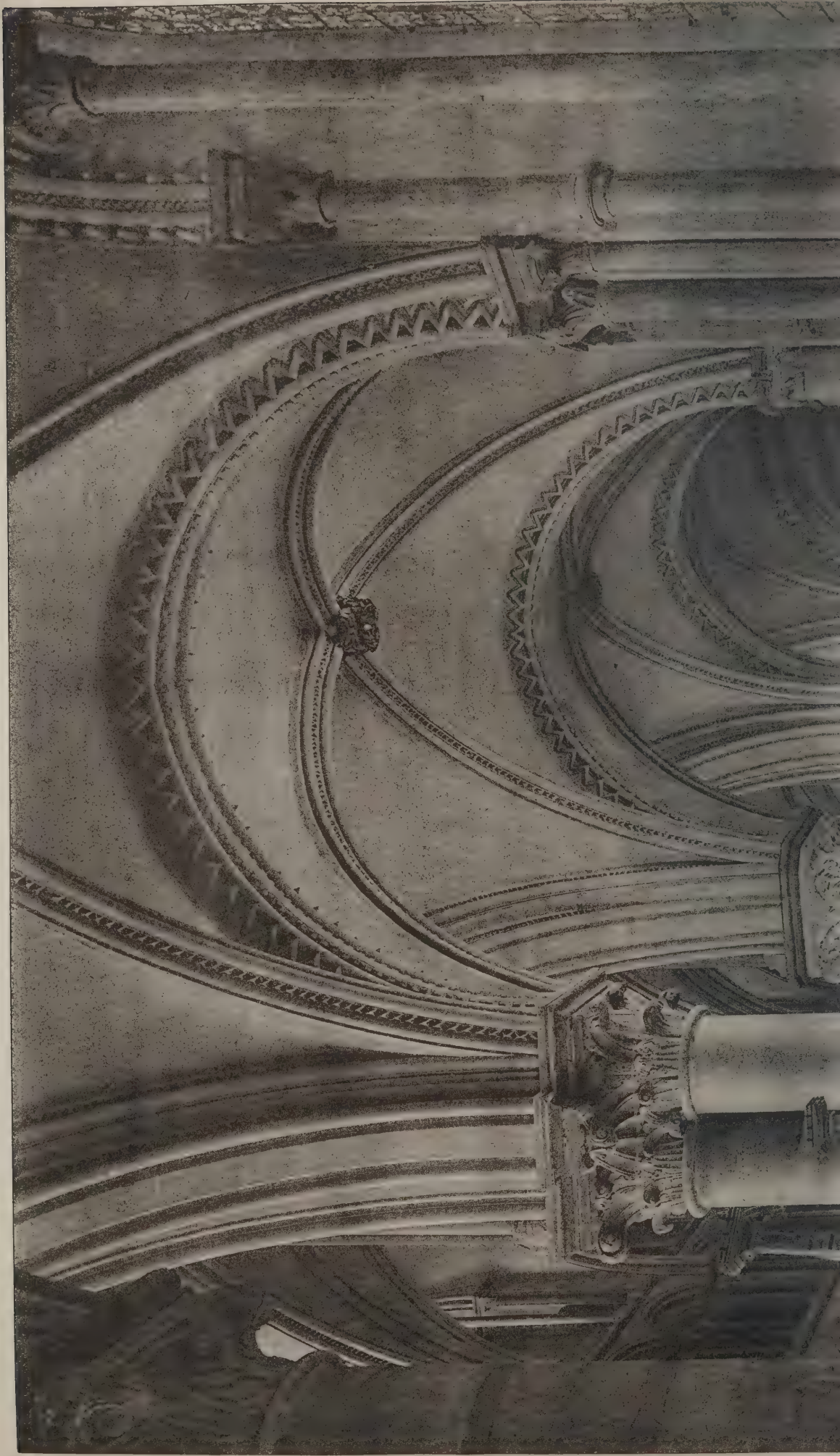
A LARGE block of buildings have recently been erected for Messrs. PAWSONS & LEAFS, with frontages to St. Paul's Churchyard, Godliman Street, Carter Lane and Dean's Court. The premises have a frontage of 200 feet in St. Paul's Churchyard, which, with Godliman Street front, is built in Portland stone, while the remaining two elevations are in Suffolk bricks, with Portland stone dressings. The main entrance is almost in the centre of the St. Paul's front with an arched head over. The building consists of ten floors, the majority of which are fireproof. The premises were erected in two portions, so as not to interfere with Messrs. PAWSONS & LEAFS'S business, and the whole of the works were carried out in a very short time.

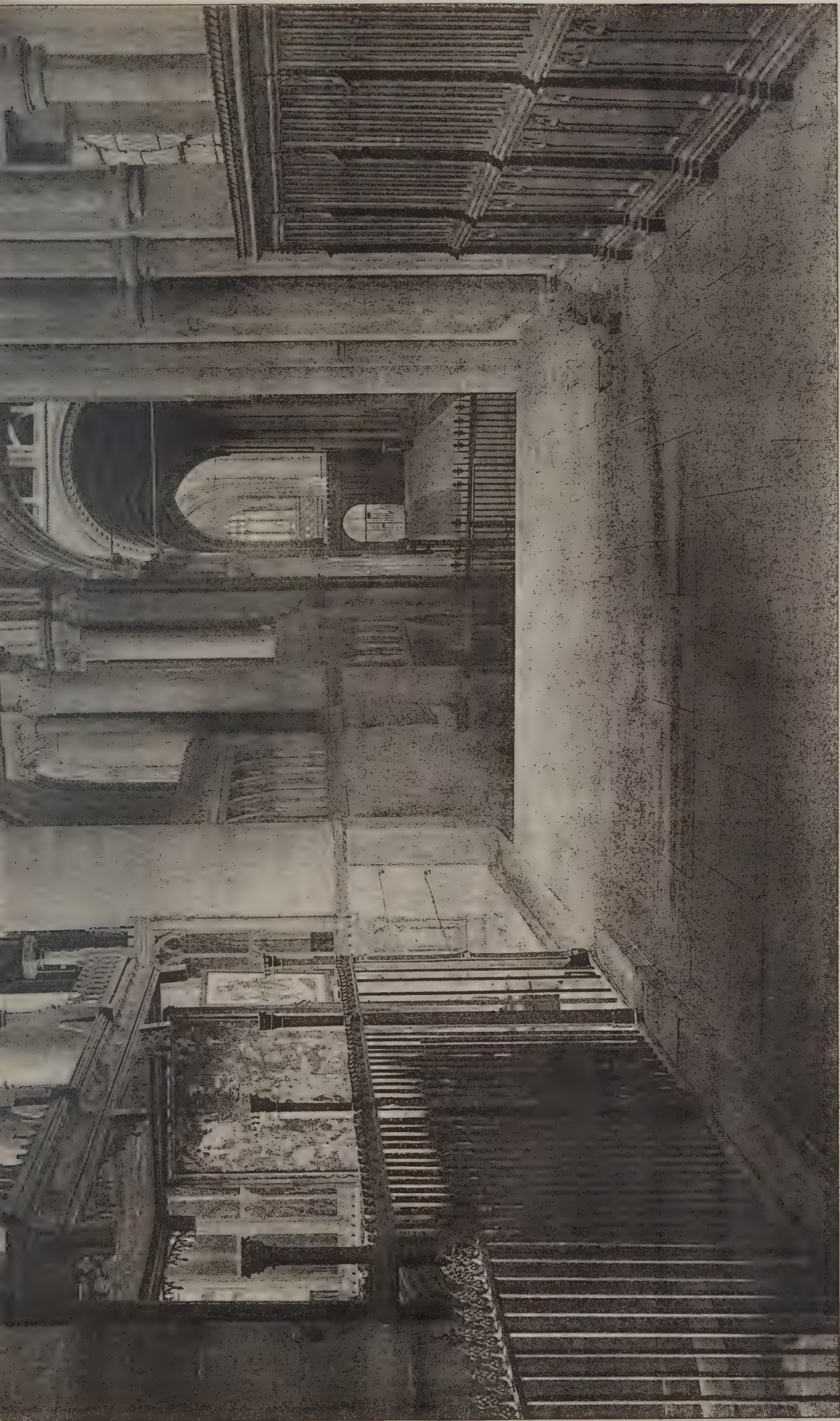
The contract amounted to about 100,000*l.*, and was carried out by Messrs. PATMAN & FOTHERINGHAM, builders and contractors, of Park Street, Islington, and Theobald's Road, W.C. Mr. H. FORD, of 21 Aldermanbury, E.C., was the architect.

ALVERSTOKE, CLAPHAM COMMON, S.W.

STANLEY PALACE, CHESTER.

The Architect, Sep. 10th 1897





PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C. 4.

INK- PHOTO, SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C. 4.

CATHEDRAL SERIES, No. 73.—CANTERBURY: NORTH AMBULATORY, LOOKING WEST.

The Architect, Sep. 10th 897

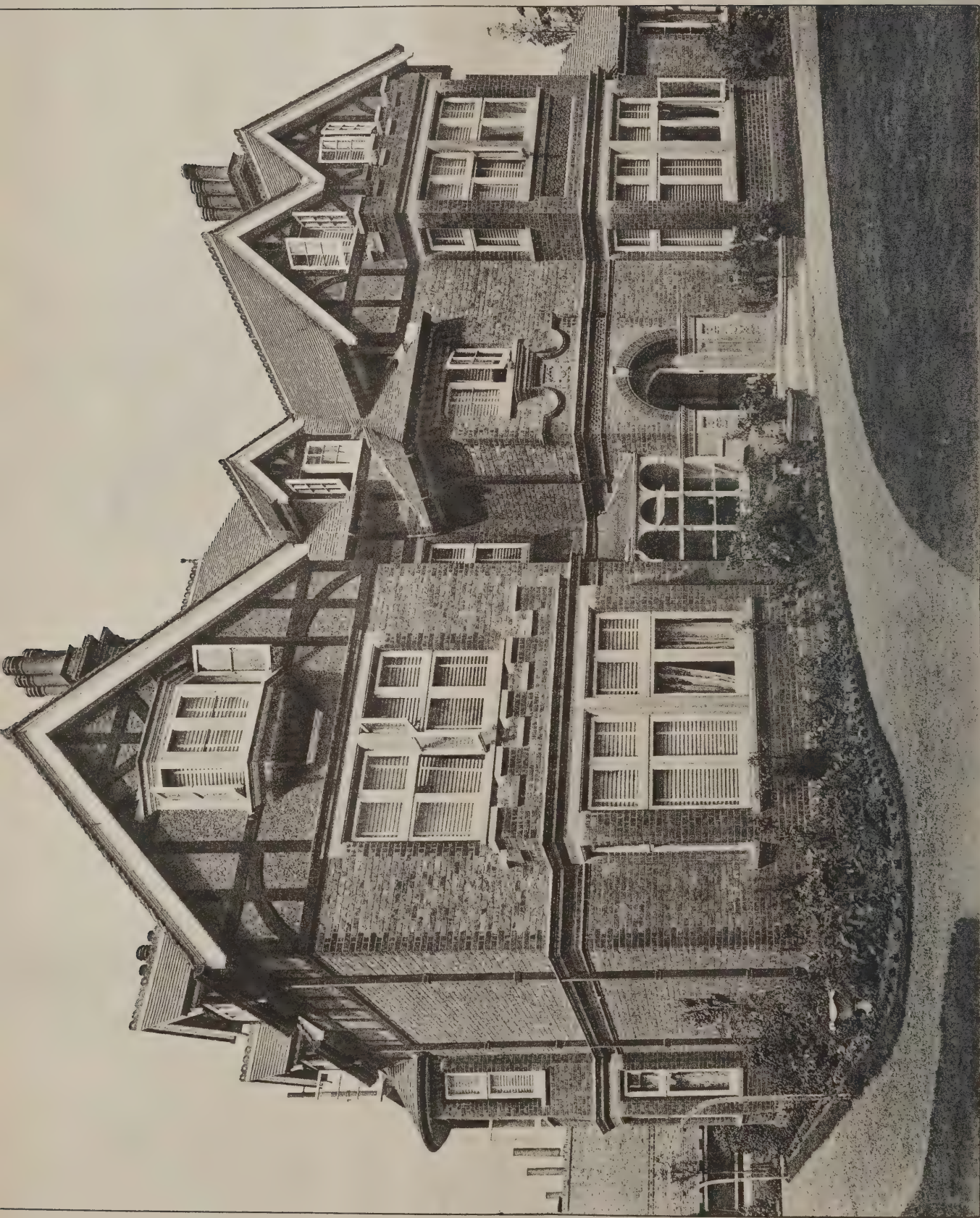




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CATHEDRAL SERIES, No. 74.—CANTERBURY: CRYPT, NORTH TRANSEPT.



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"ALVERSTOKE," CLAPHAM COMMON, S.W.



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STANLEY PALACE, CHESTER.





ST. PAUL'S CHURCH, BEDFORD.*

THE few notes which I have to offer and which have been rather hastily compiled must be mainly limited to the early state of things connected with the origin of this church. The church itself I shall only be too thankful to leave in the hands of the local friends who have so obligingly come to our support to-day, through the kindness of Mr. Hills. This subject is decidedly attractive; I only regret that I have not had more opportunity of investigating it.

This parish of St. Paul, which comprises the oldest portion of Bedford, is of unknown antiquity. It is certainly older than the parishes of the southern portion of the town, called Potter Street ward, because that was not added to Bedford till 1019, in the reign of Edward the Elder. It is a highly probable conjecture that the first Saxon church in Bedford, whenever it was erected, was dedicated either to the Apostle St. Paul, or St. Paul and St. Peter conjointly. Of such primitive dedications there are many examples. The proximity of this site to the most ancient localities renders it likely that the earliest Christian house of worship was situated here (on this spot). I am referring to the ancient ford and subsequent bridge, the Saxon fortress, where would be the residence of a thane or alderman, and the cheaping or market place, where the early borough moots would be held. But I must not pursue these speculations. What appears to be certain is, that the earliest associations of the church are monastic. Antiquaries agree that there was a primitive monastery here in the eighth century, and probably much earlier, under the Mercian rulers. King Offa II. had a partiality for it, and was perhaps a frequent visitor. There is reason for supposing that Abbot Alhmund, whose name is among the signatories to Offa's charter, given to St. Albans in 795, was Abbot of Bedford. However this may be, we have the authority of Matthew Paris for the burial of Offa with regal honours in a chapel at Bedford, 796, and the story of the subsequent submersion of the chapel and tomb by an inundation of the river Usca, *i.e.* the Ouse, and the complaints against Abbot Willelode for not securing his relics for St. Albans. The traditional site is, I believe, a few hundred yards up the river, opposite to Batt's Wharf. We may see this from the castle mount. It seems useless to speculate whether this chapel belonged to the monastery or to a royal residence. The monastery was probably destroyed in the devastations of the Danes, to whom King Alfred ceded this district north of the Watling Street, afterwards called the Danelagh; if so, however, it had been restored before 971, in which year Thurkytel was the abbot. He must have been of Danish extraction. The Saxon Chronicle informs us, under the year 971, that Oskytel, Archbishop of York, died at Thame on All Hallows' mass night (November 1), and Abbot Thurkytel, his kinsman, conveyed the body to Bedford—I suppose on its way for burial at York. This was in the reign of King Edgar, who was a great favourite of the monks.

We hear nothing more of the monastery; it was probably merged in the College of Secular Canons, which appears to have been established here a considerable time before the Conquest. Their church was dedicated to St. Paul, and very probably in succession to the church of the monastery. In the Domesday Survey, the canons of Bedford are named after the canons of St. Paul's, London (I am following the account given in Parry's "Illustrations of Beds"). They were a powerful body, well endowed with estates, and were lords of the borough manor. In their time a Norman church must have been erected, and I conjecture on this site. I may be treading on debatable ground in describing it as being situated just outside the western precincts of the Norman castle, which was erected here in the reign of William Rufus by Payne de Beauchamp, third Baron of Bedford. The distinguished antiquary, Mr. George Hurst, supposes the moat to have joined the river close to the present bridge, where the Swan Hotel now is. This church was on the canons' land, and clearly outside the castle. This secular college would have been governed by a dean or provost. About the time when the diocese of Lincoln was constituted by Bishop Remigius, who began to erect his Norman cathedral in 1080, the canons were unjustly deprived of some of their privileges by this unscrupulous prelate. Leland says:—"The prebendaries had their houses about the circuit of St. Paul's Church, and the names of two prebends remain, although their stalls be at Lincoln." Remigius seems to have appropriated two of the canonries, with their corpus prebendæ, or estates, to his cathedral. There are still at Lincoln two prebendal stalls, having attached to them the names respectively of "Bedford Major" and "Bedford Minor." Lysons states that in his time (c. 1820) a Mediæval house was standing in St. Paul's Square, held under a lease from the Chapter of Lincoln, and was supposed to have been a prebendal residence. In the reign of Henry I. these seculars were transformed into Canons Regular of St. Augustine, by Lady Roysse, the

widow of Payne de Beauchamp, who was thus accounted their foundress. The cloister and walled precinct which must have been erected for them would have been rather cramped for room in this situation. Whether these canons had the patronage of other churches in the town I have no information, but I have to note that three churches here were at a somewhat later period in the gift of the Austin Canons of Dunstable, *viz.* St. Mary's, to which they presented a vicar in 1216; the church of St. Peter, Dunstable, which stood opposite to St. Mary's, and that of St. Cuthbert, to the north-east of the castle site. Presentations to these in the thirteenth century are noted in the Dunstable Chronicle. The influence of the Black Canons must have been powerful in Bedford. The prior here, of course, had the tithes, and was bound to provide for the parochial ministrations by means of a secular priest or chaplain.

If the Norman church was on the same lines as the subsequent one (as I suppose), it was what may be called a double church (for such was the character of this structure before the modern additions). It had two naves and two chancels of equal length and width. If this is correct, I suppose the north member to have been the church of the canons, and the south one the church of the burgesses; the south chancel was probably the lady chapel. In 1164, the 9th of Henry II., the canons were still here, for in that year an incident which had important consequences occurred. The account is given by the chronicler Ralph de Diceto. One of the canons, Philip de Broc, committed homicide; when put on his trial before the king's justiciary, he behaved contumaciously. He appears to have claimed benefit of clergy, *i.e.* to be tried by the bishop's court. The account of the matter is by no means clear. It is stated when brought before the Archbishop (Thomas) he could not deny his offence. The issue was that he was deprived of his canonry and banished the realm for two years. Which court pronounced the sentence is not stated, but the chronicler says De Broc's trial gave occasion to the serious controversy between the bishops and the civil authorities on the trial of criminal clerks, which the king thought to have brought to a settlement by the Constitutions of Clarendon. We know the unhappy consequences which ensued in regard to Archbishop Thomas à Becket. Leland thinks that this occurrence was the cause of the removal of the canons to a new abode. The site was in the adjoining parish of Goldington, afterwards called Newenham, about a mile down the river. The removal, therefore, probably took place soon after 1164. It is certain that the benefactor who promoted this was Simon de Beauchamp. The chroniclers call him the son of Roysse de Beauchamp, but Mr. Elwes (in his interesting paper on the castle) has shown that he was probably her grandson (the dates require it). He was heir to the Barony of Bedford, but for some years his estates and castle were kept in the king's hands, because it appears he took the side of the ecclesiastics in the struggle between Archbishop Thomas and the king. In 1190 he recovered the governorship of the castle from Richard I. by the payment of a fine of 100 marks. What concerns us is that he was a liberal patron of the canons, and transferred them to more convenient quarters at Newenham. He probably built their church, for he was esteemed their founder. He died in 1207, the 9th of King John, and was buried in St. Paul's Church. This is an interesting point. His monument was in this church in the time of Leland, who says, "He lieth before the high altar in St. Paul's Church, with this epitaph graven in brass:—'De Bello Campo jacet hic sub marmore Simon, Fundator de Newenham.'" That monument probably no longer exists. On the slab which is reputed his memorial (now placed against the east wall of the chancel) there is no matrix for an inscription. This has been pointed out by the late Mr. H. Addington (in his able paper on Bedfordshire brasses). There are on the slab (which is 8 feet long) the indents of an engrailed Latin cross and two small shields above, but no place for an epitaph; it is probably later than 1207. I will venture to suggest that it may be the memorial of Simon's son, William de Beauchamp, who died in 1262.

To return from this digression. From this time I suppose the church to have become solely parochial, although Tanner disputes this; its history is not concerned with the canons except in the matter of the exercise of their patronage in presenting the vicars and upholding their rectorial rights in the chancel. It is probable that the Beauchamps had more to do with the structure than the canons or priors. I must hasten on. The deeds of the notorious Fulkes de Breaute belong to the history of the castle. As soon as he was put in possession here by King John in 1215 we are told that he laid sacrilegious hands on Newenham Priory and other religious houses for obtaining materials for his extensive works of fortification; for the same purpose, Matthew Paris tells us, he pulled down the church of St. Paul. This does not necessarily imply its total demolition; it is reasonable to suppose that its foundations remained. King John cared for none of these things, or, rather, he granted a license for the perpetration. The church continued in this ruinous condition until the capture of the castle after the famous siege, August 24,

* A paper read by the Rev. Henry Fowler at the visit of the St. Albans Archaeological and Architectural Society, and published in the *Heris Advertiser*.

1224. When the fortress was doomed to be destroyed and levelled, King Henry III. issued his mandate to the Sheriff of Beds about the disposal of the materials. One portion of the stones was assigned to the Prior of Newenham for the repair of his monastery; another portion to the Prior of Caldwell, the House of the Templars on the opposite side of the river, and another portion was set apart for the work of rebuilding of the church of St. Paul—"perfectioni operis ecclesiæ Sancti Pauli Bedfordiensis." It is inferred that the church was rebuilt a few years after the date 1224. We are now arrived at the history of the present structure, and the question what traces there are in it of this Early English building. I will leave this in the hands of the Bedford gentlemen who have so kindly offered to give us the benefit of their knowledge of an important local subject and of their familiarity with the works which have been undertaken here in recent times, and by which I may say that the beauty of the building has been greatly enhanced. I will just note that Mr. Elwes supposes the stone from the castle was mainly sandstone, quarried at Sandy, and that some of that stone may be detected in this church.

CASSIOBURY.

A PARTY of members of the Upper Norwood Athenæum recently visited Cassiobury, the seat of the Earl of Essex. The following description was read by Mr. D. McKay:—

Although my paper is only a brief one, I want to take you back in thought to some sixty years before the Christian era, when the land now known as Hertfordshire, Buckinghamshire and Berkshire was held by the British Prince Cassivellaunus, who ruled the tribe of the Catuvellauni, or Cassi. In the Welsh Triads and Bruts he figures as Caswallawn, and his adventures are narrated in a very romantic form, but we need not follow them to-day. St. Albans has been quoted as the great stronghold of the tribe, and Chauncy gives Cassiobury as the residence of their leader, and with his name he associates the derivation of the hundred of Cashio. Cassivellaunus was a warrior, and as he was ever anxious to extend his territory he was feared alike by friend and foe. Julius Cæsar paid his second visit in the year 43 before Christ; but after an incursion for some twelve miles he was called back to his ships, which a storm had damaged. The necessary repairs having been effected he sailed up the Thames and encountered Cassivellaunus and his army on the north bank; but notwithstanding all efforts of the Britons the Romans effected a landing. Their march was impeded by the 4,000 charioteers of Cassivellaunus, who was aided by several other native tribes. Cæsar, however, came to conquer, and one after another the Trinovantes and other tribes surrendered, praying Cæsar to protect them from their ally. Finally the British leader was compelled to yield, and for the rest of his life he paid tribute to Cæsar. In Cæsar's account he mentions having conquered the Cenimagni, Segontiaci, Ancalites, Bilroci and Cassi. Professor Rhys in his "Welsh Philology" suggests that the name Cassivellaunus is of Gaulish origin, and he gives the meaning as "a ruler of the league" or "a tribe king."

We now pass over eight centuries, and Offa is king of the Mercians. In a manuscript attributed to Matthew Paris, it is stated that his real name was Wilfreith, but owing to his likeness to his ancestor named Offa he changed his name. Of his doings for the first fourteen years after he ascended the throne no record remains, but in later life he evidenced a taste for war, and possibly, in atonement, he became a benefactor to the Church. At a synod held at Chelsea in 787 he was instrumental in establishing the Archishopic of Lichfield, and at the same meeting he introduced Peter's pence. He made grants to Christ Church and St. Augustine's at Canterbury, to Worcester, Peterborough, Rochester, Evesham and other churches. The greatest crime he ever committed was probably the murder of Ethelbert, king of the East Angles, who was afterwards canonised. On pretence of giving Ethelbert his daughter in marriage, he invited him to his palace and there beheaded him. In expiation of his crime he discovered the body of Alban, who had been martyred in 304; he journeyed to Rome and obtained the canonisation of Alban at the hands of Pope Honorius, and at Verulam he founded a monastery, which was dedicated to the proto-martyr. The abbot of St. Albans took precedence of all English abbots, and for his personal use Offa granted him the manor of Cassiobury, which was held in succession by fifty-one abbots, when Henry VIII. dissolved the monastery. In Domesday Book Cassiobury appears as Cassiou, and in an article by the Rev. H. Fowler, the name is variously given as Cayshobury, Casgeho, Caissou, Caishoo, Kayso, Cassio and Cashio. In the record in Domesday Book no mention is made of any church, although Watford Church is known to have existed in the eleventh century. I mention Watford Church because the manor of Watford is comparatively a new one, and originally formed part of Cassiobury.

In August 1546, for a consideration, Henry VIII. granted Cassiobury to Sir Richard Morison, who had acquired great honour as an ambassador to the Emperor Charles V. and other German princes. The abbot's manor house was built mainly of timber, and Sir Richard commenced to pull down, alter and extend it. On the accession of Queen Mary he fled to Strasburg and joined the exiled reformers. His son, Sir Charles Morison, carried on and completed the work of rebuilding. With the exception of the north-west wing the mansion was pulled down and rebuilt in 1677, Hugh May being the architect. Evelyn visited the new house, and described it under the date of April 18, 1680. As recently as 1800 the chief portion of the house was again destroyed, and the present pseudo-Gothic building was put up under the direction of James Wyatt. In his volume on Cassiobury John Britton states that part of the north-west wing of Morison's house was still preserved, and with it a portion of the abbot's house, and a chamber of May's building, which, with its handsome ceiling by Verrio, we have seen to-day.

Sir Richard Morison's widow, Bridget, became the wife of Henry, Earl of Rutland, and after his death she was married to Francis, Earl of Bedford. Her son, Sir Charles Morison, married Dorothy Clerk, and left a son, the second Sir Charles. He married a daughter of Viscount Campden, who built Campden House, Kensington, and left an only child, Elizabeth, who by marriage conveyed the estate to Lord Arthur Capel, Baron of Hadham. One of his ancestors was twice Lord Mayor of London, and his name is perpetuated in Capel Court. Lord Arthur was a staunch adherent of Charles I., and was beheaded in Palace Yard, Westminster. In response to his dying request, Bishop Morley, of Winchester, enclosed his heart in a silver box, and in due time handed it to Charles II., who in 1661 passed it on to the son and created him Viscount Malden and Earl of Essex. For alleged complicity in the Rye House Plot, the Earl was committed to the Tower and was there assassinated. Since then Cassiobury has had many owners who have left their names in history.

The entrance hall is a narrow cloister, whose Gothic windows are bright with coloured glass. On the walls and elsewhere various curiosities are displayed; possibly the most remarkable being the preserved head of a chief, brought to England in 1838 by Sir B. Capel and presented to Lady Essex. Near at hand is a Crimean War trophy, including a flag, brass musical instruments, swords, a helmet and guns, and not far away are the snow shoes worn by Papineau, the Canadian traitor, when he escaped from the British troops. In the great cloister, carpeted with deer skins from the denizens of the park, and now used as a billiard-room, portraits of Charles I., Queen Anne and Sir Thomas Conynsby with his dwarf Cricket are seen; and on an easel is an emblazoned panel-portrait of Henry IV., which he gave to Lenthal when he laid the first stone of Hampton Court, Herefordshire. The grand staircase is a splendid piece of wood-carving. The walls are covered with portraits—Moll Davis, the actress, by Lely, Lady Mary Sackville, George II. and Queen Caroline being among them. In the great dining-room, of old the chapel, where two brasses are let into the stone outside the window, the chief portraits are the Earl of Northumberland, by Vandyke; Algernon, Earl of Essex, and George, the fifth Earl of Essex, by Sir W. Beechey; Arthur Algernon, the sixth Earl, and Lady Elizabeth Percy, and her son and daughter, by Witting. In the saloon the ceiling is by Verrio, and, according to Evelyn, represents Apollo and the liberal arts. The green drawing-room, with its furniture of the Regency, its china, and its picture by Turner, is a striking contrast to the great library, which, with its bright flowers and fanciful decorations, is now a blaze of colour. Above the fireplace is some of Gibbons's carving, and busts of Russell, Althorp, Brougham and Denham are ranged about the room. In the smallest of the three surrounding libraries the most treasured relics of the house are contained. In one frame, covered by a silk curtain, are miniatures of Charles I. and Henrietta Maria, a piece of the blue ribbon of the Garter he wore when executed, and a scrap of the velvet pall which covered his tomb at Windsor when it was opened in 1813. In another frame is Conynsby's handkerchief stained with the blood of King William when he was wounded at the Battle of the Boyne. Here again the carving by Gibbons decorates the walls, and among the paintings is a portrait of Elizabeth Capel, Countess of Carnarvon.

In the inner library are portraits of Lord Arthur and his family, by Cornelius Jansen, and William, the third earl, and here is a scroll of fruit and flowers by Gibbons, which is almost unrivalled. According to an inscription on brass, the heart of Arthur, Lord Capel, is preserved in this room. In the gallery library is a portrait of the first Earl of Cork, who died in 1643. In the oak dining-room, with carvings by Gibbons, are various portraits—Robert Devereux, beheaded in 1601, by Vansomer; George Capel Conynsby, fifth Earl of Essex; Edward, the seventh Earl of Abergavenny, by Vansomer; the Earl of Ranelagh, by Lely; and Sir Joshua Reynolds, painted by himself. "The Catspaw," by Landseer; a portrait of Napoleon,

painted in 1815, the year of his last battle; and "Mrs. Freeke's Tea Party," by Hogarth, are also associated with this room. In a room specially set apart for the use of the younger members of the family is a quaint silhouette picture in black and bronze, representing a lad and lass of days gone by on horseback. The private office is panelled in red on a white ground; a Japanese inlaid cabinet of fanciful design and some quaint little pictures are among the most noteworthy features of the room. In her ladyship's boudoir the doors are decorated with miniature portraits, the work of Sarah, wife of the fifth earl. Among the pictures in this room is a portrait of the Duchess of Grafton, daughter of Lord Arlington, by Lely, and a celebrated painting by Rubens, representing Charlotte de la Tremouille, afterwards Countess of Derby, who became celebrated for her defence of Lathom House.

The park, which is divided by the river Gade and the Grand Junction Canal, consists of 700 acres, and is nearly four miles in circumference. The Home Park occupies 310 acres, the Upper Park 250 acres, and the remainder includes the pleasure gardens and other grounds surrounding the house. The park was planted by Moses Cook, who in his work on "Forest Trees" congratulates himself on having raised 296 of the limes from seed. The private gardens were laid out by Le Nôtre, who did like service at Versailles; and the Swiss cottages scattered about are the work of James Wyatt. Chestnuts, English and Spanish beeches that cover an area of 150 feet, elms, silver firs, the largest in the county, oaks, cedars from Lebanon, stone pines and tulip trees decorate the park. The willow by the Napoleon fountain came from his tomb at St. Helena; a treasured bay tree was grown from a cutting from the tomb of Virgil, and one tree now represented by a sapling was planted by Queen Elizabeth. On the edge of a dell, where trees and shrubs are allowed to grow at will, a dogs' cemetery has gradually been formed, and memorials, some of them with specially-written verses, have been placed to Poor Pilot, Dan Tucker, Viper, Rattler, Jock, Corrie, Peter, Tommy, Sam, Nelly, Muff, Fanny, Olga, Sailor, and other canine pets of Cassiobury. As we turn our backs on the picturesque red brick mansion, we tender grateful thanks to the genial Home Secretary, Sir Matthew White Ridley, and to the gracious Earl of Essex, George Devereux de Vere Capel, who have enabled us to spend a memorable afternoon.

Until the dissolution the church of St. Mary, Watford, belonged to the abbey of St. Albans. The rectory, with the patronage of the vicarage, was granted by Henry VIII. to John Lord Russell, afterwards Earl of Bedford, who in 1563 sold it to Sir Charles Morison, of Cassiobury. St. Katherine's Chapel, afterwards known as the Haydon Chapel, was destroyed in 1870 by Mr. Christopher, of Watford. In Keyser's list of mural paintings representations of St. Christopher and St. Dunstan are recorded as having been on the pillars between the nave and north aisle. In the vestry is a carved cupboard of continental make, presented by the Rev. R. Lee James, who carved one of the panels. The table is believed to have served as an altar. The Norman and Early English stones on the floor are from the earlier churches. On the north chancel wall are brasses to Hugo de Holes, who died in 1415, and his wife Marghetta, who died in the year following. The Essex, or rather the Morison Chapel, was built by Bridget, the Countess Dowager of Bedford, who died in 1600. In the centre of the chapel is an altar tomb of coloured marbles to herself and her three husbands. Beyond it is an altar tomb with six Tuscan columns to Lady Elizabeth Russell, who died in 1611. Against the south side is a monument to Sir Charles Morison the elder, who died in 1619. The sculptor was Nicholas Stone. In Horace Walpole's "Anecdotes" he quotes from Stone's diary where he states he received 260*l.* for the work. On the north wall is a monument to the younger Sir Charles, for which Stone received 400*l.* On the same side there is a monument to Lady Katherine Rotheram. The brass on the floor was placed by Dorothy Lady Morison to the memory of three of her servants.

STRUCTURAL TEMPLES.*

THE "structural temples" of the ancients as well as their rock-cut temples were all or nearly all built upon a common plan. This would seem to convey the impression that at one time a universal monotheistic system of religion prevailed, and that the changes in the system were but the natural result of the changed conditions under which the different peoples have existed.

The requirements of a temple were:—First, an adytum or cella. This was the most sacred place. Second, the inner court or the place where the priests officiated. Third, the outer court where the people were admitted. The foregoing requirements were not universal, as many small temples were erected with only a cella surrounded by a colonnade. Nearly all the

larger temples, the remains of which exist, were erected on the general plan above indicated. As in our former papers, we have been compelled to draw largely upon the civilisation of ancient Egypt for interesting matter, so in this we shall be compelled to go to that interesting country for the earliest examples of "structural temples."

The architectural history of ancient Egypt divides itself into three periods. The first of these is represented by the pyramids dating from the time of the Memphian kings, and are believed to be the oldest structures in existence. The second period is the one that has bequeathed to the world the indestructible magnificence of the ruins of Karnak, of Luxor, and of Medinet, and belongs to the Theban dynasties. The third has left behind it the temples of Hermonthis, of Kom-Ombos, of Khartos, of Edfoo and of Philæ, and represents the Ptolemaic rulers of Egypt. In the accounts which the Egyptians themselves have transmitted to us, their early history and chronology are divided by reference to the dynasties of their kings, of which dynasties they number twenty-nine. Their great epochs are:—The fourth dynasty reigning at Memphis, the pyramid builders; the twelfth dynasty, of which Osirtasu I. was the great monarch, and the eighteenth and nineteenth dynasties, which followed the expulsion of invaders known as the Shepherd Kings.

The early part of the eighteenth dynasty was rendered illustrious by the exploits of several kings, known under the name of Thothmes, Rameses III. The first king of the nineteenth dynasty is clearly identified as the conqueror known to the Greeks as Sesostris.

The eighteenth and nineteenth dynasties are the great builders to whom Karnak and its neighbouring temples are due. From the conclusion of this brilliant epoch Egypt began to decline until her misfortunes were consummated by the invasion of the Persian conqueror Cambyses, 525 B.C. A period of destructive tyranny followed until relieved by the enlightened policy of the Ptolemies. Architecture and arts were revived, never with the splendour of the national epoch, but still with much richness and tasteful variety. From the time of the twelfth dynasty we find Egyptian architecture characterised by the presence of obelisks and columns, both unknown to the earlier builders. The simplest form of Egyptian pillar was the plain square pier. Its next form is the octagon formed by cutting the angles off the square.

This same step carried further gives a sixteen to thirty-two sided figure, and then the idea seems to have been suggested of hollowing out the faces of this polygon with reversed curves, making a fluting; and we thus reach what is called from its similarity to a Greek order of that name, the proto-Doric column. A large class of pillars have what is called the "Lotus bud capitals," being an imitation of the buds of that sacred plant. Another large class is distinguished by Isis heads, or heads of Typhon, carved on its capitals. The earliest examples are in very low relief. It is probable that these ornaments were first simply painted on the capitals. Afterwards they cut the ornament in low relief, gradually improving on the design and its execution as the relief became higher, until its full development was attained as shown by the later examples of this work. The great palace temple at Karnak is perhaps the noblest structure ever built by human hands. Its principal dimensions are 1,200 feet in length by 360 feet in breadth, thus covering more than twice the area of St. Peter's at Rome. Its hypostyle hall or great court is 340 feet long by 170 feet wide, an area more extensive than that of Cologne Cathedral, thus giving standing room for nearly 40,000 persons. The original portion of this temple, or rather group of temples, was built by Osirtasu I., the great king of the twelfth dynasty. It appears to be the only structure left standing during the 500 years of the rule of the Shepherd Kings. It may have been pulled down by them and afterwards restored, as its great blocks of polished granite were nearly indestructible. On the restoration of the native dynasty, its first king, Amenophis, enclosed the earlier temple with a structure 120 feet square. Later Thothmes I. built in front of it a hall, surrounded by colossi backed by piers. With these additions the temple covered a space of 540 feet long by 280 feet wide, when the "sun worshippers" broke in upon the great eighteenth dynasty, and for a time checked architectural development. When the native race were again restored to power, Meneptha commenced the great hall which was nearly completed during his reign. Says a recent visitor:—"The hypostyle hall is the culminating point of the whole group of buildings. No one can describe its beauty, and no artist has yet been able to reproduce its form so as to give those who have not seen it an idea of its grandeur. The mass of its great central piers illumined by a flood of light from the clerestory, and the smaller pillars of the wings gradually fading away into obscurity were so arranged and lighted as to give an idea of infinite space, while the beauty and massiveness of its forms and the brilliancy of the coloured decorations make a wonderful *ensemble*, filling the mind with admiration and awe."

The ruins of Karnak are on the eastern side of the Nile. Across the river on the Libyan side the temple palace of

* A paper by Mr. Cyrus K. Porter, published in *Stone*.

Rameses III. crowns the rising ground of what is now called Medinet Abou. This is the latest of the four great temples of Thebes, and is by far the best preserved. "You enter," says a recent visitor, "through two pavilions which may have been originally porters' lodges, and passing through the court of Rameses (perhaps the private residence of the Pharaoh) emerge into a spacious area which leads to the great court of the temple. Here all the peculiarities of Pharaonic Egyptian architecture are displayed in the highest perfection, and bring most clearly to mind the spirit and genius of that wonderful people. It is, with the exception of Karnak, the most striking and magnificent interior in Egypt."

"The grave grandeur of this court," says Curtis, "is unsurpassed in architecture. Open to the sky above, a double range of massive columns supported a massive pediment. The columns upon the court were 'Osiride'—huge square masses covered all over with hieroglyphics, and with figures with folded hands carved in bold relief on the faces of the columns. The rear row was of circular columns, with papyrus or lotus capitals. The walls dimly seen behind this double colonnade are all carved with history, and the figures upon them and the architraves variously coloured."

This coloured decoration is indescribably effective here. Bas-reliefs in such limitless profusion would be objectionable, but these coloured intaglios, extending as they do over the whole building, give an ornamentation without impairing the outline or disturbing the general effect. They are cut down 3 or 4 inches deep into the solid stone, and their edges are as sharp as they were the day the workmen left them.

Coming down to the last, or Pharaonic, period of Egyptian architecture, we have only space to give a brief description of what is known as Apollinapolis Magna, or the temple of Edfu, about twenty miles south of Thebes. It is one of the largest in Egypt, and is in a comparatively good state of preservation. Its form is rectangular, and its general dimensions are 450 by 140 feet. In the centre of one of the short sides is the entrance, which consists of two buildings, each 100 feet long and 32 feet wide, both pyramidal in form and lying in the same direction, but separated by a passageway 20 feet wide with a doorway at each extremity. This passage conducts us to a quadrangle (outer court) 140 feet long and 120 feet wide, flanked by twelve columns on each side and eight more on the entrance side, all a few feet within the walls, thus forming a colonnade on three sides covered by a flat roof. At the further end of the quadrangle (reached by steps) opposite to the entrance is a portico extending the whole breadth of the quadrangle, and 45 feet in depth. It has three rows of columns, six to each row, covered by a flat roof, and is enclosed by walls on three sides, the fourth, or that opposite the entrance, being open.

This is, however, closed breast-high by a species of pedestal half-inserted in the columns, and in the central intercolumniation a doorway is constructed with piers, over which is a lintel and cornice cut through. From this portico a door leads to an inner vestibule with three rows of four columns, each smaller than those first described, but distributed in the same way. Beyond this are sundry passages with staircases and apartments, whereof the smaller one was probably the adytum. The present condition of this temple, as described by a recent traveller, may prove of interest. He says:—"The other temples of Egypt are either ruined or buried. In no single instance elsewhere can we see the temple in its original perfection, but here at Edfu the splendid building seems intact, perfect as when its architects left it. Except the cornice, the immense pylon is entire, and its position, with a space cleared in front and at the sides, gives it a commanding aspect that no other gateway in Egypt possesses. From every point of view the temple at Edfu is magnificent, whether standing on the steps that lead down from the modern to the old level, where one looks up to the smooth, creamy walls of the towering pylon, or, sitting under the colonnade of the great court, one surveys the dark entrance of the hypostyle hall, separated from the court by the low sculptured screen, like the choir of a cathedral, or wanders among the chambers around the sanctuary and along the paved corridor bounded by lofty sculptured walls. But perhaps the view which most delights the artist's eye is that which is obtained from near the sanctuary. Overhead rise the columns of the hypostyle hall. In front through a deeply-shaded vista of columns and portals appears the great court gleaming in sunshine, and through the gateway of the mighty pylon which closes the view, a vision of the outer world gives life to the scene."

Above the first cataract of the Nile is the sacred island of Philæ. The surface of the island is a mass of ruins, but the great Temple of Isis yet stands and a smaller temple overhangs the river. Two colonnades unite these temples. The western and more important of the two consists of thirty-three columns whose shafts are covered with intaglios and whose capitals ingeniously varied never repeat the same design.

Sixteen columns in less complete preservation form the eastern colonnade. About in the centre of the western gallery a flight of steps whose base is often under water cuts the con-

tinuous rampart and descends to the river. This propylon recalls the Roman epoch, and is not less beautiful for that. Everywhere the head of Augustus, the sceptical profile of Tiberius, or the brutal face of Claudius surmounts the great meagre figure carved with that uniformity from which Egyptian art never knew how to vary.

The temples of Philæ might easily be restored or at least further decay prevented, and let no one scorn these temples because of their comparative recent date. To the epoch of Rameses belong most of the colossi among Egyptian ruins, but the advent of the Ptolemies was a signal for a marvellous revival in arts and letters. What Egyptian architecture lost in massiveness it gained in graceful proportion.

Philæ has a history of its own, political and religious. The Pharaohs, the Ptolemies, the Cæsars in turn abandoned Philæ, but its gods remained and sustained the long siege of the new faiths. Osiris, oldest of Egyptian divinities, had his tomb in the sacred island, and with bated breath the Egyptian was wont to swear as his most solemn oath, "By him who sleeps in Philæ." Here was the home of Isis and Hather, and the sacredness of the place increased as the worship of its local divinities spread over the Roman world. Christianity came late to Philæ.

In the latter part of the seventh century of our era Isis still had her worshippers under the Egyptian palms.

About one thousand years before the dawn of the Christian era there was commenced in the city of Jerusalem a very important structure known in history as Solomon's temple. This may be regarded as the first attempt of the Hebrew people to erect for themselves a permanent place of worship. Heretofore the Divine presence had manifested itself and pronounced its judgments and promulgated its laws from the sanctum sanctorum of a temporary tabernacle. This tabernacle was for the first time set up in the plain at the foot of Mount Sinai; it was a movable temple and accompanied the hosts of Israel in all their wanderings in the wilderness of Arabia for a period of nearly forty years. From the time of its erection and consecration until the ark of the covenant was safely deposited within the adytum of King Solomon's temple this tabernacle, or one of similar form, served as a temple for the worship of the God of Israel.

The tabernacle itself was not a very large structure. In form it was rectangular, 45 feet long, 15 feet wide and 15 feet high. In front of it was a court or yard 150 feet long, 75 feet wide and surrounded by a screen 7½ feet high. It was so constructed that its parts could be easily taken down, packed into a small compass and transported from place to place. The long sojourn of the Israelites in Egypt, the fact that their chief employment there seems to have been the manufacture of bricks, must have made them acquainted with the architecture of that country. On the conquest of Canaan the Israelites seem to have taken possession of the dwelling-places of the vanquished people, and there appears no record of the erection of any important building till the days of Solomon. To this prince was delegated the important mission of carrying out the wishes of David, his father, in regard to the erection of a temple, but at so low an ebb was the art of building that the native workmen did not know even how to hew timber properly. The king therefore applied to Hiram, king of Tyre, with whom he was on friendly terms, and that monarch provided an architect and skilled workmen to carry forward the work. This building is described as a building of stone, roofed and floored with cedar. The temple itself was not a very large structure, being about 110 feet long by 36 feet wide by 55 feet high. In front was a porch the same width as the temple—36 feet—and about 18 feet high. On three sides were the priests' chambers three storeys in height. On the right side was a winding stair leading to the upper storeys of the chambers. The walls of the house as well as the ceiling were lined with cedar. The joists also appear to have been of cedar, but the floor was of planks of fir. At the door of the porch were two columns or pillars of brass or bronze, each about 33 feet high and about 7 feet in diameter. In front of the porch was the altar surmounted by a low wall, three courses of stone in height. The whole building was enclosed by a walled court called the inner court, or court of the priests. In front of this was another called the lower court, and the whole of this area was enclosed by a circumscribed court going around all the other courts and buildings, and this was called the outer court, or court of the Gentiles. Canina conceives the style of the building to have been Egyptian; that the temple was lighted like the hypostyle hall by a range of windows over the roofs of the cells or priests' chambers; that these windows were like those in the clerestory of a church, splayed at the bottom and sides; that the walls of the temple itself sloped toward the top on the outside, while the walls of the priests' chambers were built perpendicular.

He also supposes that the capitals or chapters, as they were called, which are described as lily work, were indeed the lotus or water-lily capital of Egypt. From the foregoing description it should be noted that the two celebrated pillars, Jachin and Boaz, which stood the one on the right hand and

the other on the left hand, were quite similar in their location and purposes to the columns or obelisks that occupied similar positions at the entrance of the Egyptian temple at Edfoo. We are told that the entire time occupied in building King Solomon's temple was about seven years and eight months, or about one-fourth the time occupied in erecting the legislative temple at Albany; that the occasion of its dedication and consecration was one of the most impressive ceremonies that the world has ever witnessed. "Israel sent forth her thousands and the assembled people beheld in solemn adoration the vast sacrifice of Solomon accepted. The fire descended upon the altar and consumed the offering. The shadow and glory of the eternal proclaims His presence between the cherubim, and the voice of His thunder told the faithful that the perfectness of their labour was approved."

Bright was the hour
When Israel's principals in their pride and power,
Knelt in the temple's court; the living flame,
The accepted sacrifice to all proclaim.
Brightly the splendour of the Godhead shone,
In awful glory from His living throne.
Then bowed was every brow, no human sight,
Could brave the splendour of that flood of light
That veiled His presence and His awful form,
Whose path the whirlwind is, whose breath the storm.

Without anticipating what we propose to say when we come to consider the Grecian and Roman orders of architecture, we will now turn to the consideration of some of the temples of ancient Greece and Rome. The early Greek temples did not have that graceful proportion which later characterised the works of Grecian architects and artists. One of the oldest Greek temples is the Doric temple at Corinth. The date of its erection has not been satisfactorily determined, but is supposed to belong to the age of Cypselus, or about 650 years B.C. In this example the columns are only about four diameters in height, and the architrave, which is the only portion of the entablature now remaining, is proportionately heavy. It is indeed one of the most massive specimens of architecture now in existence, more so even than the rock-cut prototype at Beni Hassan, Egypt, from which it was undoubtedly copied. As a work of art it fails from excessive strength, a fault common to most of the efforts of a rude people ignorant of the true resources of art and striving by the expression of physical power alone to attain its objects. Next to this in age is the temple at Ægina. Its date, too, is unknown, but judging from the character of its sculpture it belongs to the sixth century before Christ. Athens had a great temple on the Acropolis contemporary with the foregoing, and portions of its columns still remain which, after its destruction by the Persians, were built into the walls of the citadel. It is probable that all the cities of Greece had temples commensurate with their dignity before the Persian war. Many of these were destroyed in that struggle, but it also happened, as in France and England during the twelfth and thirteenth centuries, that the old temples were thought unworthy of the national greatness and of that feeling of exultation arising from the successful result of the greatest of their wars, so that almost all those that remained were pulled down or rebuilt. The consequence was that all the great temples now found in Greece were built in the forty or fifty years that succeeded the defeat of the Persians at Salamis and Platea. The oldest temple of this class is that known as the Theseum, or Temple of Theseus, at Athens. It constitutes a link between the archaic and the perfect age of Grecian art, more perfect than the temple at Ægina or any that preceded it, but falling short of the perfection of the Parthenon, its near neighbour both in locality and date.

Of all the great temples the best and most celebrated is the Parthenon, the only octostyle Doric temple in Greece, and in its own class undoubtedly the most beautiful building in the world. It is true it has neither the dimensions nor the wondrous expression of power and eternity inherent in Egyptian temples, nor has it the variety and poetry of the Gothic cathedral, but "for intellectual beauty, for perfection of proportion, for beauty of detail, and for the exquisite perfection of the highest and most recondite principles of art ever applied to architecture, it stands utterly and entirely alone and unrivalled—the glory of Greece and the shame of the rest of the world." This beautiful temple was 227 feet long by 101 feet broad. Next in size and beauty was the Temple of Jupiter at Olympia, finished two years later than the Parthenon. Its dimensions were nearly the same, but having six columns in front instead of eight as in the Parthenon; the proportions were different, it being 230 feet long and 95 feet wide. To the same age belongs the exquisite little Temple of Apollo Epicurius at Bassæ, 125 feet by 47 feet, the Temple of Minerva at Sunium, the greater Temple of Rhamnus, the Propylæa at Athens, and indeed all that is greatest and most beautiful in the architecture of Greece. The influence of Greek art was also felt in the island of Sicily, which was originally occupied by a Greek colony. The one city of Selinus had no

fewer than six temples in two groups, three in the citadel and three in the city. The oldest is the central one of the first-named group, and its sculpture indicates that it was erected soon after the foundation of the colony, or about 636 years before Christ. The most modern is the great octostyle temple, which seems to have been left unfinished at the time of the destruction of the city by the Carthaginians, 410 years before Christ. It measured 375 feet long by 166 feet wide, and was consequently very much larger than any temple of its class in Greece.

At Agrigentum there are three Doric temples, two small hexastyles built from 500 to 480 years before Christ, and one great exceptional example differing in its arrangements from all the Grecian temples of the age. Its dimensions are 360 feet long by 173 broad, and consequently very nearly the same as those of the great temple of Selinus just alluded to. Its date is perfectly known, as it was commenced by Theron 480 B.C., and left unfinished seventy-five years afterward, when the city was destroyed by the Carthaginians. At Syracuse there still exist the remains of a very beautiful temple of this age, and at Eggesta are the remains of another in a much better state of preservation. Pæstum, in Magna Græcia, could also boast of a magnificent group of temples. All of the foregoing temples are in the Doric order, and represent the earliest type of Greek art. The Ionic order, which to a certain extent superseded the Doric, does not present as many nor such notable examples as did the Doric order. Fergusson says:—"The recent discoveries in Assyria have proved beyond a doubt that the Ionic was even more essentially an introduction from Asia than the Doric was from Egypt. The only question is when it was brought into Greece."

The oldest example in Greece was probably the temple on the river Ilissus, dating from about 484 B.C. Next to this is the little gem of a temple dedicated to the Wingless Victory, and about fifteen years later was built the Propylæa at Athens. The last and most perfect of all the examples of this order is the Temple of Erechtheus on the Acropolis of Athens. Its date is apparently about 420 B.C., the great epoch of Athenian art.

If any temple in the Asiatic Greek colonies escaped destruction in the Persian war it was that of Juno at Samos. It is said to have been built by Polycrates, and appears to have been originally of the Doric order. The ruins now found are of the Ionic order. The temple was 346 feet long by 190 feet wide, and probably was built on a foundation of a former temple. More remarkable even than this was the celebrated Temple of Diana at Ephesus, said by Pliny to have been 425 feet long by 220 feet wide. Recent excavations on this site, however, prove that the dimensions apply only to the platform on which the temple stood. The temple itself measured from the outside of the angle pillars was 341 by 164 feet, about the average dimensions of our Mediæval cathedrals.

The Corinthian order was never used extensively by the Greeks in the erection of their temples. The largest example in Greece was the Temple of Jupiter Olympus at Athens. Though erected on Grecian soil it was essentially a Roman building, having been commenced in its present form under Antiochus Epiphanes in the second century before Christ by the Roman architect, Cossutius, and only finished by Hadrian, to whom probably may be ascribed the greatest part of what now remains. Its dimensions are 354 feet long by 171 feet wide, being nearly the size of the great hypostyle hall of the temple of Karnak. From the number of its columns, their size and their beauty, it must have been the most beautiful Corinthian temple in the Old World.

"There is nothing," says Fergusson, "that strikes the inquirer into the history of Rome more than the extreme insignificance of her temples as compared with other buildings of the Imperial City and with some contemporary temples found in the provinces." The only temple that remains at all worthy of such a capital is the Pantheon. All others are now mere fragments, from which we can with difficulty restore even the plans of the buildings, far less judge of their effect. Of the Augustan age we have nothing but the remains of three temples, each consisting of only three columns. The most remarkable of these was the Temple of Jupiter Stator in the Forum, the beautiful details of which are familiar to every student of architecture. This temple was octostyle in front. It was raised on a stylobate 22 feet in height, the extreme width of which was 98 feet, and this corresponds as closely as possible with 100 Roman feet. The angular columns were 85 feet between centres. The height of the column was 48 feet, and that of the entablature 12 feet 6 inches.

The temple nearest to this in situation and style is that of Jupiter Tonans, or the Temple of Saturn. It is much smaller than Jupiter Stator and of inferior design and execution. Its extreme dimensions are about 85 feet long by 70 feet wide. The next class of temples, called pseudo-peripteral (those in which the adytum occupies the whole rear part) are generally more modern; certainly more completely Roman than those referred to above. One of the best examples of this class of temples is the Temple of Antoninus and Faustina, a small building

measuring 120 feet long by 72 feet wide. The finest example of this class of temple now remaining to us is the so-called Maison Carrée at Nîmes, which is indeed one of the most elegant temples of the Roman world. It is hexastyle, that is, six columns in front with eleven columns on each side, three of which stand free, the remaining eight being attached (engaged) to the walls of the adytum. The temple is small, being only 85 feet long and 45 feet wide, but such is the beauty of its proportions and the elegance of its details that it strikes every beholder with admiration. The Temple of Diana in the same city is another edifice of singular beauty of detail, unsurpassed for variety and elegance by anything found in the metropolis, and applied here with freedom bespeaking the presence of a Grecian mind even in this remote corner of the empire. More perfect and more interesting than any of these is the Pantheon, which is undoubtedly one of the finest temples of the ancient world. Externally its effect is very much destroyed by its two parts, the circular and the rectangular being so dissimilar in style and so incongruously joined together. The portico especially, in itself the finest which Rome exhibits, is very much injured by being prefixed to a mass which overpowers it and does not harmonise with any of its lines. Internally, perhaps the greatest defect of the building is a want of height in the perpendicular part, which the dome appears to overpower and crush. This defect is aggravated by the lower part being cut up into two storeys in height, an attic being placed over an order below. Notwithstanding these defects, there is a grandeur and simplicity in the proportions of this great temple that render it one of the finest and most sublime interiors in the world. The dimensions of its dome, 145 feet 6 inches in diameter, with a height of 147 feet, have never yet been surpassed by any subsequent erection. Though it has been deprived of its bronze covering and of the greater part of those ornaments on which it mainly depended for effect, still nothing can destroy the sublimity of a design so vast and of a form so simply grand. It possesses, moreover, one other architectural peculiarity in having a single window, and that placed high up in the building. "I know," says Fergusson, "of no other temples which possess this feature, except the great rock-cut basilicas of India. In them the light is introduced even more artistically than here, but nevertheless that one great eye opening upon heaven is by far the noblest conception for lighting a building to be found in Europe."

Our paper on structural temples would be incomplete without a reference to the temples of Baalbec. The origin of the city of Baalbec is lost in remote antiquity. By some it is supposed to have been founded by Solomon, king of Israel, but I have not been able to find any reliable proof that such was the case. It was at one time the centre of trade and while under the control of the Romans was a very popular and important city. It was probably during the Roman occupation that the temples whose ruins now occupy the site of the city were erected. The style of the architecture indicates Greek art and Roman influence.

The group consists of the remains of three temples, usually known as the Great Temple, the Temple of Jupiter; of Apollo, or the Sun; and the Circular Temple. The Great Temple, which would seem at one period to have been a kind of Pantheon, is situated on a magnificent platform which raises it high above the level of the ground and extends from east to west a distance of 1,100 feet. The portico is at the eastern end and must have been reached by a grand flight of steps. It is 180, or, including the pavilions, 260 feet from north to south. A threefold entrance leads into the first court, which is hexagonal in shape and measures 250 feet from corner to corner. A portal 50 feet wide, flanked on each side by a smaller aperture 10 feet wide, gives admittance to the great quadrangle which extends from east to west 440 feet and has a breadth of 370 feet, thus enclosing an area of between three and four acres. On all sides except the eastern, where the stairs lead up to the front, the court was surrounded with an exedra of various dimensions enclosed by costly pillars and adorned with numerous statues, but statues and pillars and steps are now involved in a common confusion. The peristyle of the temple proper was composed of fifty-four columns, the front line consisting of ten and the side lines of nineteen each. The height of the shafts was about 62 feet, and their diameter 7 feet at the base and 5 feet at the top. They were crowned with rich Corinthian capitals, and supported an entablature of 14 feet in height. Most of them were formed of three blocks united without cement by strong iron dowels. Only six of these columns are still standing. That part of the platform on which the peristyle rests consists of immense walls built up about 50 feet from the ground, and formed, as may easily be seen on the northern side, of thirteen courses of bevelled stone in alternate layers of longer and shorter blocks. Outside these walls, at a distance of 29½ feet, is another wall on the north, the west, and probably, though concealed by the rubbish, on the east side. This is built up of large stones, and contains three blocks of such extraordinary proportions that the temple acquired from them the name of Trilithon, or three-stone temple. These measure respec-

tively 64 feet, 63 feet 8 inches and 63 feet in length, and are 13 feet in height, and have been raised 20 feet from the ground in the western wall. Two underground passages, 17 feet wide and 30 feet high, run from east to west along the sides of the platform of the great quadrangle and are connected by a transverse tunnel of similar description. They seem from the inscriptions on the wall to have been tenanted at some time by Roman soldiers.

Slightly to the north of the Great Temple and agreeing with it as to the points of the compass is the Temple of the Sun, which is in much better preservation than its neighbour, and though small in comparison with it is larger than the Parthenon at Athens.

It was also built on a platform and was reached by a flight of steps on the eastern end. The height of columns, including capitals, is 45 feet and the circumference of each 19 feet. They supported an entablature 7 feet high, from which a ceiling was carried back to the wall of the adytum, consisting of slabs enriched with sculpture of great beauty. The principal ornament of each slab is a hexagonal moulding enclosing the figure of some god or hero; but the profusion and elegance of the fretwork can only be rendered by the artist. After passing the vestibule the visitor reaches an exquisitely carved doorway (having a staircase on each side leading to the top of the building) which gives entrance to the interior of the temple.

On the soffit of the vestibule is the figure of an eagle, referred to by many travellers and regarded by Volney and others as the emblem of the Sun god. The adytum was richly ornamented, the floor now presenting a mass of broken sculpture and pillars.

Further east stands the Circular Temple, which is very small but of beautiful workmanship and design. The ruins of Baalbec have awakened the admiration of European travellers from the sixteenth century down to the present date. The city of Palmyra, the ancient Tadmor of the wilderness, is also noted for the ruins of its temples. The site of the city was long unknown until the spot was at last penetrated by some European travellers. It had an immense temple dedicated to the Sun, of which sixty-nine columns out of three hundred remain standing. Of its appearance in modern times, Volney observes:—"In the space covered by these ruins we sometimes find a palace of which nothing remains but the court and the walls; sometimes a temple whose peristyle is half thrown down, and now a portico, a gallery, a triumphal arch. If from this striking scene we cast our eyes upon the ground, another almost as varied presents itself."

"On whichever side we look the earth is strewn with vast stones half buried with broken entablatures, mutilated friezes, disfigured reliefs, effaced sculptures, violated tombs and altars defiled by the dust." In addition to the structural temples already described there are several very large ones in India and China. Enough has been said, I think, to establish the fact that a similar form of worship prevailed among the nations of antiquity, and that these forms required buildings of a similar construction to adapt them to the systems of ancient worship.

Another thing seems to have been pretty well established, and that is the construction of a secret vault or vaults beneath the adytum, or sanctum sanctorum, as a place of deposit for sacred vessels, of jewels, of gold and silver. We are told that a place of this character was built beneath the sanctum sanctorum of King's Solomon's temple, and that a true copy of the Book of the Law—that is, the Ten Commandments—with a history of the children of Israel up to that time, a true imitation of the ark of the covenant, and other valuable relics were deposited in that secret vault. We know that General Cesnola, who conducted the explorations of an ancient temple in the island of Cyprus, did discover such a secret vault, and from thence brought forth a large and valuable collection of ancient jewellery, which collection is now on deposit in the Museum of Fine Arts in Central Park in the city of New York. Such being the facts, we have no reason to doubt that if a thorough system of exploration were permitted, and was conducted upon scientific principles, very many valuable relics of art now hidden would be recovered, and the world largely enriched by the knowledge thus obtained.

The Local Government Board having declined upon second solicitation to allow the Scarborough Corporation to sell part of the Weaponness estate for the purposes of a site for a proposed Wesleyan College, Mr. J. H. Moody, a member of the Council, and the town clerk (Mr. J. E. T. Graham) have been appointed to wait upon the Local Government Board to endeavour to induce that authority to permit the sale upon the terms proposed, which are:—(a) For the first ten years the purchasers to pay the Corporation a rental of 5% per acre per annum; (b) from and after the expiration of that period the purchasers to pay in perpetuity a rental at the rate of 20% per acre per annum.

TESSERÆ.

Classification of Temples.

THE buildings and sites dedicated to Pagan worship were classified as *templum*, *ædes*, *fanum*, *delubrum*, *ædícula*, *tesca*, *sacellum* and *lucus*. The *templum* was not invariably a building, but sometimes a walled enclosure, either consecrated for worship or merely inaugurated for some public usage—thus were the *Curia Hostilia*, the *Curia Julia* and even the *Rostra*—classed among *templa*; the *ædes* was, in the exclusive sense, a sacred edifice, the “church” of Pagan worship, always consecrated, whilst the former might be without such dedication, though inaugurated. The *fanum* also might be merely a space marked out by the Pontiff for sacred uses, and the *delubrum* (as to which term grammarians differ) was probably an edifice where, under one roof, the images and worship of different deities had their centre. The *ædícula* was a small isolated shrine or niche, usually within a temple, raised for private piety, without formal consecration by the priesthood; the *tesca*, a shrine or tabernacle apart from other buildings; the *sacellum*, a chapel containing an image of some deity, without portico, and sometimes without roof; the *lucus* being a sacred grove dedicated to a particular deity, as were several in the Roman neighbourhood—one to *Picus* and *Faunus* (between *Ostia* and *Ardea*); another, near *Aricia*, to *Egeria*; to *Mercury* on the *Applan Way*; to the *Bona Dea* (or *Fauna*) near *Albano*; also the well-known grove of the *Camænæ* (Muses) near the *Porta Capena*. One sole example of the Pagan *ædícula* still extant in Rome is a small brick rotunda, with niches, on the *Applan Way*, between *S. Sisto* and the *Porta S. Sebastiano*. In the countless *Madonna* shrines of the city's streets we see the antique *tesca* faithfully reproduced.

The Villa Livia.

In the course of the explorations, under the direction of Signor Gagliardi, on the site of the *Villa Livia* or *Villa Cæsarum*, about eight miles from Rome, the workmen came in May 1863, on a flight of steps which led to two apartments about 20 feet under ground: one vaulted, divided by a wall, the other about 35 feet square, adorned with perhaps the most beautiful ancient frescoes hitherto brought to light. The ceiling of this exquisite apartment was principally composed of marble. When discovered, the centre was filled with marble fragments and rubbish, but so little damp existed that, with the exception of two or three places of insignificant extent, all the frescoes were as fresh as if they had just been painted. It is supposed that this part of the villa was situated in the midst of a plantation or garden, and that this painted room was intended to be in harmony with the objects around. The lower portion of the walls, to the height of about 4 feet from the floor, represents trellis-work, from which spring the most exquisitely painted trees, shrubs and plants. These are loaded with fruit and flowers, among which a variety of birds and insects are feeding, fluttering, or reposing. The vegetation is for the most part tropical, and the painter has been careful to introduce amidst it those animals only which are natives of tropical regions. The grace and delicacy of the foliage and fruit are worthy of Raphael's happiest efforts; indeed, it may be doubted whether any part of the famous paintings by that artist in the Loggia of the Vatican are more beautiful than these. Amidst the foliage is the representation of an elegant cage suspended from a bough containing a goldfinch, the bird being in all respects most life-like. The artist evidently bestowed very great pains on the adornment of this chamber, which antiquaries are disposed to believe was the garden bower of the voluptuous *Livia*. As the paintings are in a villa built for *Livia* by Augustus, it is but reasonable to conclude that they are of that period, and were painted by *Ludius*. They are in all respects worthy of that artist, for they far surpass paintings of a similar nature hitherto found at Pompeii. No feature is neglected, every portion is painted in a manner exhibiting the most intimate acquaintance with the trees and flowers represented, and the same may be said of the various birds and insects which are introduced.

The Gothic Revival.

The great impetus to the revival of art in England was given by a religious movement. It was when the deficiency of church room in proportion to a rapidly-increased population had roused the energies of the Church of England that people felt the need of a working knowledge of ecclesiastical architecture. For nearly three centuries church building had been almost unknown in England. After the excesses of the Reformation, and the still more destructive iconoclasm of the Great Rebellion, enough churches remained for all the wants of the rural, if not of the urban population. Pointed architecture for religious buildings died out quite as much negatively, from want of occasions of exercise, as positively from the superior attractions of revived Italian. What works of church building and church restoration were undertaken in the seventeenth century were almost intended to be in the old

style. Under *Laud* and *Cosin* there was even a temporary revival, and there are many churches, such as *Higham Ferrers* in *Northamptonshire*, *Probus* in *Cornwall* and *Castle Hanley* in *Worcestershire*, where very late work exhibits, in spite of defective detail, the general feeling of the *Pointed style*. So, too, the hall at *Lambeth Palace*, rebuilt by *Juxon*, is in its outline and proportion a Gothic building, as *Pugin* was fond of asserting, although the particular features are of an exceedingly debased kind. In the two universities, and in many cathedral cities, the actual practice of Gothic survived to our own days. It could scarcely be otherwise in places where so many noble examples of the style remained to influence successive generations of students or worshippers by their own mute eloquence. And the surveyors and workmen attached to most cathedral churches simply handed down, without breach of continuity, the traditions of their predecessors. So, too, it has been remarked by *M. Rio* that the *Duomo* of *Milan* has itself maintained, down to very recent times, a series of by no means contemptible Gothic designers. Domestic *Pointed*, again, though in a degenerate form, is not even yet extinct in many rural districts of England—along the *oolitic range*, for example, or upon the millstone grit, or, in short, wherever good building stone is easily procurable. Mullioned windows, bold labels and string-courses and well-worked chimneys are to this day living traditions among country masons in places where stone has not been superseded by the cheaper brick. It is only in the red-brick region of the Midland counties, and the domain of the still less picturesque white brick of *East Anglia*, that any remains of Gothic treatment will be sought for in vain. To these circumstances we probably owe the fact that, when church building became recognised as one of the most pressing duties of the age, it was taken almost as a matter of course that Gothic was the prescriptive style for ecclesiastical architecture. In fact, there was no serious rivalry. The adoption of the *Pointed style*, in some form or other, was all but universal, and just enough opposition was made by the adherents of Greek or *Palladian* to give the *éclat* of a controversial victory to the supremacy of Gothic. Here and there, indeed, a church was built in pseudo-Classical style. *Pennethorne*, for instance, inflicted upon London the nondescript monstrosity of *Christ Church* in *Albany Street*. At *Wilton* and at *Streatham*, though thoughtful in plan and sumptuous in execution, premature attempts were made to import foreign forms of undeveloped Gothic without any attempt to mould them to the national type.

The Pre-Raphaelite Reaction.

Pre-Raphaelitism in its origin was a natural and necessary reaction from a system of effete conventionalism. And in so far as it vindicated the necessity of truthfulness and reality, of the original study of nature, and of the due attention to the inner meaning of art, it deserved sympathy. Unhappily, if not the leaders yet the followers of the movement carried their reaction too far. Passing beyond the true mean in the opposite direction, they came to subordinate the ideal to the actual, and in their pursuit of the minute accuracy of accessories they forgot alike abstract beauty and general harmony of effect. The extraordinary finish of Dutch art in the genre style, in which the labour of half a lifetime was expended on a pot or a pan, a carrot or a carpet, had begun to be estimated at its right value as a waste of time and thought on unworthy subjects. But the new school were ready to elaborate with nearly equal minuteness the grass or flowers of the field or the pattern of a brocade without observing that due proportion, that balance of light and colour which was never absent from a *Mieris* or a *Douw*. All details, whatever their relative prominence in nature, were, so to say, equally accented. The softening, mellowing, blending, obscuring effect of atmospheric distance was by some of these artists ignored altogether. Because aerial perspective had been abused and made to cover by a touch of hand a multitude of sins of omission and carelessness, the new school painted their subjects as though they were all under the exhausted receiver of an air-pump. Because the conventional treatment of the middle distance had become an academic commonplace, it was thought original and meritorious to project a group like a coloured elevation on one plane, while each subordinate detail was made as independent and as prominent as though it were the special object of a microscopical observation. As a natural consequence, finish of execution and conscientious truthfulness of representation came in time to supersede the ideal conception of beauty. If a model was exactly copied its faults were perpetuated as much as or more than its good qualities. And thus many who were fully prepared to admire and to sympathise with the movement were revolted by a crudeness and often a repulsiveness for which the evident good intentions of the artists and their undoubted power as colourists and draughtsmen were no compensation. However, what amount of truth there was in the new principles has already had its victory. We owe to the so-called pre-Raphaelites a growing sense among our English school in general of the importance of the true mission of art and of the necessity of reality and patient fidelity in the imitation of nature.

Greek Architecture.

In architecture as in sculpture, in the form of a temple as in that of the deity to whom it was consecrated, a beautiful type once selected was respected and improved for ages by successive emulation, but never wantonly or capriciously abandoned from mere thirst for change or the pride of originality. The simple proportions of the wooden building in which their ancestry had worshipped remained in their marble temples under every subsequent modification, whether enriched with Doric, Ionian, or Corinthian ornament, whether bounded by a simple portico or a basement enriched with a surrounding peristyle of 100 columns. Appropriate decorations and proportions soon were attained in each of the prevailing orders; but, admitting within certain limits the variations required by the local situation of each separate structure, the main principle was adhered to. Perhaps there are not two of the edifices which exactly correspond with each other, and yet the diversity never seems to have been capriciously invented. Columns and friezes, blocked out within prescribed dimensions, were completely finished from scaffoldings after the temple was built, and the precise degree of diminution in the flutings, capitals and entablature were probably determined by the eye of the architect under circumstances which then enabled him more exactly to appreciate the effect. With him—as with the painter and the poet—“*Quidlibet audendi semper fuit æqua potestas*”; and yet all of them were restrained from unmeaning and random innovation. It was, indeed, only by these governing principles, which are alike essential to every one of the liberal arts, that they controlled the flight of genius; and it has been by neglecting these for the narrower rules of technical dogmatism that our failure has been rendered so conspicuous. The very axioms which Horace collects for poetry are equally applicable and have been equally violated in this kindred art. In her productions too “*desinit in piscem mulier formosa superne*”—in them too, with vain ambition and in discordant succession, “*latè qui splendeat unus et alter assuitur pannus*,” in many a form of motley plagiarism.

Invention in Painting.

Invention as a general power undoubtedly depends on the command of a large fund of ideas and an intuitive readiness of associating and combining them in every possible mode. This produces those radiant recollections by which the images of absent things are often almost involuntarily called up, with all the vivacity of real objects moving about us and pursuing us as in a kind of waking dream. Thus the casual mention of the single word battle will to some minds instantly furnish out an endless chain of associated circumstances; cannons roar, clouds of smoke arise, the combatants on each side present themselves, we see them rush together, fight, struggle and die; we hear their screams and shouts, notice all their various movements and changes of colour, advert to all the surrounding objects, observe how they are affected, and share their hopes, fears, compassion, rage, astonishment or despair. To an Englishman of warm feelings and a lively fancy the word would perhaps suggest a different train of associated ideas, connected with another element. His imagination would present the picture of a sea-fight in all its accumulated horrors—of ships sunk or blown up, batteries silenced and whole fleets of the enemy at one stroke taken or destroyed; it might transport him instantly to Copenhagen or the banks of the Nile, and force him to dwell with an equal mixture of grief, fondness and exultation on the unparalleled deeds and the untimely fate of the hero of Trafalgar. As a technical power invention consists, not in composing, in the first instance, the story to be represented, but in seizing at once on the peculiar and prominent feature of the subject, placing it in the noblest and most interesting point of view, taking in all that belongs to the time and place chosen, discriminating the characters, entering into their situations, circumstances and relations; and all this with a reference at the same time to the genius and powers of the art by which they are to be embodied. The painter, for instance, as soon as his mind is affected by the grand or the pathetic, instantly clothes his ideas in all that is touching and awful to the sight, and carries it out through the whole of his composition, which includes the invention and disposition of every part, the managing his background, throwing his lights and shades, and ordering the attitudes and action and expression of every figure that enters into and constitutes a part of his work.

Thorvaldsen and Scott.

Though Sir Walter Scott does not seem to have felt any especial interest in works of art, judging at least from the fact that he never once visited the Vatican during his stay in Rome, he was extremely anxious to make Thorvaldsen's acquaintance. The meeting between these two great personages must have been a strange one. Though Sir W. Scott was acquainted with several languages, he could speak none but his own, while Thorvaldsen knew nothing of English. But there was one language common to both of them, and that was the

language of the eye and heart. To have seen them pressing each other's hands, patting one another on the shoulder, nodding, smiling, while the only words that were heard on either side were “*connaissance*,” “*charmé*,” “*plaisir*,” “*heureux*,” “*piacere*,” “*happy*,” &c., must have been diverting in the extreme. The interview of course could not be of long duration. On separating they warmly embraced, and followed each other with their eyes as long as possible, “*darting at each other glances of the warmest assurances of regard and esteem*.”

A. W. Pugin on his Contemporaries.

Trading, under the cloak of art, belongs to the modern architects or surveyors—for the terms are now synonymous—men, for the most part, utterly despicable, who venture to profess a noble art for the sole purpose of prostituting and degrading it to their own private interests; and they have so far succeeded that, while immense fortunes have been amassed, their very name has almost become a reproach; men without one particle of soul or feeling except the hope of gain or the fear of loss. They proceed to design a church, a poor-house or a tavern in the same business sort of manner. They have a set of stale ideas drawn from borrowed sources, which they keep as stock patterns and transpose to serve all purposes. They do not understand any style, but profess themselves masters of all; and they will undertake any absurdity to suit the caprice of an individual, provided they are well paid. I never behold one of those sprucely-dressed, ignorant, insolent pretenders without a bitter rising of bile on hearing the careless manner with which he speaks of the greatest efforts of ancient art, cloaking his ignorance of their merit by an affected indifference. Show him a splendid piece of sculpture, and he will talk of the material out of which it has been carved; tell him of some vast cathedral, he will ask if it proved a good job for the contractor. The superficial contents of a brick wall or plastered ceiling, on which he gains as much a square rood, is of infinitely greater interest to him than the most elaborate production of an artist. In fine, he draws, looks, thinks and lives at so much per cent. This is the very acme of his ideas, and he would estimate the Raphael Cartoons by the yard, canvas included, and gird the limbs of Michel Angelo's *Crucifixion* to price the labour.

GENERAL.

The Vicar of St. Helen's, Bishop Auckland, has discovered, hidden by masonry in the chancel of the church, a fine example of a piscina, believed to date from the eleventh century.

The Trustees of the British Museum have presented to the Corporation of Glasgow, for the museums of the city, cases containing a series of about one hundred electrotypes of the principal medals illustrative of British history from the days of Henry VIII. down to the close of the Peninsular War and the career of Napoleon Bonaparte.

The Foundation-stone of the Fine Art Galleries, Glasgow, is to be laid to-day by the Duke of York.

The Excavations undertaken by the French School of Archæology at Delphi will be shortly resumed. The ancient gymnasium is selected as the site of the exploration.

An Exhibition of Shropshire antiquities is to be held in Shropshire next spring. Mr. H. Southam is the honorary secretary.

The New General Hospital, Birmingham, has been visited by the members of the Birmingham Royal Society of Artists, who have contributed a collection of works for the adornment of the walls.

Mr. F. A. Bather, of the department of geology in the British Museum, has been sent on an official mission to Russia to inspect and report upon the museums and scientific institutions in that country.

Lord Beauchamp has offered to present to the City Council of Worcester a pair of entrance gates to Pitchcroft, lately acquired as a public recreation ground.

The Dublin Corporation have increased the salary of Mr. Harty, the borough surveyor, to 1,000*l.* a year.

A Marble Tablet, erected in Kelloe Church in memory of Elizabeth Barrett Browning, was unveiled on Tuesday by Canon Kitching, of Durham. On the tablet is the following inscription:—“To commemorate the birth in this parish of Elizabeth Barrett Browning, who was born at Coxhoe Hall, March 6, 1806, and died at Florence, July 29, 1891. A great poetess, a noble woman, a devoted wife. Erected by public subscription, 1897.”

The Colne School Board have decided to erect a new technical school and public library on a site in Albert Road, the maximum cost to be 5,500*l.*, which, with the cost of land, viz. 1,300*l.*, would amount to 6,800*l.* Two prizes of 50*l.* and 35*l.* will be offered for the best designs.

The Architect.

THE WEEK.

LEEDS is well adapted for a Sanitary Congress. During some years past progress has been made, and the life of the citizens is of longer duration, but various arrangements connected with property prevent the Corporation from carrying out improvements as expeditiously as is desirable. Those who remember Leeds twenty-five years ago must be struck by the different appearance it presents to-day. The inky river is an eyesore, but with so many manufactories along the banks the purifying of it is no easy task, but the delay is favourable to the maturing of serviceable schemes of sanitation. In other cities and towns much money has been wasted by precipitate action, and from that loss Leeds will be spared. The Corporation are acting with much energy, and when we learn that three-quarters of a million are being expended on street improvements, it is evident that nobody can charge the Municipal Government with indifference. The scheme for dealing with the insanitary area is one of the most colossal that has been devised.

MR. WILLIAM MATHER, of the Salford Ironworks, may always be counted on to offer wise suggestions on strikes which affect his business. From his position, what he says should be considered with respect, for as a representative employer he is acquainted not merely with the conditions of his own order, but of the men also. MR. MATHER considers it is time the engineers' strike should come to an end, as already it has inflicted enough misery on men, women and children, who are outsiders. He therefore proposes:—

1. That the working week shall consist of forty-eight hours, with a mutual agreement as to shifts, overtime and other details to meet special circumstances.
2. That the question of the employment of machine tool and labour connected therewith, which has recently been the subject of discussion between the Employers' Federation and the Amalgamated Society of Engineers, and other questions not at present mutually agreed upon, shall be settled on such lines as the Employers' Federation shall be willing to accept.
3. That on a settlement being arrived at, the Employers' Federation undertake to do nothing for the purpose of impairing the trade union, that no member of the Amalgamated Society of Engineers shall be treated with less consideration and respect than he received before the dispute, and that no member of the Amalgamated Society of Engineers shall be subject to exclusion from or disqualification for employment in any works of the members of the Employers' Federation so long as the settlement exists. It will be seen that this proposal is intended to secure to each side what they most desire in exchange for what they regard as of less value in comparison therewith. Of course it is a compromise, but it would afford the basis of a lasting settlement.

THE Blue Book on the trade of the British Empire and foreign competition contains much which is suggestive. If it served no other object than to show how far foreigners are wresting the trade from Englishmen in the colonies, its appearance would be justified. The proportion of foreign to total importations sometimes rises to 80 per cent. In particular cases the foreigner now does more than 50 per cent. of a trade which a few years ago was admittedly British. In Hong Kong for wire, and in Malta for wrought-iron, the Belgians have practically ousted their British competitors. The countries which are most frequently mentioned in the returns as seriously competing with British goods are, without doubt, the United States and Germany; in some lines Belgium is an equally energetic competitor, but her scope appears to be more limited. In the East the competition of Japan is rapidly becoming the leading feature in the trade of that part of the Empire. German cement, for example, having a finer grain and lower price than what is made in England, has come into favour in various colonies. The lighter and cheaper furniture of Austria and the United States is superseding British productions. Owing to the effect of patents and advertising,

tools of industry and implements by Americans are preferred. The principal attraction in foreign goods is, however, their cheapness. The finish is also much greater, and in many cases the packing is superior. The general conclusions drawn from the returns are:—(1) In the best classes of goods and in the capacity to put the best possible article on a market which requires it the British manufacturer (and this seems generally to mean the manufacturer from the United Kingdom) is still supreme. (2) There are certain exceptions to the above rule, chiefly in the case of machinery and tools of certain patterns, and in favour of the United States. Yet in these particular lines the Canadian manufacturer is often a successful competitor with those of the United States. (3) A great portion of the general colonial market is not a market for the best class of goods, and in proportion as cheap and finished imitations of such goods can be put on the market the trade will go away to the producers of such imitations. This is precisely where the foreign manufacturer is coming in. (4) There is some danger that, where the trade goes to foreign competitors in the cheap goods just mentioned, a certain proportion of the better class of trade may also be diverted eventually.

It is not every enterprise in seats for the Jubilee crowds has been so successful as St. Clement Danes, in the Strand. The seats were certainly piled to a height which caused some alarm, but 5,750*l.* is an enormous sum to derive from the desire to witness a spectacle which was so brief in its duration. The money belongs to the rector, the Rev. S. PENNINGTON. He has generously withdrawn his claim on it, and the whole sum is to be devoted to the restoration of the church. There are many who would like to see the building removed, in order to allow of the carrying out of an improvement scheme for the Strand. But the associations with Dr. SAMUEL JOHNSON are still too strong to be annihilated, and it is not unlikely that the brass plate in his pew will soon be the only memorial of his connection with the Strand.

A PAPER was read on Wednesday at the Sanitary Congress, Leeds, by Dr. J. SPOTTISWOODE CAMERON, entitled "Drain-testing: Some facts revealed by testing the drains of 1,121 houses in which typhoid and diphtheritic disease was thought to be present." The value of the material gathered as the result of drain-testing in Leeds had, he said, been less than it might otherwise have been, owing to the possibly unintentional selection of those houses occupied by the poorer inhabitants of the city, and to the incompleteness of the methods of examination employed. It seemed to many of them that the day had gone by when the duties of a ward-inspector should be limited to the verification of nuisances complained of by the householder. If the sanitary service was to become an efficient preventive, they must examine the houses in their districts before, and not merely after, they had given rise to disease. From 1894 to the end of 1896 the sanitary department of Leeds had specially tested 1,121 houses in which typhoid and diphtheria were supposed to have occurred. Of the houses thus examined no fewer than 30 per cent. allowed the smell of the test placed in the drain or sewer to enter the dwelling. After giving the results of the examinations in detail, he said he thought the figures would warrant the following conclusions:—(1) As even in houses free from the special dangers due to the presence of a water-closet within the dwelling, and further protected by the disconnection of all other waste-pipes, drain-testing revealed serious defects in nearly 12 per cent. of those tested, it is obvious that there should be a regular systematic and periodical testing of all house drains. (2) This periodical examination by tests should be three times as frequent where, though free from the special dangers attending the inside closet, the other waste-pipes are not "cut off" outside the house. (3) It should also be three times as frequent where, though all other wastes are disconnected, there is a water-closet within or beneath the dwelling. (4) It should be six times as frequent where there is the double danger of an inside water-closet and undisconnected house wastes.

HISTORIC ORNAMENT.*

IT is said by Mr. WARD in the introductory chapter of the new treatise on decorative art that "we are handicapped in the development of anything new in the way of an architectural style by traditions of the past. Our knowledge of what has been done in the past, paradoxical as it may appear, has proved itself a great stumbling-block to the progress of new ideas." Although he holds that belief Mr. WARD, by the publication of his book on "Historic Ornament," is increasing the number of stumbling-blocks and doing his best to retard progress. It is a great pity writers on art will not have the courage to be honest. They must know that the work of the past is like a great treasure-house, which can be used without any restriction, and it is absurd while explaining the value of the contents to advise those who have come to carry off spoils against taking advantage of their privilege. So long as antiquity is treated with a reverence that often becomes folly, we must expect the ornamentists will take advantage of the general feeling, and instead of inventing forms will practise the less troublesome process of adapting them from ancient examples. When men and women are taught by writers like Mr. WARD "that the best period in the life of historic styles and its duration corresponds with that of the highest culture and religious thought of the people at their settled and most flourishing epochs," the natural conclusion is that it becomes a duty to keep up ancient patterns. He implies that Victorian Gothic failed from the absence of high culture and religious thought, but surely England was as richly endowed in qualities of the kind in the nineteenth as in the fourteenth century. There are so many restrictions now imposed that an inventive designer has as little chance of appreciation as an inventive judge. On the bench a man has to follow precedents regardless of their equity; he is only there, he will say, to administer the law as interpreted by predecessors. The respect shown for leading cases corresponds with the fidelity to "historic ornament" which teachers of design always display. It may be that we cannot emancipate ourselves from the forms which were devised by primitive designers, but so long as we are content to be indebted to them, it is absurd to show our gratitude by railing against them. If we are sincerely desirous of freedom and development let us begin by eschewing whatever is historic, and with the great stumbling-block out of our way we may hope to make progress.

The fact that four hundred and thirty-six illustrations are to be found in Mr. WARD's volume is by itself enough to suggest the hold which ancient forms have still on designers and the public. Many are taken from the South Kensington handbooks, still more from the excellent books by MM. PERROT and CHAPIEZ. But while we can find no fault with them as illustrations, it is not easy to discover on what principle they were selected. The text is written up to them, and it must be said that the quality of architecture and ornament bears little correspondence to the number of pages employed for the descriptions. Egyptian art, for example, is allotted sixty pages, while Greek, Lycian, Etruscan and Roman art are crushed into a similar space. Indian art, which is rich in historic ornament, has ten pages, Gothic has twenty, and Renaissance forty, or less than is devoted to Chaldean and Assyrian art. In modern times Renaissance examples are more freely utilised than those of an earlier period, and it would have been an advantage for the student to possess the information which he is likely to require. The book may, however, be intended for candidates who are ambitious to attain such honours as the Science and Art Department can confer, and with all who are infatuated in that way utility is not of much account.

The author says that "in the development of nearly all historic art we find that the religious aspirations of man were the chief factors. The forms of ornament were generally derived from the figurative signs of sacred animals, plants and other mystic symbols of a religious meaning, and were in the end converted into meaningless but æsthetic ornament. This is the history of nine-tenths of

historic ornament that has survived the decay of nations." Unfortunately the explanation is too true. Religious aspirations in our time, if expressed in ornament, would produce forms very different from those of antiquity. For in the old days religion was an auxiliary of government, and its main object was to excite terror. The severity which is found in Egyptian, Assyrian, Persian and earlier Greek work corresponded in spirit with the laws which were obeyed. It is possible that the human mind rebelled against the tyranny, and if we possessed examples of the stuffs which were used in clothing and other objects of an unimportant and fleeting character we might discover patterns which were not so geometrical and oppressive. Some of the objects found at Mycenæ indicate that heresies in ornament were not impossible. But as objects in stone and metals are those which have commonly survived, we are forced to take our notions of ancient art from them alone. The care taken is manifest, but when there is a continuous repetition of patterns executed with equal care the whole becomes more wearisome than a piece of machine-printed cotton. For in the latter there is generally some attempt to subdue the monotony by the simplicity of the pattern, but the ancient workers in stone and metal seemed to think they could not be too rigorous in representing geometrical forms. The objects in the Gold Room of the British Museum show the extent to which monotony prevailed in periods when the arts were supposed to flourish.

When ornament is employed as an accessory to architecture a severe character may generally be imparted to it. Work that has to be executed in hard stone, and which is expected to endure for a long period of time, can with advantage exhibit subservience to the conditions imposed on it. But if the floor of an Assyrian palace exhibits carving in low relief of rosettes, stars and lotus leaves, it does not follow that a British carpet should present a similar combination of forms. Yet that arrangement is not unknown. The more or less faithful reproduction is not to be excused by saying that the Assyrian carving must have been a copy of a carpet or piece of woven stuff. We may take our pleasures sadly, but there is not such a dearth of invention among us as to make it necessary to go back to a remote age for patterns for borders and the like. The school inspector in "Hard Times" laid down the laws of ornament according to one theory when he told the children that they must for all purposes employ combinations and modifications of mathematical figures which are susceptible of proof and demonstration, or otherwise there would be no taste; but the children were scared by the prospect of a world with that sort of adornment, and they were wiser than their teachers in allowing their feelings to control them.

The numerous illustrations give to Mr. WARD's book the character of a collection which is the more trustworthy because it does not appear to be gathered with a view to the proving of any theory. The pages demonstrate that in the progress of ornament the aim has been towards lightness instead of massiveness, and efforts were continually made to approach nearer to nature. The Greeks, for example, were not too proud to derive *motifs* from the countries to which they gained access, but in every case they endeavoured to remove the heaviness which characterised foreign forms. The Ionic capital is far more graceful than any of its relatives, and the very lightness of the volutes inspired a French architect with the idea that they were derived from the turning upwards of the ends of a flexible covering that was thrown over an altar. Forms somewhat similar would serve as roots for the evolution of the Ionic capital, but with as much probability it can be said that the original suggestion for the volutes was derived from the lotus plant. There is a large capital in the British Museum which shows the spiral as terminating in a big flower of the kind. When we find one exception to the conventional arrangement we may assume there were many others devised, and that natural forms were not altogether avoided by Greek architects. The Corinthian capital is less logical than the Doric or Ionic, but on that account it is a stronger indication of a desire for lightness and grace, which were obtainable only by coming closer to natural forms. The Romans wished to be sumptuous in their ornament as in other things, but what we still see

* *Historic Ornament: Treatise on Decorative Art and Architectural Ornament.* By James Ward. London: Chapman & Hall, Limited.

in Pompeii, as well as what existed in the Baths of Titus, from whence the decoration of the Loggie in the Vatican was derived, is more refined. In Pompeii the dimensions of rooms which are represented on the walls must have been inspired by some forerunners of the bamboo building of the Japanese. If the Loggie of the Vatican are correctly copied, it is not unlikely that the patterns or objects represented were brought together at the suggestion of children. But the most remarkable proof of the tendency of the period is to be found in the Roman catacombs. They belong to the Christians, a class whose lives were scarcely worth a pin's fee. It might be concluded that in so uncertain a condition of affairs they would have sombre ornament, of which there were many precedents, but these chapels and tombs are made by means of painted decoration to assume a festive appearance, and the frivolity has been a puzzle to inquirers. The Olympian beings that were most attractive to the Pagans of the time were introduced as types of biblical characters. The Christians probably considered it was easier to go with the current than to stem it, and their commissions to artists force us to conclude that the yoke of religion was supposed to be easy and the burden light. In most Roman work vegetation is introduced as subservient to some other objects; but when it was announced that a philosophy of Christian life was to be derived from the flowers of the field, plant forms assumed a new importance. In the *Orpheus* trees are represented not only in the central panel, but in those around, and a new era in art was commenced. Conventionalism again asserted itself in Saracenic art, but how different it is to the conventions of an earlier period. The Byzantine and Romanesque show a multiplicity of causes at work. There were many invasions, and the clumsy hands that could wield battle-axes were not adapted to carve or paint delicate ornament. According to Mr. RUSKIN, "to the Gothic workman the living foliage became a subject of intense affection, and he struggled to render all its characters with as much accuracy as was compatible with the laws of his design and the nature of his material, not unfrequently tempted in his enthusiasm to transgress the one and disguise the other." The various periods are marked by the relative amount of lightness and naturalness found in the foliage, and there can be no doubt that in many cases flowers and plants were copied directly from nature. The Renaissance was a period of liberty and men followed conventions or natural objects with equal pleasure. In all countries of Europe we find plant form produced with an elaborateness which is sometimes startling. Our own GRINLING GIBBONS entered into the spirit of the style, and his wood-carvings came nearer to nature than any of the paintings of the time.

ELECTRIC TRAMWAYS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

THIS subject is now coming very much to the front, and the municipal engineer or surveyor has very often before him the question of mechanical traction, the improvement of the service, especially the question of increased speed and the reduction of the working expenses. It may, therefore, be of interest to review the positions of the various forms of traction at the present time. The systems at present in use are horse, cable, steam, gas and electric (third rail, conduit, accumulator and overhead trolley).

With regard to horse traction there is no doubt that the cost for the track is low and the cars inexpensive, but the cost of operating is certainly high. The speed attained is very low, consequently passengers are driven to use railways for even short journeys. There is no doubt that an average speed of 5 to 6 miles an hour is rarely exceeded in our suburbs. The limits of speed which are imposed by the horses and the heavy deterioration in the life of the animals are undoubtedly the chief causes of the inadequate service. Another point, and one which should be more considered in these days of civilisation, is the cruelty to the horses. There is no doubt that the conditions of running are too heavy for a horse. Starting heavily loaded cars on

a gradient, the frequent starting and stopping, and the large force required to put the heavy weights in motion, combined with the bad effect on the horses due to running on the stone setts continually, are responsible for the extremely short lives of tramway horses.

The sanitary aspect of the matter must also be considered, as it is of great importance. It becomes necessary, when the traffic is at all heavy, to consider whether a mechanical system of tramway working can be introduced with advantage.

In considering this step it is probable that a system which does not require any great alteration of the track will be favoured. The most general systems which comply with this are steam, gas or oil, and electric accumulators. These systems do not require any reconstruction of the track (if it has been well laid), and no permanent constructional works.

Steam Traction.—There is no doubt that steam traction is convenient, cheap and reliable. There is no one who will deny this point; but when this is said there is an end of the matter. The system has been extensively tried in England, but it is losing ground, owing no doubt to the very objectionable smoke, noise and the appearance of the engine. English people do not view with favour the spectacle of a locomotive in the streets, and do not like the soot, sulphur and noise of escaping steam. It may be that the great improvements in steam-propelled vehicles for the ordinary roads will result in a noiseless steam boiler and engine, which will be smokeless; but, until then, steam-propelled vehicles will never be popular.

Gas or Oil Traction.—This system has come into use a little lately in an experimental way, but very little has been done practically. The facts that gas can be obtained in any town, that it can be easily compressed, that it is efficient and inexpensive, make it a very promising subject for experiment. There is no doubt that the gas-driven car will prove a formidable rival for any of the other schemes as regards cost of maintenance. The same arguments apply to oil-engines, but with rather less force, as it has been found that the cost of running is rather higher with oil than with gas, and that the engines are not quite so reliable. The disadvantages against the use of oil or gas are also numerous. The exhaust gases are very disagreeable, and it is doubtful if the local authorities will allow it to be discharged into the streets; the motor must be always running, as it is difficult to start, and complicated gears will be required to start a heavy car on a gradient; the gas or oil-engines are very complicated and are extremely liable to get out of order, the engines cannot be reversed, lubrication is difficult and it is necessary to carry either an explosive gas or an inflammable oil, neither of which are likely to meet with popular approval.

Electric Accumulator Traction.—This system of traction is one which has very many advantages, among which are—(1) noiselessness, (2) ease of control, (3) absence of vibration, (4) cleanliness and good appearance. These advantages have marked it out as being one of the few systems which are suitable for large towns, where overhead wires, escaping steam, smoke or exhaust gas are impossibilities. The system is also very suitable in cases where the service is infrequent; it is, in fact, the ideal system of traction. A small engine and dynamo can be used continually for charging the accumulators, and working under these conditions electricity can be generated and stored at a cost unapproachable by oil, gas or steam, or in fact any other system, including the overhead electric system, where the conditions are different, a large plant being required, and expensive overhead work to transmit the electricity to the car.

In years past, however, the storage batteries have been a failure. The heavy starting current, combined with the effects of vibration, have made the life of the batteries very short, so short, in fact, as to prohibit their use. There are now, however, some accumulators which give better promise of success, and there are two places, at least, where some very encouraging results have been attained, viz. Chicago, and St. Denis, in France.

The subject of accumulator traction cannot be dismissed by reference to past failures, as the accumulator has been very much improved of late. The question of weight is, of course, against the accumulators at present, but there is no

doubt that very many advantages are to be gained by their use.

We have now mentioned the various systems which do not need any alteration in the track, and will proceed to the others before giving the details of the various systems in use.

The Cable System of tramways has before it a great future under certain circumstances. This system consists of a cable which is continually in motion in a conduit under the ground. The car is connected to the cable when required by means of a grip, actuated from the car. In this system all the cars move at the same maximum speed, viz. that of the cable, while those going down-hill help those going up-hill. It is evident that this system has a great advantage in all cases where a heavy incline has to be mounted, as there is no difficulty as to adhesion of wheels, &c., and no very excessive strains on machinery. The chief difficulties are with the slots in the road, stones sometimes being wedged in them, thus stopping the traffic, and also the impossibility of using the systems for very long runs. The conditions under which this system is undesirable are when there are many curves, and when, of course, the service is not frequent. The cost of altering the track is rather heavy; the pulleys over which the ropes run have to be lubricated, and the rope requires frequent inspection and repairs owing to the tearing action of the grip when starting the car. Two very successful cable tramways are in operation—one on Brixton Hill and another in Birmingham.

The Electric Systems.—These systems are the ones which attract most attention. We hear of schemes for electric traction in almost every town in the country, and there is no doubt that every borough engineer will have before him some scheme for electric traction within the next year or two. The electric traction systems which entail interference with the existing tracks, or the erection of poles, may be divided into three systems:—(a) The overhead trolley system, (b) the conduit system (underground trolley), (c) the closed conduit (surface rail or stud), (d) various new systems including electromagnetic traction.

a. *The Overhead Trolley System.*—In this system the energy is conveyed from a central station to the car by means of an overhead wire supported on poles or on wires spanning the street. Contact is made with the wire by means of a pulley working on a spring arm fixed to the car; this spring arm allows the wheel to be always in contact with the wire, as it takes up the variations in level of the wire. This arm is, in the case of the pulley, on a swivel, so that it may take into account side movements of the car. In another case the arm is not provided with a pulley, but is merely a horizontal bar on a spring arm, there being no swivel. The width of the bar is sufficient to take up the greatest amount of side play, it usually being the full width of the car.

In most cases there is only one wire, the return being by earth; in others there are two trolley wires, to avoid the earth return. In the single trolley system the current passes from the motor to the framework of the car, and thence to the rails. The result of this is that great care must be taken to see that the rails are connected together electrically as well as mechanically. This is more difficult than it would appear at first sight, owing to the difficulty of making a good electrical joint with iron, due to rusting. There have been numberless rail bonds invented; but as a rule they must be looked upon with suspicion, owing to the previously mentioned fact that iron will rust. The only perfect method is of course electric welding. By this process the rail becomes continuous, but troubles are likely to occur with expansion. There is, however, no doubt that electric welding would be good in England, owing to the small ranges of temperature compared with those in America. The sinking of the rails in the road and the side-pressure exerted by the stone setts prevent serious buckling due to expansion, and also reduces the range of temperature to practically that of the ground instead of that of the air. Another process of rail bonding is by means of casting the ends together, molten iron at a very high temperature being poured between them. This is hot enough to fuse the surfaces of the rails, thus making the metal continuous. There is, however, a liability to get a bad joint in this process, owing to the different and prob-

ably crystalline structure at the joint. However, both these processes are in use in America.

The effect of a bad joint in rail-bonding is to cause a difference of pressure between adjacent rails, and so increase the drop of pressure between the furthest point and the central station. The result of this is that the greater part of the current from the further end prefers to go through the earth, and incidentally most of it goes through any good conductors it may find on the way. These conductors are usually gas and water-pipes, and although there is no harm in the passage of current through these pipes, the current must leave them again to get back to the dynamo. The pipes are severely corroded at the points where the current leaves them, owing to the electrolytic action. There is no absolute remedy for this, except to make the drop of pressure on the return circuit so low that the resistance of the earth return is high compared with that of the rails. If this is the case very little current finds its way to the pipes and the electrolytic action is negligible. There are several advantages of the single trolley line over the double. At crossings there is very little difficulty with it; the expense is lower and the street looks less crowded with wires. This latter advantage is very great in England, where convenience is sacrificed to appearance to such a great extent.

(To be continued.)

THE ARTS AND CIVILISATION.

THE arts are the landmarks of civilisation. By their means we are instructed no less in the social progress than in the extent of refinement to which at various periods the most celebrated nations of the earth have arrived. Like the Nilometers of old, they inform us of the precise changes they have severally undergone, no less than of the different degrees of elevation to which, in the fluctuations of empires and states, they have attained. Long anterior to any written record found in the pages of the poet or historian, even to that volume which we all hold in veneration, nations existed who employed, though in a rudimentary form, the language of art—that “inestimable art” which has been properly described as one which “softens, refines and embellishes the intercourse of life.” The means which the graphic and plastic arts supplied were among the earliest employed by the nations of antiquity for the expression of their religious aspirations and the preservation of documentary or biographical details; these were recorded in characters and forms of objects with which they were familiar, subordinated to an imaginative treatment which was not the mere result of accident, but a studied reflection of their spiritual wants as well as of their social condition. Thus, when we should now be otherwise deficient in a knowledge of primitive history, or dependent for it on fragments of fabulous tradition or unauthenticated travel, the language of art, supplied by the sculptor’s chisel or the painted wall, fills up the blank and furnishes the information we require. The aspiring tendencies of the human mind first considered art in its spiritual essence rather than in its material nature. Devotional fervour in the earliest times, as in the Middle Ages, rose superior to the deficiencies of optical observation or the dexterities of manual skill. The end and object of art being to aid in the promulgation of religion—the highest and most deep-seated principle of which our nature is susceptible—the absence of other sources of knowledge, the peculiar condition of the major part of society and the power of ruling hierarchies, invested art with the privilege of communicating to masses of the human family intelligence which could not have been conveyed in any other manner. Although the living principle that animated these arts was manifested in systems in which our sympathies have no share, they may yet command our attention for having endured through lengthened periods and furnished for our contemplation some of the noblest exercises of man’s ingenuity. Art then as a mental exercise, and in its loftiest application, may well challenge our calm inquiry, no less than furnish reasons for the successes which it achieved, and this also explains why, when that aspiration ceased to afford an impulse and give a direction to the energies of its professors, it should have declined from a great and sanctified system of expression, from an elevating and expanding exercise of mind into a narrow and limited channel of material agency. At a time when there was a spirit abroad which rose superior to material forms the artist looked beyond and out of himself into spiritualisms, and dealt in abstractions congenial with the feelings and the poetry of his own times; if he did not fully recognise art in its imitative capacity it was in consequence of respect for creeds, no less than of the short

comings which a defective education may have induced, and when afterwards he did employ natural objects with more strict regard to their artistic presentment, he did so by availing himself of their highest and completest forms.

ARTS AND CRAFTS IN GENEVA.

IN *La Tribune de Genève* a communication appears from Mr. Lawrence Harvey, who may be considered as the pioneer of technical education as adopted in this country by the County Council of London and other public bodies. The object of it is to demonstrate the superiority of Geneva as a training school for the architects of the future. "There is a position to be gained," says Mr. Harvey, "and Geneva is especially adapted to seize it, for neither in Zurich nor in Paris nor elsewhere can they form young architects that will satisfy the requirements of the public. The arrangements that are adopted now appear as if intended to compel students to acquire what is superfluous, and to forget what is indispensable for their future career. Is it a piece of strategy devised by old architects to defend themselves against the competition of young rivals, or is it stupidity? I cannot tell, but it is certain that in the practice of architecture one is always talking about money, and it is never mentioned in training schools or academies of art. This is the more strange if we consider what an architect is. He is a man to whose care large sums of money are entrusted in order that profit may be derived from them. As respects buildings for investment, that is a truth which all admit. An architect who does not know how to arrange building for investment wastes his client's money. The building may never attract a tenant, or the rent given for it may be insignificant; if the house must be sold the proprietor is sure to lose a part of his capital. But the facts are not less convincing when they relate to a country house or to a monument of any kind. The only difference is that the equivalent of the capital may be reckoned in services that are rendered or in satisfaction that is given. Is there, for example, one individual in Geneva who is not assured that the money devoted to the erection of the Brunswick monument is wasted? With an equal sum it would have been possible to raise a memorial which would have contributed to the reputation of Geneva as an artistic centre, whilst the existing monument is enough to raise a blush with all who look upon it. Still more, when he has to deal with an edifice of a purely decorative and ideal kind the architect is compelled to keep his eye fixed on the problem put before him, that is, to make the most of a sum of money by converting it into a constructive work.

"In order that he may profitably invest the capital of his clients, what has the architect to do? He must, in the first place, realise to himself the exact sum which a structure according to his plans will cost. In the case of ordinary constructions, buildings for investment or for pleasure, there are data which can be employed, and with which every builder is acquainted. But when the estimate relates to some simple work, such as an opening in a wall, the construction of a door or a partition or a roof, it is necessary to analyse the elements of the problem, and to consider, first, the cost of materials and, secondly, the cost of labour. In order to make the valuation correct it is absolutely necessary for a man to have had experience as a workman, to be familiar with the stone-cutter's chisel, the carpenter's saw and plane, and the hammer and tongs of the metal-worker. It will be asked, Do I recommend a seven years' apprenticeship in order to devise a few miserable details? That is surely too much to expect from architects. Insignificant details may appear, but in nine cases out of ten it will be found that at the commencement of an architect's practice it is with such things he will have to deal, and by means of them will succeed in gathering a *clientèle*. For where is the client to be found who is ready to entrust capital of a large amount to a young architect that he knows to be wanting in experience?

"But that is not all. In order to give assurance to his clients that they will receive value for their money, the architect must be thoroughly acquainted with the quality of the materials and the labour to which they are subjected. For that purpose a workman's education can render the greatest service to an architect. It is only in handling materials that one arrives at a knowledge of their properties. It is by operating on them that one discovers how work is to be done on them and what length of time is needed. It is, moreover, in the course of his apprenticeship as a workman that the architect will discover the tricks of trade, the frauds against which he must be on his guard at a later time in order to protect the interests of his clients. But what about art? How does it count in such an architectural education? Is there not a danger that it would cease to be reckoned among the fine arts? The fact is, however, that there is no surer way of becoming a true artist than by commencing with a practical study of the crafts. I could

investigate at any length the æsthetics of building, and there would be no difficulty in proving that the power of composition is in direct proportion to the possession by the architect of all the elements which should unite in his work; that good taste depends in a great measure on the exact adaptation of the form to the material and to process which it must undergo at the hands of the workman. As evidence I need only refer to the nave of the cathedral of Geneva. There is to be seen the work of men who have followed the career of an operative of men who, prior to the time when they were entrusted with erection of edifices, were stone-cutters or carpenters. In all Geneva there is nothing to be found more beautiful than the interior of St. Peter's. We may run through Europe on all sides, and we shall learn that during long centuries architects as workmen have raised buildings which are more and more marvellous in their execution, for architecture was then a living art which displayed increasing progress. Then a time arrived when all of a sudden the creative art was abandoned, and for it was substituted the copying of ancient buildings that had been forgotten and were misunderstood. There was an end to progress; there was no longer the breath of life; the ideal vanished, for the architects became archaeologists or painters or sculptors, and finally were transformed into gentlemen in black frock-coats, who were above handling a tool.

"Owing to its *Ecole des Métiers*, Geneva can now take up the broken threads and enrich the world with architects resembling those who constructed the cathedral of Geneva and the cathedral of Paris. It is not my intention to recommend young men to give themselves up to handicrafts in order that they may become practical. On the contrary, I consider that it is most desirable for architects to possess high culture, and it is for them above all that the study of the classics is advantageous. But I would say to those young folk who have already attained the power to appreciate Homer and Horace, that it would be well if they put on one side every sentiment of pride, and began their technical training for architecture by spending two years in the *Ecole de Métiers* in Geneva. If they will apply themselves to the task of learning all that can be taught to them, they will come out of the school competent to find employment as stone-cutters, carpenters, joiners, or metal-workers. The time spent in the school will have for its result a manifest superiority over rivals who have neglected similar advantages, and this will be seen in following out studies at a later time and in the struggle to make a name."

REPRESENTATION AND DESCRIPTION.

THE general nature of the formative arts as distinguished from language or description, from which their subjects are often taken, is too familiar to require much comment. It may suffice to advert to those principles of representation which have been derived from such a comparison, and which affect the question proposed.

In a subject taken from description it is required that the impression conveyed should be as nearly as possible equivalent to that of the written narrative; and this translation (for such it is) can rarely be accomplished without some deviation from the letter of the original in order to render its true meaning. It follows that where it is absolutely impossible for painting, which represents what passes in a single moment and in one view, to convey an impression equivalent to a given description, that description cannot be said to furnish a good subject for representation.

Sir Joshua Reynolds gives an instance of an ill-adapted subject of this kind which was recommended to a painter. "It was what passed between James II. and the old Earl of Bedford in the council which was held just before the Revolution. This is a very striking piece of history, but so far from being a proper subject that it unluckily possesses no one requisite necessary for a picture; it has a retrospect to other circumstances of history of a very complicated nature; it marks no general or intelligible action or passion," &c. The following appears to be the incident referred to:—"As soon as James entered the city he summoned an assembly of the peers to ask their advice and to make an apology to them for not having called a Parliament. In passing to the council he met with a shock, perhaps as severe as any he had felt. Meeting the father of the unfortunate Lord Russell, the old Earl of Bedford who had offered 100,000*l.* for his son's life, but which the king when Duke of York, had prevailed with his brother to refuse, he said to the earl, 'My lord, you are a good man; you have much interest with the peers; you can do me service with them to day?' 'I once had a son,' answered the earl sighing, 'who could have served your Majesty upon this occasion.' James was struck motionless."

The question here is not whether a good picture could be made out of two persons in conversation, but whether the precise story could be told. It is evident that it could not, and that the representation could not be equivalent to the description.

Among the changes which a subject may undergo in being transferred from description to representation may be mentioned the omission of circumstances which, however forcible and satisfactory in words, would be disagreeable when presented to the sight. One well-known instance may suffice. In the "Æneid" the serpent coils itself twice round the neck of Laocoon. Suppose some Mæcenas, more conversant in poetry than in art, were to employ a sculptor or painter to copy this description literally, the admirable lines of Virgil thus rendered would produce a tasteless work of art.

Not only forms, but colours, however agreeable in description, might be unpleasant to the sight, and the assumption that poetical allusions of this kind may be literally adopted in pictures has sometimes led to false criticism. In this respect the means of the two arts differ widely. An image is more distinct for the mind when it is compared with something that resembles it. An object is more distinct for the eye when it is compared with something that differs from it. Similarity is the auxiliary in the one case, contrast in the other. The poet succeeds best in conveying the impression of external things by the aid of analogous rather than of opposite qualities; so far from losing their effect by this means the images gain in distinctness. Comparisons that are utterly false and groundless never strike us as such if the end is accomplished of placing the thing described more vividly before the imagination, or of conveying an impression of excellence. In the common language of laudatory description the colour of flesh is "like snow mixed with vermilion;" these are the words of Aretino in speaking of a figure of St. John, by Titian. Numerous instances of the kind might be quoted from poets; even a contrast can only be strongly conveyed in description by another contrast that resembles it.

On the other hand, whenever poets have attempted the painter's method of direct contrast the image has failed to be striking, for the mind's eye cannot see the relation between two colours, to say nothing of the vagueness of their names. It has been already observed that words, necessarily presented in succession, are, strictly speaking, inadequate to the expression of harmony, the elements of which must be simultaneous.

Poets to avoid competition with the painter's elements, or rather to attain their end more completely, have often judiciously taken refuge in moral qualities when describing forms and colours. By means of such associations hues which would be far from agreeable to the eye become pleasing. All light, positive colours—light green, light purple, white—may be thus recommended to the mind's eye; no degree of dazzling splendour is offensive and no repose is required.

To insist, therefore, that a work of art should be absolutely faithful to the description from which it is taken (though that description might be excellent in itself, and true to the conditions of eloquent language) might be sometimes fatal to its success.

The restriction of representation to a single moment and a limited space has suggested various liberties in painting and sculpture, in order to render the impression as nearly as possible equivalent to that of the story represented. For example, in Raphael's celebrated painting representing the possessed boy brought to the Apostles while Christ was transfigured on Mount Tabor, the painter has taken the liberty of bringing the figures of the Redeemer and those who were with Him on the Mount during His Transfiguration near, and has reduced the mountain to a hillock.

This is an instance of a great liberty taken with space, but not with time, since the two events represented may be supposed to have happened together, and it is evident that in order to be equivalent to the description the scene of the Transfiguration required to be prominent. The ultimate object of the artist in proposing such a subject to himself it is not necessary here to inquire into.

The liberties taken with time are much more common, but they are only considered excusable in historic art when they greatly increase the force of the impression, and render it on the whole a more intelligible translation of the description. It is to be observed that the great artist above mentioned in most of his Scripture subjects does not depart in this respect from the letter of sacred history.

The liberties taken with the personal appearance of historical characters are thus defended by Reynolds:—"How much the great style exacts from its professors to conceive and represent their subjects in a poetical manner not confined to mere matter of fact may be seen in the cartoons. In all the pictures in which the painter has represented the Apostles he has drawn them with great nobleness; he has given them as much dignity as the human figure is capable of receiving; yet we are expressly told in Scripture that they had no such respectable appearance, and of St. Paul, in particular, we are told by himself that his bodily presence was mean. A painter must compensate the natural deficiencies of his art. He cannot, like the poet or historian, expatiate and impress the mind with great veneration for the character of the hero or saint he represents, though he lets us know at the same time that the saint was deformed, or the hero lame. The painter has

no other means of giving an idea of the dignity of the mind but by that external appearance which grandeur of thought does generally, though not always, impress on the countenance; and by that correspondence of figure to sentiment and situation which all men wish but cannot command. The painter ought to give all that he possibly can, since there are so many circumstances of true greatness that he cannot give at all. He cannot make his hero talk like a great man; he must make him look like one."

The precept here given, in its application to historical painting, properly so called, may require to be received with caution; and the great authority referred to by Reynolds may be quoted on the other side as having attained the grandeur of his style, at least without losing himself in vapid generalisation, a defect so frequent in the later Italian schools. The rule is chiefly applicable to works of large dimensions, and requiring to be seen at some distance; but in paintings which admit of nearer view, the power of expression has often triumphed over unpleasing forms.

The liberties taken with costume are notorious, and are frequent among the great masters. Their sole object seems to have been to be true to the imagination. Even in the instance of Nicholas Poussin—the most remarkable of the older painters for attention to costume—the air of remote antiquity, the classic probability which he contrives to give to his works, are addressed quite as much to the imagination as to the erudition of the spectator; and the artist's materials are selected or modified according to their applicability to this larger purpose, for he is frequently incorrect in the mere scholarship of costume. The rage for classic research in some modern (now nearly extinct) continental schools often led to the reverse of this principle, viz. the habit of addressing the understanding rather than the imagination. The weapons of Homer's warriors were chiefly tempered copper, not steel; but as few persons are accustomed to associate this circumstance with their conception of Homeric battles, the representation (for such representations have appeared) was unsatisfactory though true.

The extent of modern antiquarian researches in increasing information in archæology has increased the number of critics; and to be true even to the imagination now, a painter requires to be more attentive to the details in question than the earlier artists were. But the character of art is unchangeable, and the materials of costume are still to be considered subservient to the end of representation. Notwithstanding the gross errors in costume, which are observable in the pictures of the Venetian and Flemish masters, it will be remembered that such errors have scarcely weighed in the balance when their merit as artists has been considered; and that, on the other hand, the most rigid correctness in costume would never of itself be sufficient to constitute a fine picture.

The practice of the great Italian painters resembled that of the artists of antiquity. Their first care was to avoid as much as possible a modern appearance and ordinary associations in dress; and this was frequently extended even to contemporary subjects and portraits. In selecting obsolete costumes they were at least sure that taste could not alter respecting them, or that if any reaction took place it would be in favour of such costumes. The dress being once removed from the immediate present they were not particular about the precise period of a subject, and were guided chiefly by the demands of the art. Thus Giorgione appears to have dressed his figures in costumes older than those of the period in which he lived. Raphael, who willingly introduced the flowing robes of the clergy and religious orders (unaltered from much earlier times) and the armour and habiliments of Swiss guards (uncommon from their foreign appearance), took great liberties with the general costume of the period in which he lived.

Many of the licences above adverted to are regulated by the style of the art; different subjects, indeed, suppose different modes of imitation, and even different dimensions. The imitation of the details of dress is one of the points which characterise works of art of moderate size; for the fullest means of imitation which painting can employ are, strictly speaking, most appreciable in such dimensions, as coming within the range of most distinct vision, and hence the more complete those means the more the introduction of accidental circumstances is compatible with due gradation. But, as dimensions and distance increase, or as the scale of effect which represents the differences of nature, from whatever cause, becomes less full or less appreciable, the objects represented require to be selected with an especial regard to their importance, beauty and character.

Turner's House at Twickenham, known as Sandycombe Lodge, Sandycombe Road, St. Margaret's, will be offered for sale on September 21. According to Mr. Ruskin, the artist bought this house in 1808 and resided there till 1827; but other writers place the period of his residence at Sandycombe Lodge as from 1814 to 1826. The auctioneers state that the house was built after designs by Turner himself. The original structure has been added to,

"PROVAN'S LORDSHIP," GLASGOW.

IN the discussion about the house in Glasgow which has a claim to be considered the oldest, "Provan's Lordship" is to the fore. The following remarks on the building by Mr. P. Macgregor Chalmers, architect, appears in the *Glasgow Herald*:—

The old house which stands fronting Cathedral Square, at the corner of Macleod Street, has been attracting public attention recently. The following note is written after an examination of the building. My experience is that M'Ure, the first of Glasgow's historians, is not to be tampered with lightly. This short study adds another "stone to his cairn." Referring to this house, he wrote:—"The prebendary of Balernock, or, as he was called, the Lord of Provan, and his rectory, was always designed the Lordship of Provan. I am really at a loss to know the import of this designation. His manse was at the large house near the Stable Green Port, that now belongs to Mr. Bryson, of Neilsland." It is worthy of note that it is not stated that the manse was this large house. Referring to the thirty-two manses which Bishop Cameron is credited with having ordered to be built, it is mentioned that some were "now demolish'd and level'd with the ground," and in a general reference it is said that the manses "were so changed and gone through so many hands that the memory of many of them are quite forgotten." It would appear that the only fair interpretation to put upon M'Ure's statement is that the manse of Provan had stood on the site of the large house near the Stable Green Port. It has been shown recently that the present existing house was in the possession of Mr. Bryson, of Neilsland, when M'Ure wrote. As the title "Lord of Provan"—a title enjoyed by King James IV.—did not cease at the Reformation, it will be interesting if it can be demonstrated that the existing house standing on the site of the ancient but demolished manse retained the title of "Provan's Lordship."

The present building is of two dates. The earlier and much the larger portion is a long, narrow oblong, about 18 feet wide within the walls, extending along the front to Cathedral Square, with a small projecting wing on the west at the south end. The walls are nearly 3 feet thick. The joists of the floor are of oak, or other hard wood, about 6 inches square, and they run the long way of the building. The roof also is of oak, and the old slates were fastened to the sarking by long oak pegs. Many fragments of the old stone ridge are still preserved. The windows and doors have no ornament save a simple small chamfer. Several of the windows have well-executed stone seats on each side. The fireplaces, which are of more than ordinary size, are of one design, with chamfered jambs carrying moulded corbels on which the lintels rest. I found traces of a fireplace of similar design in one of the ground-floor shops, and at a level which shows that the original floor was considerably lower than at present. Having secured the use of a long ladder I climbed up to the roof, and there on the south-western corner, on the corbel of the gable top, I found the date 1570. There was the appearance of a rough projection high up on the south wall, and this, I was assured, was a sundial. Unfortunately, the whole wall is used as a hoarding for posters, but with a brush and water, and a liberal use of my fingers, I soon had the stone laid bare and cleaned. I found half a sundial only. The other half was probably removed recently and needlessly when the present rain-water pipe was put up. The portion remaining, however, is valuable. It bears the following:—

W. PROVA

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There are also a few radiating hour lines. The inscription, when complete, probably read, "W. Provan's Lordship. B." It is an interesting fact that on December 6, 1570, Thomas Baillie transferred the lands of Provan to his brother, William Baillie, senator and president of the College of Justice, by the title of Lord Provan. He died May 26, 1593. Provan passed to the Hamiltons of Silvertownhill, and later, on March 3, 1669, was purchased by the town of Glasgow. It is probable that it was at this date that the small addition was made to the house on the west, to the north of the existing west wing. Possibly the character of the house was considerably changed. It was at this period that two of the original large fireplaces were greatly reduced in size by the insertion of new jambs within the old. The mouldings used are of the same date as those on the entrance doorway which was made in the new addition. That this north wing is a later addition is made abundantly manifest at the roof. The old roof, with its spars and sarking, resting on the original back wall, was retained and still exists. All that was done was to remove the slates. The new roof, which is of a flatter slope, was laid over the old one.

This old house possesses many features of considerable interest and it is well worthy of preservation as a relic of old Glasgow. The personal interest attaching to it is now seen to be for lawyers rather than for churchmen. M'Ure's statement

as to the site of the manse of Provan may now be accepted. I have been greatly indebted to Mr. Innes, the caretaker of the property, for his kindness in allowing me to examine all parts of the building and for his assistance.

ATMOSPHERE IN CITY CHURCHES.

A CORRESPONDENT of the *Guardian* says:—As a rule, there is never any thorough ventilation at all. The system of having two or even three absolutely dark lobbies between the church and the open air, each closing with a spring door, makes any ventilation very difficult. Too often, in a few minutes, after several hundreds of people have left, every door is closed and locked, until a short time before the next service begins. Then, again, in by far the greater number of our churches, the daylight is so rigorously shut out that an enormous amount of gas has to be burnt, thus adding very greatly to the heavy and poisonous state of the air. Why are our churches dark? We worship the light, we call ourselves children of the light, and yet as one enters one after another of these otherwise beautiful buildings, the one text that comes first to mind is, "Ye love darkness rather than light," &c. Is the God-given light of the sun an evil thing, that we should shut it out so persistently? If only we would let the sunlight into our churches, in too many instances we should at once start with horror to see how dirty they are. It cannot but be so while we shut up the breath-laden, gas-laden air, to settle upon walls and carvings and upon costly ornamentation, until it forms a foul crust on everything. In many modern churches there is an elaborate system of roof ventilation, of which the architect is justly proud; but in many it is too elaborate to be of practical use. All the winter, when double the gas is burnt, these ventilators in so many churches are never opened at all. Roof ventilators, to be of real use, should be easily manipulated by cords and pulleys, and it should be the churchwardens' duty to see that all these are opened immediately after every crowded service for at least twenty minutes, even in cold weather. If, at the same time, the large doors of the church on two or three sides of the building were also wide open, all the vitiated air would quickly disperse; a new supply takes its place, and then doors and ventilators in winter can be shut and the church made comfortable for the next service. The average verger's idea of ventilation is to open a window about an inch during the service. These windows are generally just the height of one's head, and the cold air rushes in like a sharp knife, giving stiff necks and neuralgia with a liberal hand, yet practically doing nothing to freshen the depressing heat-laden air. How much harm is done by the fearfully poisonous air of so very many of our churches it is impossible to define. We know that many of the clergy fall ill; even the strongest are altogether exhausted after every Sunday, and this exhaustion is the direct result of foul air. We know that many business men refuse to come because of the weariness that ensues. Thousands are deterred every Sunday from coming because of it, and large numbers of those who do come find the intense heat, the heavy air a very grievous preventive of true devotion. The mind cannot give all its powers of attention when the body is required to suffer so painfully. Until our churches are full of sweet, pure sunlight, coming down in rich abundance from clerestory windows that will open freely, and giving us the light from above; until the air is as sweet and pure as in our own drawing-rooms and we have swept away the forbidding spring doors that so certainly deter the entrance of the stranger; not till then can we hope to get the intelligent artisan to come to church, and not till then can we hope to find the worship of our churches a true service of praise and rest and undisturbed devotion. Why cannot this form a subject for discussion at one of our Church Congresses?

EDINBURGH BUILDINGS.

THE President of the Dundee Institute of Architecture has invited the members of the Edinburgh Architectural Association to accompany the members of the Institute on their visit to the M'Ewan Hall, Blackford Observatory, &c., which will take place to-morrow, Saturday. Among the places to be visited are M'Ewan Hall, adjoining the University Medical College; Blackford Observatory; Craigmillar Castle, where Mr. Thomas Ross, architect, Edinburgh, who will accompany the party, will describe this ancient fortified mansion, whose outer wall bears the date 1427. In 1479 John, Earl of Mar, was imprisoned here, and, tradition says, put to death by the opening of his veins in a bath for alleged conspiracy against his brother, James III. The castle was frequently the residence of James V., and the chief country retreat of Queen Mary Holyrood will be next visited. After luncheon the members of the party may individually visit the Castle, St. Giles's Cathedral, National Gallery or Museum of Science and Art.

NOTES AND COMMENTS.

Now that Herr PÜLSZKY, the director of the National Gallery of Buda Pesth, has passed away, a great many stories are current about his weakness in giving big prices for works of art which were nearly valueless. He directed one of his representatives to go as far as 125,000 francs for a portrait of an unknown man by SEBASTIAN DEL PIOMBO. He placed it in a prominent position in a gallery, but the next day it was put out of sight. It is hard for a director of a gallery to be always infallible; precious works mysteriously turn up from time to time, and the officials who do not secure them are blamed for their indecision. There are comparatively few works by SEBASTIAN DEL PIOMBO, and, although MICHEL ANGELO chided him for his sloth, he could hardly help painting a larger number of pictures than those bearing his name. An amateur who devoted himself to a search of the artist's works could hardly fail to make some interesting discoveries.

THE continuous purchase of works of art by the French Government, and which disappear as soon as they leave the exhibition, necessarily leads to various accumulations. From time to time we read of discoveries in out-of-the-way places. One of the latest was in an old stable, which is about to be cleared away for the purpose of enlarging a shop. Among the collection is a fine portrait in his coronation robes of NAPOLEON I., by RAMEY. In this the Emperor's countenance assumes an expression of majesty which was not surpassed by any of the Court sculptors, while the details of the robes have the delicacy of porcelain. Another work by the same sculptor represents LOUIS PHILIPPE, surrounded by his sons, receiving the charter of 1830 and the oath of the army. There are also figures and busts of NAPOLEON III. and the Empress EUGÉNIE. There is also a recumbent figure of the Duc D'ORLÉANS, who is draped in a mantle of St. LOUIS. After lying neglected for so long a time, the sculpture is to be sent to Versailles, that refuge for the waifs and strays of art.

ALTHOUGH valuable prizes may be founded it is not always easy to bestow them. The will of NOBEL, the inventor of dynamite, seems to be up to the present a dead letter. He founded four prizes of 10,000*l.* each, which were to be annually awarded to men who deserved them by their labours in science, letters or philanthropy. The heirs of the chemist are attacking the arrangements, and not one of the four societies who are to choose the recipients has received the money for last year's prizes. Another prize of his was to be given to the man who had endeavoured most efficaciously to render war more impossible. That prize is to be awarded by the National Assembly of Norway, and a commission has been appointed to investigate the claims of the competitors. No more than two competitors have as yet appeared—one is the painter VERESCHAGIN, the other Count TOLSTOI. M. VERESCHAGIN's pictures of Russian battlefields were exhibited some years ago in Bond Street, and the pride, pomp and circumstance of glorious war appeared more brutal than any scenes in an abattoir. It was courageous of the painter to oppose national opinion in Russia, and he undoubtedly has a claim on the 10,000*l.*

THE goldsmith's trade in Paris is probably the most important of all. The influence of the costly and beautiful examples in the precious metals extends to the humblest *objet de Paris*, and examples of jewellery which only cost a few sous have a character which is not rivalled by goods at a higher price in other countries. The death of LUCIEN FALIZE at the age of fifty-eight is therefore a more grievous loss to France than would be caused by a dozen deputies. He was recognised as a distinguished artist, and his productions were sought after in all the courts of Europe. M. FALIZE was the successor of M. BAPST, the jeweller to the crown, and his ambition was to uphold the reputation which for centuries belonged to French metal-work. Among his later works were the toilet service in massive silver which was presented to the Princess LOETIZIA on the occasion of her marriage with the Duc D'AOSTA, the *Gallia*, which was the most important example of its style in the Exhibi-

tion of 1889, and the golden olive-branch which M. FAURE deposited on the tomb of ALEXANDER III. Let us hope he will be succeeded by some other artist who will carry on the old traditions which have made Paris [supreme in jewellery.]

THE psychical visitations of which we hear in England suggest that the spirits are wanting in originality; apparently all they can do is to make a noise. A story has been revived in Paris which reveals that spiritual manifestations, as other things, are better managed in France than with us. The witness and recorder was THOMAS COUTURE, whose *Roman Orgie*, now in the Louvre, is one of the great pictures of the century. The artist never gained the success which was the right of a man of such genius, and in consequence he became cynical and looked at everything in the most unimaginative way; he was therefore entitled to credit when he testified to a phenomenon. COUTURE was employed on the wall paintings of the lady chapel of the fine church of St. Eustache. From time to time he was disturbed by the appearance of a harlequin of the old school, who gracefully saluted and pirouetted round the chapel. Sometimes he would express his gratitude by delight at the painter's work. The harlequin even ascended to the scaffolding and carefully examined the ornament of the cornice. The first time COUTURE saw him he imagined that harlequin was one of the street pantomimists of Paris who had found his way from the Halles into the chapel, but when the painter examined the door leading to his enclosure he found it was double locked. The visits continued for about a week, and COUTURE was eager to utilise his admirer for a pantomime scene, but he disappeared. Subsequently he came across an old book entitled "Life of DOMINIQUE, the Celebrated Harlequin of the Italian Comedy." There he discovered that the actor was greatly admired by LOUIS XIV. He made some money, and on his death he bequeathed the greater part of it for the upholding of St. Eustache, on the condition that he was allowed to be buried in the lady chapel. It was DOMINIQUE who gave the famous answer to the king. His Majesty had been dining, and, pointing to a golden dish, said to an attendant, "Give this dish to DOMINIQUE," who replied, "Shall I have the partridges also, sire?" The event may be no more than hallucination, but in the haunted houses of which we hear so much in this country it is a pity our spirits are not capable of such dramatic and charming incidents.

MR. B. T. BATSFORD's forthcoming publications include "Later Renaissance Architecture in England," by JOHN BELCHER and M. E. MACARTNEY, the second and concluding part; "Bungalows and Country Residences," by R. A. BRIGGS, fourth edition, with additional plates; "A History of Architecture for the Student, Craftsman and Amateur," by Professor BANISTER FLETCHER and BANISTER F. FLETCHER, third edition, revised; "The Influence of Materials on Architecture," by BANISTER F. FLETCHER; "Modern Opera Houses and Theatres," by E. O. SACHS, third and concluding volume; "Examples of Old Furniture, English and Foreign," drawn by A. E. CHANCELLOR; "Windows: A Book about Stained and Painted Glass," by LEWIS F. DAY; "Alphabets, Old and New," selected by LEWIS F. DAY; "Examples of Greek and Pompeian Decorative Work," measured and drawn by J. CROMAR WATT; "Estimating," a method of pricing builders' quantities for competitive work, by GEORGE STEPHENSON, third edition, revised; "Repairs," how to measure and value them, by GEORGE STEPHENSON, second edition, revised.

ILLUSTRATIONS.

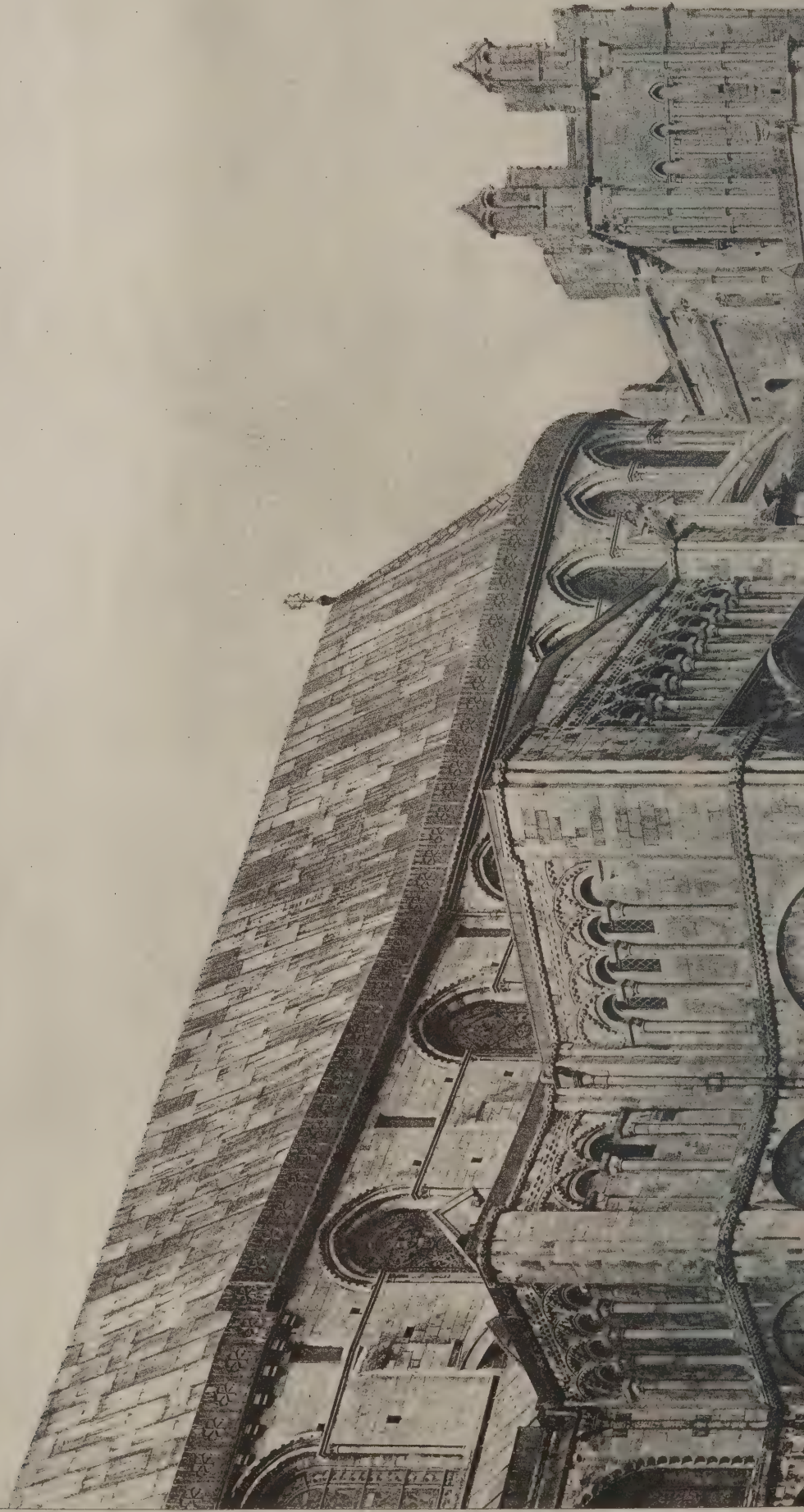
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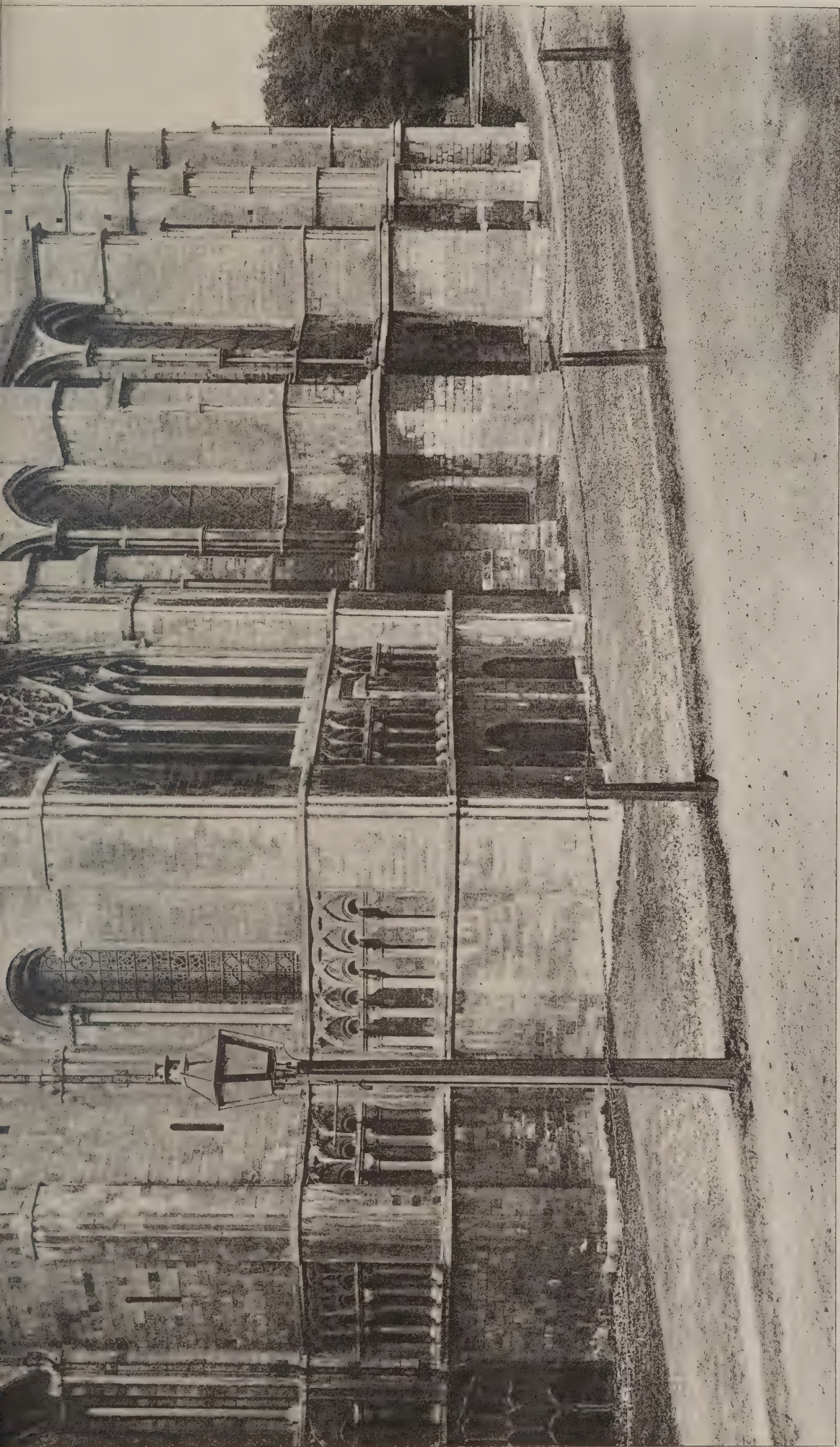
HER MAJESTY'S THEATRE, HAYMARKET.

VESTIBULE, HER MAJESTY'S THEATRE, HAYMARKET.

GRAND STAIRCASE, IMPERIAL INSTITUTE.

The Architect, Sep. 17th 1897





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CATHEDRAL SERIES, No. 75.—CANTERBURY: SOUTH-EAST END.

The Architect, Sep: 17th 1897





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HER MAJESTY'S THEATRE, HAYMARKET.
The Late CHARLES J. PHIPPS, F.S.A., Architect.



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GRAND STAIRCASE: IMPERIAL INSTITUTE.
T. E. COLLCUTT, Architect.

THE SANITARY CONGRESS.

THE presidential address at the Congress of the Sanitary Institute now open at Leeds was delivered in the chemistry classroom of the Yorkshire College by Dr. Robert Farquharson, M.P. He said the responsibility of an introductory orator on such an occasion as this is much increased by the fact that hygiene has now become fashionable, and that most people nowadays know at all events the elementary principles on which it works. "All great subjects like this, and more especially those which involve some dislocation of antiquarian superstition and domestic prejudice, must pass through a variety of stages. Next, when the general public recognise that we are in dead earnest and have come to stay, the stage of active opposition sets in; and, looking backwards, we can hardly wonder at the slow movement of people's minds in favour of sanitary progress. Poets and novelists have cast a halo of chivalry and romance around conditions of dirt and discomfort which must have made the lives even of knights and barons barely worth living two centuries ago. Old prejudices die hard, and old-fashioned people do not like being disturbed in their belief in the old order of things handed down to them by their forefathers. But we have nearly outlived all this; ventilators are no longer stuffed up; the working classes, no less than their employers, are beginning to be connoisseurs in the quality of their atmospheric conditions, enjoy a good wash as much as a University graduate, and are fully prepared to appreciate the advantages of hygienic house accommodation at other people's expense, and so we have reached the stage of enthusiastic acceptance and universal approval, and the sanitary reformer is as much petted and caressed as he was formerly scouted and despised. No properly instructed person in these enlightened days would dream of taking a house without a thorough inspection of and report on its sanitary arrangements; water analysis and food analysis keep us fairly free from adulteration, and most of us know pretty well, or at all events know, how to get the information as to the amount of help given us by the law in keeping our health fairly sound.

Man a Good Animal.

We must come to the conclusion, reluctantly, perhaps, but inevitably, that the race is to the swift and the battle to the strong, and that unless we are well equipped physically for the contest we are outpaced and shoved aside, and laid on the shelf along with the other failures of the world. The well-worn quotation from Herbert Spencer sums up the whole case:—"The first requisite of life is to be a good animal, and to be a nation of good animals is the first condition of national prosperity." The good animal forces his way to the front by the sheer force of pushful progression, and it is our duty, both to ourselves and others, to see, so far as we can, that our vital functions are maintained in good repair. Each one of us has, or ought to have, our own place and our own work, which we fill or do, and the filling or doing of which according to our highest capacity should be the supreme aim of our lives and of others, because the sum of the success and progress of our country is made up of the vigour and intellect of the individuals which compose it. Each one of us has a right to expect that his neighbour will not only contribute his fair share to the efficient working of the universe, but that he will not hinder or obstruct others who are trying to do the same.

Modern Labour and its Reward.

I wish to make a couple of protests. The first is against the monotony of modern labour, caused partly, no doubt, by the rapid extension of labour-saving machinery, but also largely due to what Dr. Beddal, in his very suggestive "Address on Health" (Social Science Congress in Edinburgh, 1880) called the specialisation and minute subdivision of employments. "The influence of this last alternative," he continues, "on the health of the workman has never been thoroughly worked out. If not counteracted by some extent of general education, or opportunity for employment of leisure, it must apparently tend to dwarf both body and mind by the unbroken monotony of action." There is food for reflection in this, and I recommend it to your mental appetite and digestion. Protest number two is against the doctrine, for which I think the Bible is primarily responsible, which was further elaborated by Ruskin, and which is now, I understand, accepted by certain sections of labourists. And that is that the workman should be paid the same wage, whether he works well or ill, whether he be clever or stupid, skilful or clumsy, industrious or lazy. I must not enlarge on the moral or social side of this dogma of some trade unionists, but I am entitled to say that, in my opinion, it is hopelessly at variance with the common-sense laws of health, and therefore I protest against it. If you take away the stimulus of ambition and the wish to excel in any pursuit or work, so much more does the work become flat and stale, if not unprofitable; and if a man knows that by showing a superior capacity and superior zeal and energy, he cannot get ahead of the dull drone who works by his side, then he becomes a mere

machine; his faculties grow stunted and sluggish, and his physical perfection must also of necessity deteriorate.

The Progress of Hygiene.

Some cautious people are beginning to fear lest we may be going ahead too fast, and that some day when we find ourselves in advance of public opinion it may be necessary to call a halt. But take it all over, our modern developments of sanitary organisation have worked well and have given general satisfaction. But some will probably ask, "It is all very fine talking about fashion and popularity and progress, can you show any tangible results? Is the human race any longer lived, or better, or happier than in the good old days of pre-hygiene?" If you have any leaning towards the life conditions of Mediæval or past-Mediæval England, read Simon's "English Sanitary Institutions" and the "Health of Nations," and I guarantee that you will thank your stars that your lines have been cast in the cleaner and pleasanter places of the Victorian era. There is no doubt that the average sum of life has been sensibly prolonged. During the last quarter of a century the death-rate has been reduced from about 22 to 18 per annum, and whilst I give you sanitarians your full meed of praise for having abolished some diseases and lessened the incidence of others, we doctors intend to claim some credit too. We diagnose disease earlier and treat it far better, making much less demand on the constitutional vigour of our patients, and keeping in mind the good old principle that prevention is better than cure. As to the future, let Professor Matthew Hay, of Aberdeen, speak. He writes to me:—"Progress of the death-rate downwards must in the future be less than in the past. A death-rate of 10 per 1,000 would mean that everybody born lived to 100 years, or an average of that. Probably it will be found that the mutual elements of decay in men, as in all living things, which make eventually for death, independently of environment, will not permit of a lower general death-rate than about 14 to 15, even under the most favourable hygienic conditions reasonably attainable. So that by the time we have gone as far in reducing the death-rate as we have in the past quarter of a century, we shall have reached the ultimate minimum, but it will certainly not be in another quarter of a century." We can thus see a considerable material gain, but I claim for hygiene more than the mere prolongation of life—the betterment of it, the heightening of the mere joy of living, the clear and bright outlook over the horizon which results from good health. I am a great believer in the influence of physical causes over human affairs, and I commend to some of your ingenious and industrious minds the study of how far, at the supreme crisis of life, some preventable derangement has marred some great career. Temper and passions are often the result of temporary and probably preventable physical causes. Under the skilful guidance of Sir John Simon, and Sir George Buchanan and Sir Richard Thorne-Thorne, some of the most acute minds in England have been unravelling abstruse sanitary problems, and tracking out from clues invisible to the ordinary eye sanitary defects which were poisoning districts and embittering and destroying human life. But these are scattered and not always accessible, and I strongly commend to your attention two capital little books, which strike the nail very directly on the head. The first of these is by your respected townsman Mr. Pridgin Teale, who in the intervals of a brilliant and successful surgical career has found time to preach the doctrine that a nation's health is a nation's wealth, and to furnish a series of object-lessons of the most clear and practical, if alarming kind. The second is by our esteemed friend and associate, Professor Corfield, one of the pioneers of sanitary progress, and it is called "Disease and Defective House Sanitation." It consists of two short lectures, but it is crammed with suggestive matter, and he enumerates the following diseases as directly caused by the defects included in his title—sore throats, diphtheria, scarlet fever, blood poisoning, puerperal fever, pneumonia, diarrhoea, enteric fever and general malaise have all resulted from badly-connected ventilating pipes, badly-trapped waste pipes, defective drains, split soil pipes, foul pan water-closets, and very frequently from escapes of gas, a cause more especially of sore throats, new to me, I must confess. But short of the more formidable diseases included in the list, and which can be readily diagnosed and treated, there is no doubt that ill-defined symptoms of malaise and depression are often caused by sewer-gas.

The Defects of Civilisation.

What are the defects of modern civilisation? I have told you many of the benefits. In the seventeenth century the death-rate was said to be 7 per cent.; it is now about 18 per 1,000, but unfortunately for many of us, the advantage is mainly between the ages of five and thirty-five, and our chances of reaching this maximum period of longevity are distinctly increased. The majority of us are older than that, and we want to know what is to become of us, and vital statistics do not give us much comfort, for after middle life, when we stand on the tableland and look over the edge before stepping downhill, we

do not live longer and we break down sooner. Why is this? One evil of civilisation is the tendency to crowd into big towns, and Dr. Fan long ago showed that the rate of mortality increases as the density of population increases. Dr. Beddal says:—"Men seem in this climate and country to be most healthy where they see least of each other, where they produce and convey the least infection; in fact, where the proportion borne by man to nature is the most insignificant." No doubt a country life is often dull and monotonous, and the charms of town are numerous and varied, but I have a shrewd suspicion that many an emigrant from one to the other will end by agreeing with Professor Poore, that "as things go at present there is very little doubt that the agricultural labourer with his cottage and garden and 12s. a week (I may say in Scotland 15s. to 20s.), is infinitely better off than the town artisan on 25s., who pays dearly for pigging it in overcrowded rooms in which a cleanly and decent existence is impossible." We all know the drawbacks of big towns. Houses are dear and often bad, the air is usually poisoned with smoke, a nuisance on which Ernest Hart and others have expended much patience and labour, but which seems as far from being abated as it was twenty years ago, when we had congresses and exhibitions, and apparently a fair chance of getting something done. Then there is the difficulty of sewage disposal and the pollution of rivers, and the multiplicity of local and public Acts, some oppressive, some repressive and some progressive, which Parliament and other bodies inflict on us year after year. No doubt it is dangerous to be placed within easy reach of receptacles of foul air and sewer gas, as we all are, and necessarily must be, under the system of water-borne sewage, common to our great towns; but the greater the risk the greater should be the care exerted to keep it off. It would be a good thing if workmen, and more especially those who manufacture the complicated networks of machinery which modern hygiene requires, should not only feel but carry into practice the full sense of responsibility resting on them in connection with their trade. They should be taught how a bit of scamped work—a leaking cesspool or a badly placed or constructed drain, or a badly socketed soil-pipe, or any derangement in the mechanical contrivances designed to keep out the sewer gas which is always trying to force its way in, may destroy human life just as effectually as poison or the knife—and this is why I have persistently supported the plumbers' registration in and out of Parliament, being convinced as I am that without establishing a monopoly, or doing any real harm to any vested interest, the establishment of a defined curriculum, followed by registration and examination, will raise the status and character of the workman, and by increasing his sense of responsibility and his interest in his work, will not only confer benefits on him, but also on those by whom he is employed.

The Increase of New Diseases.

The next point I wish to refer to is one of considerable interest. It is the curious way in which, when we have abolished one set of diseases, another band of successors sometimes springs up to plague humanity. We have stamped out typhus under its various names of gaol fever, or black death, or plague, although I am not sure whether the recent epidemic at Ballymullet, in Ireland, is the old-fashioned spotted pestilence about which Stokes and Granes used to write, or whether it is relapsing fever, that gaunt spectre which followed in the wake of misery and famine. Enteric fever remains pretty stationary in the last ten years, but a drop of from 309 in 1876 to 175 in 1895 does credit to our sanitary administration, and phthisis has gone down from 26,443 in 1876 to 22,775 in 1894. Smallpox has taken a satisfactory dip downward from 2,405 in 1876 to 33 in 1895. Measles, scarlet fever and whooping cough have killed fewer than formerly, but per contra diphtheria has largely increased, and the reason of that no doubt is, as Sir R. Thorne-Thorne says in a most interesting private communication I have received from him, "the ever-growing facilities for personal infection, and other similar points, have followed on the success in herding our child population into elementary schools at the very age at which they are most susceptible to this disease." Other diseases have also increased, and the point I wish to make is this—that they are mostly diseases connected with the nervous system, and that Crichton Browne is probably right in his opinion that not merely the nervous temperament but the neurotic diathesis is on the increase among us. To begin with, it is a mournful but, I fear, an undoubted fact that more people go mad than formerly. I have not by me any statistics to prove this beyond the report of the Registrar-General for 1895, but there I find under the heading of insanity and general paralysis, a disease which was seldom or ever heard of in former years, 3,620 deaths in 1895 against 933 in 1876. Angina pectoris, a typically neurotic disorder, has increased within the same period from 397 to 696; tubular disease of the heart, which has some practical sympathy with the neurotic diathesis, has gone up from 274 to 10,072; whilst Bright's disease, the frequent causation of which by sudden mental shock has been demonstrated by

Clifford Albutt, shows an alarming rate of increase from 4,100 to 8,351. Cancer, to which, in absence of any better explanation, I must ascribe a venous origin, has nearly doubled since 1876, whilst diabetes reached its highest point in 1895, accounting for 2,265 deaths over 910 in 1876, and most of us know only too well the firm grip taken by influenza on the British constitution, and the way in which in more recent years it has attacked the nervous system and damaged both weak and strong points with a zeal and discrimination too often permanent in its effects.

A Neurotic and Anæmic Age.

There seems no doubt, therefore, about the fact that we are now in the midst of a neurotic age; and the next note of interrogation is, Why? The answer to this, if there be one, would require a course of lectures rather than one address, and all I can do is to indicate one or two suggestive considerations which perhaps some of my successors, or some of you sitting before me, may work up. About the time I began my medical studies a furious controversy raged in Edinburgh concerning the treatment of acute inflammation, one side affirming that there had been a change in the type of disease, whilst the other affirmed, and to my mind more successfully, that the change had rather taken place in the constitution of the patient. At all events, the bleedings and blisterings and purgings, amid a succession of which the sufferers of former days passed peacefully out of existence, have given place to careful nursing and feeding and moderate stimulation, and results which enable the medical man to rank along with the sanitarian as the prolonger of human life. But why this change of constitution? Some ascribe it to the stress and push of this competing age, when berths are few and men are many, and when the margin of subsistence trenches too closely on the means of support. This sort of reason has always seemed to me both feeble and unsatisfactory as well as non-convincing, for is it not those who are removed by fortune from the whirling maelstrom of life into quiet backwaters who suffer most from nervous affections? Who is it who have the neuralgias and the hysterias and the heart failures which send them to Schatt and Neuheim, and the nervous prostrations which attack both sexes alike, and which sometimes seem to me to come from blue rather than red blood? Not the strenuous workers in the hive, but the drones, who, more by chance than design, and from lack of opportunity rather than deliberate idleness, lose the healthy stimulus of occupation and spend their time in that most wearisome of human occupations—trying to kill it. And now I think I have a clue. This is also essentially an anæmic age. How many young girls in any rank of life escape passing through a bloodless stage, which suggests a strike or lock-out among their red corpuscles and a consequent stagnation of those vital processes which depend on their active functioning? Some one has described neuralgia as the cry of starved nerve roots for a healthy blood, and may not modern nerve derangement be due to this deficiency of the most vital element of our vital stream? Let us take another glance at the Registrar-General's report, and we shall see that deaths from anæmia, chlorosis and leucocythæmia have advanced from 576 in 1876 to 1,883 in 1895. A glance at the cheeks of the rising generation must convince you that this increase of pallor is only too real. Then why is it? Ask your medical friends (for on this occasion I am only a sanitarian), and put before them these special points. Has anæmia anything to do with too much meat-eating and too little milk and oatmeal and fruit and vegetables? Is it connected in any way with our pressure at schools, or has our old friend tight-lacing anything to do with it, in other words, what is the explanation of the undoubted fact? And when you have received the information from your medical adviser I hope you will come and tell me all about it. So much, then, for civilisation and its defects. Have I anything to suggest for the improvement of the human race? Evolution is still going on, and I have some suggestions to make towards the formation of a Sanitary Utopia, the capital of which shall be our lamented friend Sir B. Richardson's City of Hygeia, where we should all like to live and move and have our being, if we could get the chance.

The Value of Light.

We should be exacting in the matter of light, and light should even face the fading of a drawing-room carpet rather than have blinds drawn down and windows closed until what we Scotch folk call "the room" is about as close and musty as a ship's cabin in mid-ocean. Remember that the sun's rays kill bacilli and encourage the processes of life, cheering the sound and aiding the recovery of the sick, and even its imitations are useful, for Sir W. Preece found at the General Post Office Savings Bank Department that electric light diminished the sick absence by two days per head per annum. The difficulties of water-borne sewage will have to be vigorously faced some day, and I agree with Dr. Poore in hoping that the manurial wealth annually squandered and rendered useless by dilution and antiseptic admixture may some day be utilised for the good of the earth as effectually on a large scale as he has shown it can be on a small scale.

The Secret of Long Life—The late Sir I. Holden.

If time had permitted I should like to have traced the budding citizen from the period of adolescence at twenty-three years of age to maturity, when the leaf is fully developed at forty-five, until decline sets in at sixty-seven, and the green turns to russet, and finally bidding him farewell, when the branches begin to grow bare "and autumn's falling leaf told to the old man he must die." Let me give him a word or two of advice before we part. If he wishes to live long he will have the best chance in Norway and the worst in Ireland, and it is well to be a Jew, because the strongly vitalised and aptly christened "Ancient People" pass four score and five years of life in the proportion of three to one of those among whom they are cast to live as fellow citizens. Long life as well as the full enjoyment of it while it lasts depend on three conditions. First, a good digestion. You must put yourself under medical guidance for this, and your doctor's attention should be largely directed to keeping you clear of uric acid, that pest of advancing years, which teases us with gout, and the origin of which seems to depend a good deal on intemperance in the use of red meat, and perhaps of tea, coffee and cocoa, which contain, according to Dr. Haigh-Zanthin, a chemical substance which is speedily changed into a tormentor. Second, on the integrity of the heart and great vessels, and if we have been strictly moderate in the use of alcoholic drinks, and not put ourselves in the way of catching those euthetic diseases which have so much to do with atheroma, we may hope to keep our muscular system in a state of integrity until tolerably advanced years, barring accidents, of course. In the late forties the degenerative changes are apt to set in, and rigid arteries suggest that we should moderate our pace and walk rather than run. My old friend, Sir Isaac Holden, who lately ended his most honoured and useful life at the age of ninety, was very fond of expounding his dietetic scheme, which largely depended on the avoidance of salts of lime, as contained in bread and water, and which, according to him, became deposited on the coats of the arteries, and led to brittleness and cracks and apopleptic seizures. He ate a great deal of fruit and vegetable, and very little meat, and partook most sparingly of alcohol, and a month or two before his death, when I met him in London, he looked in most perfect bodily vigour, and had all the appearance of a man of seventy or seventy-five. His death might really be called premature, and illustrates the well-known fact that the old get along all right as long as the road is smooth and flat, but they do not triumph over obstructions which would hardly affect a younger man. For I believe it was from the effects of influenza that this remarkable man was removed from among us. Third and last. Sustain the nervous system in good repair, and this simply means—general bodily vigour. Good regular work is essential to keep people's minds from pressing too much on their bodies, and it is interesting to note with Dr. Beard, quoted by Richardson, that the average age of 500 of the greatest men in history was sixty-four, and Madden gives a list of 220 illustrious hard mental workers who attained to an average of sixty-six years. Then how long should we live? Professor Owen used to say as long as our teeth, but dentists have altered all that. Richardson says ninety years. Dr. Farr extends the space to 100, and Lady Glenesk in her recent article in the *Nineteenth Century*, makes our claim on longevity run as far as 120 years. And the moral of it all is—that we should try to live as long and as well as we can, and teach our children to do the same, saying with old Adam:—

Though I look old, yet am I strong and lusty,
For in my youth I never did apply
Hot and rebellious liquors to my blood.

The Housing Question.

Finally, a word on the housing question. What is urgently needed is, firstly, drastic radical legislation, by which local bodies may be able to acquire land compulsorily, on paying full compensation, for building workmen's houses, and then quick and cheap railway travelling, rendering it possible for city workmen to live in the surrounding country. As Dr. McVail puts it in a letter to me:—"This is a sanitary measure which may have a great future before it. Houses built in the country for such a purpose would not have the defects of damp and disrepair which belong to the dwellings in a decaying agricultural village. Such dwellings would have the advantages both of town and country, and natural advantages of fresh air and rural surroundings and the artificial advantages of houses built according to city requirements; and with shorter hours of labour the artisan will have plenty of time to travel backwards. Light railways will do much to help in this direction, and it does not require me to sing the praises of well nigh universal weal."

Parliament and Health Questions.

But we must now leave Utopia and come back to this work-a-day world, which, after all, is not such a bad place to live in if we treat it properly. As I have already shown, each of us is individually responsible to ourselves and to others for

our scheme of sanitation, and then we pass into the hands of local authorities, who are doing good work, who generally give you value for your money, and whose beneficial operations I hope you duly appreciate. But over them stands the House of Commons, and I am glad of this opportunity of saying that I have a very poor opinion of that legislative assembly in its dealings with public health. Both sides are bad, but that to which I belong, I think, the worst, for a suspicion of scientific methods and of progressive sanitation is deep-rooted in certain Radical quarters, and abstract views of personal liberty and distrust of the so-called tyranny of doctors sway a kind of plausible sentiment which is usually irresistible in its paralysing effects of hygienic legislation. As a member lately remarked with refreshing frankness when we were considering the Public Health (Scotland) Bill, "When I see the doctors on both sides of the House agreeing, my instinct tells me that something is wrong, and I will vote against the amendment." Under such conditions the private member can hope to do nothing, but he may be still usefully employed in stimulating public opinion in and outside the House, until particular problems reach the acute stage and are taken under Government protection; and, as one last word, let me reiterate the strong wish I have already publicly expressed in favour of a Ministry of Health, a department of the State which will collect and co-ordinate into one harmonious whole the scattered threads of sanitary legislation which entangle and frequently perplex every one of our great Parliamentary officers, which would focus all health questions and furnish a bureau of information which would enable us to see at a glance what is going on elsewhere, an admission to which would be an object of honourable ambition to the best scientific talent of the day.

BEDFORD CASTLE.*

FOR the matter of the notes which I have to offer on this historic site, I beg to say that I am almost exclusively indebted to the writings of some able Bedfordshire archaeologists. I propose to preface my remarks on the castle with some allusions to the early associations of the locality.

It appears that Bedford was not a military station of the Romans, and no Roman name has been found for it. Camden says it cannot be identified with the Lactodorum of the Itinercaries, for it is not on a military road. It is situated, however, on a vicinal or bye-road—that which branched off from Sandy (Salinæ), and after passing through Elstow and over the ford here, went northwards to join some of the Roman stations on the river Nenn. A portion of this road, on the south side of the river, is identified with Potter Street, and (as we have heard from Mr. G. Hurst this morning) skirts the south side of St. Mary's churchyard, forming the boundary between the parishes of St. Mary and St. John, and then turns towards the river at the place of the ancient ford, which is supposed to have been nearly opposite to the Castle Mount. Roman pottery has been found in Potter Street, also in the Market Place. It is probable that British earthworks for the protection of the ford stood on this spot. There was a defensible stronghold here at the time of the Saxon invasions, for we read in the Saxon (or Old English) chronicle that in the year 571 Cutha or Cuthwulf, brother of Ceaulin, king of the West Saxons, overthrew the Brito-Welsh in a great battle at Bedicanford, and took four towns; and nine years later, A.D. 580, Ceaulin himself took the fortress of Bedicanford and seven other towns. The Romano-Britons appear to have made a desperate resistance here. This earliest form of the name, "Bedicanford," may be explained to mean "the ford protected by an earthwork," from the Saxon "Bedician," to bedike, *i.e.* to fortify with a dyke (a rampart and ditch). Several other etymologies, however, have been proposed by antiquaries.

In Mercian times Bedford seems to have been a place of some importance, and a favourite resort of King Offa II., who, we know, was buried with royal pomp in his chapel here in 796. Matthew Paris says this chapel was outside the town, on the banks of the river Usca (*i.e.* the Ouse), and some ages after the chapel and tomb had been swept into the river by floods they were still visible to bathers during the summer droughts. It is possible the chapel was built on an island; the traditional site, however, is near the wharf called Batt's Ford, on the north side of the river; it is nearly opposite the site of Caldwell Priory. According to King Alfred's compact with Guthrun, Bedford, being north of the Watling Street, fell within the district afterwards called the "Danelough." It has been remarked by Mr. Douglas Elwes, that in Bedfordshire there are no local names terminating in Thorpe or By (Danish words for village and dwelling), whence he infers that this county was never permanently settled by the Danes. In 919 (according to the Saxon Chronicle), King Edward the Elder marched to Bedford, and having gained

* A paper read by the Rev. Henry Fowler at the visit of the St. Albans Archaeological and Architectural Society, and published in the *Herts Advertiser*.

the town, remained thirty days and ordered a burgh to be built on the south side of the river. Hoveden says that this was called Mikesgate. This section of the town has been called from time immemorial Potter Street ward (which, as we have heard, Mr. Hurst derives from the Latin "Porta"); he has also suggested that the pre-Norman work in the tower of St. Mary's Church belonged to a watch-tower of Mikesgate, and that the church was built on to the tower. In 921 a Danish host marched from Tempsford (Tamis Ford), about 6 miles down the river, and made a desperate attempt upon Bedford; they were repulsed by the brave burgesses with great slaughter. It is inferred that the ancestors of the people of Bedford were Saxon or East Anglian rather than Danish. There were Danes, however, even among the abbots of the primitive monastery after it had been reinstated. In the year 1010 the town was taken and burnt by the Danes (Saxon Chronicle). The churches, we presume, must have been in great measure destroyed and rebuilt soon after this date. I must pass on to the Norman period and the story of the castle.

After the Conquest the barony of Bedford was conferred on Hugh de Beauchamp, a great lord who came over with Duke William, and was rewarded for his services with forty manors in this county. In the Domesday Survey Bedford is rated at half a hundred. The Hundred Norman Castle was built by Hugh's second son, Paganus (or Payne) de Beauchamp, in the reign of William Rufus, and so before 1101. It was clearly a place of great strength, for it was an object of contention during all the civil commotions till its destruction. The castle was erected on this site, I mean the mound on which we stand, and what is now the beautiful garden of Mr. L. C. Higgins; this is probably identical (as I have already mentioned) with the site of the Saxon fortress. The mound is large enough to have been the site of the keep or dungeon, for its summit is 150 feet in diameter (I am quoting from the account of Mr. G. T. Clark, the great authority on castles); he says it is only 15 feet high, but from the bottom of the fern-covered ditch it looks like 25 feet. It has been levelled down and may have been twice as high originally, in which case, of course, the summit would have been much smaller. The situation of the Norman keep, however, is debated by antiquaries. Mr. Higgins informs us the strong tower was probably in about the position of his present house. I will return to this matter by-and-by. The burgesses of Bedford, sturdy men as they were, had, of course, to bow to the great lord who was their patron, although they had their immunities by prescription, and probably were assisted in maintaining them by the canons of the collegiate church of St. Paul, who appear to have been lords of the borough manor. The borough obtained its first charter in Henry II.'s reign. There is some discrepancy in the authorities in regard to the earlier sieges of the castle, and no little confusion about the relationships of the Beauchamps, its owners. I will follow the account given by Mr. Dudley Elves in a paper written in 1874.

Milo de Beauchamp, the son of Payne, was attacked here by Henry I., and driven from his castle. Nothing more is known of this, but he seems to have recovered favour and to have been reinstated, for we find him and his brothers holding the fortress in defiance of King Stephen in 1136, when the king was bent upon depriving him and bestowing the barony on Hugh de Bellemont, brother of Robert, Earl of Leicester, to whom he had given in marriage Milo's sister, Maude de Beauchamp. Dugdale states that the castle was then "a place of great strength, with a mighty rampart of earth and a wall enclosing an impregnable tower." The king failed in his assaults, but after a long siege the garrison was starved into surrender. Milo and his companions-in-arms, who had friends at court, were allowed to march out with honours. It is very doubtful whether Hugh de Bellemont was ever put into possession, for the Barony of Bedford was annexed at this time to the Earldom of Huntingdon, which had been granted to David, King of Scotland, and (according to Holinshed) his son Henry was enfeoffed. In 1138, when David had espoused the cause of his niece, the Empress Maud, Stephen marched against him, and on his way sat down before Bedford Castle, which is said to have been garrisoned by the Scots. Meanwhile David burst into Northumbria, and (says Matthew Paris) committed the most horrible slaughters and devastations. The castle was taken in thirty days by a succession of fierce assaults, the first being delivered on Christmas Eve, and the fighting carried on through the festival of "Peace and goodwill." After the capture the Beauchamps seem to have recovered the barony by Stephen's favour. Simon de Beauchamp, the king's steward, was probably the son of Milo, although the chroniclers call him the son of Payne (the dates requiring this correction). In 1155 he was at strife with King Henry II., and held the castle against him. On its surrender the burgesses who were found in the fortress with him were mulcted in a fine of 20*l*. Simon's lands were then taken into the king's hands. He was a great benefactor to the Augustinian canons of St. Paul, established here by his grandmother, Rohesia, or Roysse, de Beauchamp, widow of Payne, the founde

of the castle. He removed the community to a new habitation which he provided for them at Newenham, about a mile down the river, and was honoured as their founder. He was the holder of forty-four knights' fees in the honour of Bedford, which he does not appear to have forfeited. Under Richard I. he recovered the governorship of the castle by paying a fine of 100 marks. Richard I. confirmed the charter of liberties to the burgesses. Simon died in 1207-8, and was buried (says Leland) before the high altar in the church of St. Paul, Bedford; the patronage of this, doubtless, remained in the hands of the canons. The priory church of Newenham was also dedicated to St. Paul, as the seal of the convent shows.

In the turbulent reign of John, the Beauchamps upheld the patriotic combination of the barons. William de Beauchamp, the son of Simon (who paid 500 marks and six palfreys for livery of the lordship on the death of his father), had served under the king in several military campaigns. When the rupture occurred he sided with his peers, and in the spring of 1215 opened his castle to the baronial forces, who had failed in their attack on Northampton. Shortly after this the angry king sent his favourite, Faulkes de Breauté, with an army to demand the surrender of the castle. It was given up in a few days without fighting. The cause of this is left in obscurity. Probably the place was not provisioned for a siege, for there was no lack of bravery in William de Beauchamp, who was among the staunch men who enforced the signing of the Great Charter at Runnymede. The castle and barony of Bedford were conferred upon Faulkes as a reward for his services. He was a man after John's own mind. He had been brought over from France by him in a mean capacity, and had been advanced on account of his military abilities to considerable honours and emoluments, and had been married to a rich heiress, Margaret de Redvers. We heard of him when we were at Luton, about seven years ago. He built a castle at Luton in 1221. The "Monastic Chronicles" are full of his deeds of violence, spoliation and sacrilege. It appears that as soon as he was put in possession he set about fortifying the castle on a grand scale, thinking to render it impregnable and to secure himself against all interference in his lawless practices. To provide himself with materials he pulled down St. Paul's Church without remorse and partly demolished the buildings of Newenham Priory and of some other religious houses. John cared for none of these things, or rather, according to documentary evidence, he sanctioned them; but the loyal supporters of his youthful successor, Henry III., were of a different mind, and in due time retribution came. Matters were brought to a head in 1224, when judgment was given against Faulkes on thirty indictments of wrong by the king's justiciary, Henry de Braybrock. He refused to appear and was thereupon fined 3,000 marks. Faulkes in his rage sent an armed band to Northampton, seized the judge and shut him up in Bedford Castle, where he was treated with great harshness. To avenge these wrongs and outrages the forces of the kingdom were set in motion. And we are now brought to the closing scene of our story. Preparations for the siege were made on the largest scale, for it was a most formidable undertaking.

The late distinguished antiquary, Mr. Hartshorne, has given the fullest account of it, but I have not had the advantage of seeing his paper. The king held his court at Dunstable, and presided over the preparations in person. The leading peers and ecclesiastics of the realm brought to him their contingents and subsidies. Archbishop Stephen Langton, the Primate; Eustace, Bishop of London, and other prelates and abbots who were of the number, pronounced a solemn excommunication against Faulkes and his associates. Each of the prelates furnished two labourers from every hide of land which they possessed. The Sheriff of Bedfordshire looked to the provisioning of this great host, which included quite an army of miners and sappers, carpenters and labourers, for working the engines of war, and the operations were pushed forward with vigour. Faulkes, who seems to have considered his defences perfectly secure, after victualling the castle for twelve months, had withdrawn to Chester to foment disturbances in Wales, leaving his brother William in command. The siege commenced on June 20, 1224, and lasted two months. Matthew Paris informs us that the besiegers erected a lofty wooden tower, which enabled them to observe the movements of the enemy, and discharge their artillery upon them with great effect.

The account given by the Dunstable chronicler, who was a contemporary, is this:—"The castle was captured by four assaults. In the first the barbican was taken; in the second the outer bailey, in which they took possession of a great number of horses, munitions of war, live pigs and stocks of provisions—the barns stored with grain and hay were set on fire. A considerable share of this booty was bestowed on the brave men of Dunstable, who led the attack. In the third assault the walls next to the Old Tower (we may suppose 'the Norman keep') were overthrown by mining, and the inner bailey was occupied. The miners were protected by a machine called 'the Cattus.' Here ten of the king's men were caught by surprise and shu

up in the tower. Others were killed by the falling of walls. In the fourth assault the tower itself, having been mined, was split asunder by the combustibles which were applied beneath it, and the defenders were smoked out of their habitations. Thereupon they sent out Faulkes's consort, the judge, Henry de Braybrock and other prisoners; the next day they gave themselves up. On the morrow (which was August 24) William de Breaute and eighty of the garrison were summarily condemned to be hanged for their treason, and after having been absolved from their excommunication they were hanged on gibbets at the foot of the mount." Matthew Paris has drawn on his MS. a picture of the scene, with the king's standard flying from the summit of the keep. In the castle was taken an immense amount of treasure and booty of all kinds. Three Knights Templars from Caldwell Priory, who were among the defenders, received a pardon on condition that they went to the Holy Land. Strange to say, the traitor Faulkes escaped capital punishment. He soon came to throw himself on the king's mercy, pleading some former services, and that he was pledged to go on a crusade. His sentence at length was commuted for perpetual banishment, with the confiscation of all his castles, lands, treasure and plunder. His wife received protection. He went to Rome, and is said to have died in abject poverty at St. Ciriac in 1226. The king gave orders to the sheriff of Beds for the destruction of the castle. The great tower and the works of the outer bailey were to be demolished and the moats filled up. The inner bailey was to be partially preserved. The directions about the disposal of the building materials are of some interest. The mandate runs:—"Let one portion of the tower and walls of the ramparts be assigned to the prior and canons of Newenham; another to the prior of Caldwell (of course, in compensation for the injuries they had sustained); a third portion for the work of rebuilding the church of St. Paul in Bedford; and a fourth portion to William de Beauchamp, for the construction of his habitation." William de Beauchamp also obtained the castle site and the Barony of Bedford. He had made his peace with the king in 1217, and had restitution of his estates. He was a man of high character, and was subsequently sheriff of Beds and Bucks. He is supposed to have built his house in the inner bailey, the walls of which were left standing to half their height for his accommodation. The Beauchamp name here died with him. The site of the ruinous castle came to the Mowbray family by marriage with one of his daughters. I may just notice that the property, after passing through various hands, was purchased from the Gostwicks (in about 1730) by Sarah, Duchess of Marlborough, and then passed to the Dukes of Bedford.

FLODDEN AND FORD.

A CORRESPONDENT of the *Scotsman* writes:—"The Flodden of to-day lies in a richly prosperous piece of country. The "airy brow" of hill from which King James descended to meet his enemies is now fringed by well-grown woods. The plain which lay between him and his land is fat with crops. The Till winds its sinuous way by meadows, where the cattle stand knee-deep in succulent pasturage. It is a treacherously smooth river, still fulfilling its boast that for all its slow going it drowns twice as many men as the turbulent but honest Tweed. Red with the best blood of our country this murderous Till ran on that Black Friday on which Flodden was fought. Its gory flood carried to the Tweed the news of dire slaughter. It is difficult by reason of the peace and plenty which now reign on that once debateable land to follow in the prints of the olden wars. Great castles, such as Norham and Twisel, still magnificent in their decrepitude, show how strongly guarded once upon a time was this border. Peel towers on the north side, from whence the stirring Scots raided forth, stare over at their English rivals. These peels to-day are now mostly found cased round by farm buildings, which shelter only honestly bought beasts. In an old peel not far from Berwick, still used as a dwelling-house, the flooring on the lower flat being lately renewed, there clung to the soil the red hair of cattle lang syne driven hastily in to the tower to keep them from some acquisitive moss-trooper. But the whole of the broad border is now so thoroughly under the dominion of the plough that the era of the sword seems almost mythically far past. Tall is the wheat and full eared in the field where a pillar marks the spot where King James fell surrounded by that valiant rampart.

Every stone a Scottish body,
Every step a corpse in mail.

He could with but a handful of the stubborn spearmen who there formed that "dark, impenetrable wood" around him have checked the English at Twisel Bridge, but Pitscottie tells us with a fatal love for a fair fight James refused to take advantage of the English in the narrow defile, declaring "that he was determined to have his enemies before him in a plain field."

There was a quixotic dash and chivalry in James which made a hero of him. Erring though the hapless Stuarts in succeeding generations were, they too attracted their followers, they brightened the pages of history with a romantic glamour, which even now blinds one to their faults and stirs our sluggish "fin de siècle" blood into enthusiasm. By Sybil's Well the thirsty pilgrim of to-day can rest and drink. The little fountain cell has engraven on it the words of the wizard who immortalised it. It was from this spring likely our troops drew water as they lay idly waiting while Surrey crossed the Till and cut them off from Scotland, so that when the armies met they each faced the land they loved the best. The English looked to the south and beyond the green swelling outline of the Cheviots saw their homes. The invading Scots fought with their faces to the country beyond the rippling Tweed. Evidences still tell of the rich harvest that the Great Reaper garnered on September 9, 1513, on that border field. Swords long hid have again in this century seen the sun, and sometimes the ploughman's course is impeded by a stone cannon ball. Shortly before Waterloo was fought some ground on Flodden was drained, and there came to light a long trench of bones—the sepulchre of the forbears of many of us, for but few Scots live who did not lose an ancestor on that field. Two ladies told a neighbouring rector in the early years of 1800 as children they used to gallop their ponies over a still uncultured Flodden. Nothing in the shape of gates or crops stopped them from careering over the country till they reached the bracken-covered slopes of the Cheviots, topped by storm-stricken thorns. That "plain field" whereon James elected to meet his foes till comparatively recently was guiltless of cultivation. Till this century it was as untutored as when our kingly squire of dames took his three steps into English ground to please the Queen of France. She sent him a turquoise ring, and charged him if he were a worthy knight to break a lance for her sake and harass their mutual enemies, the English, on the northern border while France kept her alert with warlike preparations in the south. King James had been married full thirteen years then to Margaret Tudor. Some jewels he thought her due had been withheld from her dower, and this made him all the readier to take up the Queen of France's challenge. His appetite for battle whetted by her turquoise ring, he eagerly set forth to war on England and take from it in land the value of Margaret's jewels. To prove his prowess he captured Twisel, Etal and Ford castles, and there paused. Sir William Heron, the owner of the latter, was a prisoner in that secluded hold, Fast Castle (better known to us as Wolf's Crag), but his wife unfortunately remained in Ford and wiled the too susceptible and gallant king to dally there. The room he slept in before the battle is still shown. From its windows we look on the gardened Flodden of to-day, where the prime of our land fought so well and bordered the pages of our history with mourning. That saddest story of dule and woe bore in time the fruit of sweetest song. England lost her thousands, too, but they were only her pawns in the chess-board of war. In these past days it was the loss of those of high estate which made a battle memorable, nay, even a paying concern to the victor if he captured nobles and knights of renown. It was the levelling radicalism of shot and shell, *versus* the more select bow and spear, which took away the revenue of these fighting nobles of old, by bullets finding a fatal billet in a knight as readily as in a man-at-arms, and leaving to the victor no wounded, sought-after grandee to hold as hostage for a ransom. At Flodden, king, bishop and knight fell before the English archers. Not only in the green loanings which traverse the Border was there sighing and moaning for these bonny men, the Flowers of the Forest, but Westland lairds and ladies under the dule trees by their castle doors wept for sons and husbands who had gone forth with their followers to Flodden, never to return. There, where to-day the corn yields a full harvest, the carnage raged, till the pall of night hid the enemies from one another. Then jaded, beaten men escaped in the darkness to spread the news of that fatal field where our royal standard received its most costly dye—the life-blood of its king.

Ford, like many Border strongholds, was famed in these olden times for its warlike spirit. Its smiths hammered stout armour and forged deadly blades for the castle's guardians, but now, when all need of constant skirmishing is gone, it is famous in these piping times of peace for the brush. Art has eclipsed war, and many journey to the thatched beflowered village which lies under shelter of the strong castle of Ford to see in its school the walls lined with wonderful frescoes. Lady Waterford, one of the "Two Noble Lives" Hare has written, wrought marvellously well on these school walls: The Ford children whose ancestors had been the wielders of the sword do their daily tasks in a gallery created by the brush of a genius. Their idea of the childish Bible characters will be clearer than most. Cain and Abel, David the shepherd boy, Esau and Jacob, Moses and Samuel, &c., are all there before them graphic and life-like. Our first thought is that so much beauty of design is wasted on these careless scholars; but who knows what fru

the learning of lessons within such lordly walls may not bear? It is an education in itself; they must carry out with them into the battle of life many recollections woven into their hearts by that well-endowed schoolroom. Some puzzle in the multiplication table they could not answer will be fixed in their minds by the recollection as they stood up facing the master of how their thoughts travelled from seven times seven to the portraits of the Johns, Evangelist and Baptist, which flank the teacher's desk. Copy-book maxims they slowly indited will be associated with the pictures on the walls their inattentive eyes fixed on—of Christ before the doctors, where the figures of each stand out at the end of the schoolroom so life-like as almost to seem to move. The picture of the little children He begged to come unto Him faces that of the Boy Christ in the Temple. The little ones anxious to gather round Him are the counterpart of the children who do their daily tasks below that fresco—rosy of cheek and hair bleached fair with the sunshine. It was their mothers and fathers who sat as models to Lady Waterford. Big men grimy with their toil on the neighbouring coalfield will point out to their sons lint-locked, smiling bairns in the frescoes which were exact portraits of them when they were in petticoats. The Bible stories and Bible people are brought very near to the inhabitants of Ford, for they are familiar with them from the time they learn their A B C, and it is small wonder if Ford folk should be better than their neighbours. The frescoes are turned round with flowers, and the pictures they frame are ever with them—evergreen in their memories. The village, which in olden times grew up round the castle to hold the Herons' vassals, is model and picturesque. The people look out on the stately column their Lady Waterford reared to her husband, who "had no son to keep his name in remembrance." He had read this verse from Samuel to her on the morning of his death, when he went out to the hunt, a man in the heyday of his strength. He was carried back to his home dead before eventide. To his widow he left the castle of Ford, which she restored and decorated. Little of the walls which beheld the fight had been left by former owners, but King James's tower remained intact. It overlooks the battlefield, and, like the rest of the dark stone pile, it stands, as it were, on a bed of roses, for terrace on terrace of these red flowers surround this dark Border castle. Across Ford's drawbridge the English herald, Rouge Croix, rode when James was making preparations to fight. He had refused to listen to the counsel of his barons to retrace his steps. It was at Ford that he bid Archibald Douglas, Earl of Angus, to "Get home if he were afraid." Choking with tears the aged Bell-the-Cat replied, "As long as my body was able to undergo hardships, I never spared it for the public good and to maintain the honour of my king; but since now I am useful only for advice, and the royal ears are shut against it, I will leave my two sons who, next to the nation, are most dear to me." He gathered his convoy and forthwith left. When a bearded man was forced to weep, and that man a Douglas, James was deaf indeed to advice. Through our country's history, foremost as doers of doughty deeds always came a Douglas, for

Never king did subject hold,
In speech more free, in war more bold,
More tender and more true.

It was not only the men who bore that name who were aye ready to face danger. Catherine Douglas's arm supplied in the staple the place of the missing bolt, which, till it snapped, barred the door against James I.'s assassins. Down where now the damask roses cluster rode the mortified and heart-broken old earl, who saw his king and his sons no more. Flodden killed him, for the heaviness of that blow weighed him down, and he died the ensuing year in the monastery where he had retired after that storm of sorrow had swept over Scotland. The going and coming of the heralds before James threw down the gauntlet of war must have been a lordly sight. Lady Waterford could conjure up these old-time diplomatic formalities, so full of scenic display, for she saw a this century tournament at Eglington and there first met Lord Waterford. In her room at Ford still hangs a portrait she painted of her own true knight.

It is difficult to leave Ford, so full and fascinating is it of a past of war and pageants, a present of flowers and art; but the sun is turning to the west and we are a far cry from home. We have to cycle to far beyond the Tweed, and turn our backs at Berwick on what Johnson epitomised as the finest view a Scotsman can behold, the road to England. So we are forced to leave Ford ensconced in its roses and green woods and Flodden arrayed in its fertile garment of corn, and we pass the false Till at Twisel Bridge and the noble Tweed at Norham. It was to Norham's castled steep a Marmion before Scott's came with his golden helmet and tasted of blows from mettlesome Scots, as his lady had commanded. We speeding north after having left Berwick a few miles behind us pass by Lammerton Farm, which stares out on the grim North Sea. There once stood a tower in which Margaret Tudor halted on

her bridal progress. It is well past "our good town of Berwick" and all its debateable land. Sure she was on undisputed Scottish soil, she was there married by proxy to James Stuart. The royal marriage seemed fraught with dissension. The jewels she did not bring with her were the ostensible reason of England's being invaded and Flodden fought. Margaret, if all tales be true, had but a sorry time of it as King James's wife. Her signature scratched in a good hand on the wall of Falkland Palace was recently there found, and is now sheltered under glass. When she first wrote "Margaret" in Scotland one wonders what she thought of the kingdom she had come to rule over, if she longed in the after years to return to her gentler south country. Her courtiers little dreamed, when she became wife of James IV. at Lammerton, that she dowered Scotland and her heirs with the succession to the crown of England. Flodden was the last great battle between her land and ours, for it was she who was the means of bringing about a lasting union between the sister kingdoms, and turned our bitter enemies, the English, into our peaceful fellow-subjects.

CHURCHES ON THE EAST COAST.

THE Ecclesiastical Commissioners, says the *Norwich Mercury*, it is reported, will decline to accept any site for a new church near the sea along the stretch of east coast from Yarmouth northwards. The matter has arisen at Mundesley, where the old dispute between the possible restoration and a new building is being fought out. The decision of the Commissioners is certainly a wise one. Visitors to this coast must have been struck by the old deserted churches that stand at the sea's edge at intervals, "solitary warders of the deep," waiting for the storm that will bring them down as the sea encroaches on the crumbling land. Cromer old church went under the waves long ago. The old tower at Eccles, of which Chaucer makes mention, went down in the great gale two years ago. The most notable of the remaining old sanctuaries is the Sidestrand tower, which stands amongst its graves right on the cliff's edge. A corner of the old churchyard has already gone down, and some morning the people of the district will undoubtedly look for the familiar old landmark and find it gone.

THE STABILITY OF MASONRY ARCHES.*

FROM the time of Newton the theory of the arch has been discussed by innumerable writers, among whom, as the most noted, may be included Gregory, de la Hire, Coulomb, Eytelwein, Navier, Lamé, Poncelet, Moseley and Rankine. All of these, with the exception of Navier and Lamé, seem to have accepted the so-called statical theory, stated in its clearest form by Coulomb in 1773, and treated with the greatest mathematical elegance by Moseley in England and Scheffler in Germany.

Since the introduction of railways, however, the importance of taking into proper consideration the heavier moving loads has caused the statical theory to be regarded as not altogether equal to the conditions, and the increasing knowledge of the properties of materials under stress, together with the widening appreciation of the importance of considering the question of elasticity, has led engineers to believe that the elastic theory should also be applied to the arch, whether built of masonry or of metal.

The elastic theory, as applied to arches, is due to the researches of Bauschinger, Köpcke and others, and appears to have been first clearly stated by Winkler in 1867, followed by Weyrauch in 1879, and Müller-Breslau in 1886, and has been most fully confirmed by the important experiments made by the Austrian Society of Architects and Engineers from 1891 to 1893, and published in 1895.

Under the old statical theory the stone was supposed to be rigid, and when the equilibrium line approached too near the outer limit, "rotation" was assumed to take place, the joints on the opposite side of the voussoir opening and the entire structure suffering distortion. The only resistance which the stone was supposed to offer was based on its ultimate crushing strength, and the question of its elasticity was not taken into account; indeed, its modulus of elasticity was rarely found.

It is evident, however, that if we consider the material as possessing elasticity, the yielding of the voussoirs at the points under greatest pressure might cause a tendency to rotation, and consequent opening of joints, long before the crushing strength was approached, and that, when the load which caused this action was removed or shifted, the parts might resume their normal positions and relations without having suffered any permanent deformation, while, if the yielding to unequal pressure was sufficiently great, the portions under tension

* From a paper by Mr. H. H. Supplee in the *Engineering Magazine* for September.

might be permanently injured by the action of loads much smaller than those which the old theory would consider serious.

The elastic theory having been considered and practically accepted for metallic structures, it became a question how far it was applicable to those of masonry. In order to solve this, as well as to add to the stock of experimental data upon the general subject of arches of various materials, the Austrian Society of Engineers and Architects appointed, several years ago, a committee composed of some of its most eminent specialists to investigate experimentally the behaviour of large arches under known stresses, and to test the whole subject upon so large a scale as to furnish data of real practical value for future use in arch-design and construction. The report of this committee, published in the journal of the society and subsequently in a special reprint consisting of 131 folio pages and 27 large plates, is undoubtedly the most important publication on the subject of the arch which has ever been made. The technical details of the subject are too voluminous and mathematical to be given here, and for them the professional engineer must be referred to the original publication; but an account of the general nature of the tests and the results obtained are of so general interest and importance as to be worthy of general attention. The preliminary portion of the work consisted in experiments made upon small arches, such as are used in fireproof building between floor-beams and the like, and these need not be discussed here. The important tests were those made upon several large arches of different kinds.

Those in which we are interested were made upon four arches, each of 23 metres (75·4 feet) span, 4·6 metres (15·1 feet) rise, and 2 metres (6·56 feet) width. Three of these arches were of materials in general use, *i.e.* rubble, brick and concrete, while the fourth was of the so-called Monier construction, consisting of concrete in which is embedded a network of round iron rods to assist in resisting the tension stresses. The location of the experimental arches was well adapted for the purpose, being on the line of the Western Railway at the Purkersdorf station near Vienna.

Although the curves upon which the arches were constructed were arcs of circles, yet for so flat arches the circular arc differs so little from the equilibrium curve for uniform loading that the latter occupied practically the middle of the arching. The test, therefore, was made by loading one-half of the arch gradually, measuring the deflections very carefully at points along the entire curve, and watching carefully for the appearance of cracks or other symptoms of distress. This one-sided loading was intended to cause the distortion of the arch to a much greater extent than was likely to occur in practice; if the cracks appeared at the points indicated by the theory, the deductions were to be considered sustained.

The materials used were tested by sample beforehand, and the modulus of elasticity determined in each case, so that the theoretical and practical conditions could be compared.

Many ingenious and delicate devices were used for measuring the deformations of the arches at different points under increasing loads, as, under the elastic theory, the deformations should be proportional to the loads until the elastic limit is reached; the importance of exact measurements in this connection was, therefore, very great. The loads were applied at points prepared in the construction of the arches in the form of steps at equidistant points in the span, this form of loading giving a clearly-defined distribution at definite locations, and also corresponding to a satisfactory method of supporting the roadway in actual constructions.

As the method was the same for all the arches tested an account of one will serve for all. Taking the case of the rubble-stone arch, the load of the arch itself was gradually distributed, the depth of the key being 23·6 inches, and at the springings 43·3 inches, while the additional load was applied at six points equidistant from the crown to the springing. The test load was composed of rails piled upon the platforms above, and gradually allowed to descend upon the arch in determinate quantities, the measurements giving the corresponding deflections.

As the loads were applied, the deflections increased almost in direct proportion to the force applied, showing that the laws of elasticity hold good for masonry as well as for metallic structures, while, after the elastic limit was surpassed and cracks began to form, both the location of the cracks and the point of maximum deformation showed that the position of the equilibrium curve practically coincided with that demanded by the elastic theory. The cracks began to appear when the one-sided load reached about 500 lbs. per square foot, and in nearly every case they occur at those points furthest from the distorted line of pressure—that is, at the portions under greatest tension—and it was at these points that the arch finally failed when tested to destruction with a load of 660 lbs. per square foot.

Practically similar results were obtained with the other arches, the differences in strength and distortion being only those due to the difference in material, and the theory being sustained in all cases. In the report, which was jointly prepared by the twelve members of the committee, all the data are given

in detail, and the mathematical discussion is worked out in full, while graphical diagrams show clearly how the results of the tests may be applied to the design of future arches.

One of the most immediate results of these exhaustive and valuable experiments was the construction of the great arch over the Pruth at Jaremcze. This is a stone arch of 65 metres span by 17·9 metres rise, or 213 feet by 58·6 feet, and has therefore a greater span than any other railway arch in the world. The only arch exceeding it is the Cabin John Arch near Washington of 220 feet span, but that carries only an aqueduct and is therefore not subject to the action of moving trains. The Jaremcze arch was designed by Inspector Huss, directly upon the lines indicated by the results of the tests of the committee, and in its construction the distribution of the load was effected in a manner similar to that adopted in the tests. This fine arch, completed in 1894 at a cost of about 34,000 dols., was the first fruit of the result of the work of the committee, and it is probable that other great arches will be constructed on the same lines.

The report contains a design for a similar arch of 120 metres span (393 feet). In some particulars the proportions differ materially in the two arches from those called for by previous methods; the effect is artistically pleasing, while the strength and distribution of material are such as to conform fully to the requirements developed by the tests.

It is a matter for congratulation that the work of the Austrian Society of Engineers and Architects has practically solved the problem of the arch, and enabled both its theory and practice to be established upon a sound and fully-demonstrated basis.

TESSERÆ.

Inigo Jones as a Designer.

IF we take a critical survey of Jones's designs we discover first the sketch, the outline and the shadows; and in this he is only equal to his school. But by a consummate skill in assorting his parts he stamps his name upon the edifice. With the same cornice, architrave, balustrade, figures and pediment as others employ, a very different arrangement appears. If his front be short, we see this more particularly. He destroys the stiffness of outline by the detail. His decorations are sometimes sweeping and reclining in their form; and it was a desire to avoid the rigid line in ornament that taught him to break the tympanum for the introduction of a wreath or a shield. If the wings are raised (which with him is usual when the centre is much depressed and the main body of the building long), he seeks to relieve by a depression of form (very frequently) in the decoration. The architrave sometimes sweeps into width towards the base, as in the wing of Wilton House. He seldom employs one uniform unbroken balustrade in the middle part along the whole length, unless there has been a paucity of reliefs below. In Wilton House, too, we see this. If, however, the front be long and the design a mansion, the various parts assume the varied forms and, together with the detail, unite their effect; the various points of the building in this case assume an inclination in form as they soar up and encounter the sky. They exhibit no harshness in their outline, or very little. He seems to unite with Wren in opinion and taste, and to mould the figures into spheres and sweeps as they stand against the sky. It is this which regulates him even in the balustrade vases and globes that crown the cornice. It is something of this which directed a pediment on the wings of Wilton House, for it leads the eye in breadth as a balance to the loftiness of the wing and avoids the harshness of the horizontal. It may be admitted that this disrelish for harshness often led him into extravagance in composition and caused him to exhibit in his smaller studies a richness and exuberance more fitted for an interior. It may be admitted, too, that a certain want of severity in taste and coolness in adjustment led him to trespass beyond what his more careful rival Burlington dared to allow. Often he may appear omitting the necessary members from a cornice, omitting the frieze and introducing double plinths; still that richness of the artist, snatched from Italy, is a charm entirely his own.

Specific Style in Art.

In all the fine arts some external attraction, some element of beauty, is the vehicle of mental pleasure or moral interest, but in considering the special form or means of any one of the arts, as distinguished from the rest, the excellence of each will be found not to rise from the qualities which it possesses in common with its rivals, but from those qualities which are peculiar to itself. We thus comprehend why various schools have attained great celebrity in spite of certain defects. It is because their defects are generally such as other modes of expression could easily and better supply. Their excellences, on the contrary, are their own, and not to be attained except in the form of art proper to them. Such excellences constitute

what may be called specific style. Accordingly, it may always be assumed that pictures of acknowledged merit, of whatever school, owe their reputation to the display of qualities that belong to the art of painting. In histories of painting these merits are often attempted to be conveyed in words, and the mode in which language endeavours to give an equivalent for the impressions produced by a picture is at once an illustration of the above principles. The changes of time, of motion, the imagined interchange of speech, the comparison with things not present—all facts beyond the scope of a silent, stationary and immutable art—are resorted to without scruple in describing pictures, and yet the description does not, therefore, strike us as untrue. It will immediately be seen that the same liberty is allowable and necessary when representation enters into rivalry with description. The eye has its own poetry, and as the mute language of nature in its simultaneous effect (the indispensable condition of harmony) produces impressions which words restricted to mere succession can but imperfectly embody, so the finest qualities of the formative arts are those which language cannot adequately convey. On the same grounds it must be apparent that a servile attention to the letter of description, such as accuracy of historic details, exactness of costume, &c., are not essential in themselves, but are valuable only in proportion as they assist the purposes of the art or produce an effect on the imagination. This may sufficiently explain why an inattention to these points on the part of great painters (and poets, as compared with mere historians) has interfered so little with their reputation. In this instance, while the powers of painting are opposed to those of language generally, they are on the same principle distinguished in many respects from those of poetry, and in like manner, if we suppose a comparison with sculpture, or with any other imitative art, the strength of painting will still be found to consist in the attributes proper to itself. Of those attributes some may be more prominent in one school, some in another, but they are all valued in proportion as they are characteristic, because, in short, the results are unattainable in the same perfection by any other means.

The Walls of Athens.

About 481 B.C. the Athenians restored their dismantled walls, and also enclosed the Piræus. From political circumstances the works were very much hurried, the foundations were laid with stones of all sorts and sizes, some unwrought and just as they were brought up by the servers. Many pillars, too, from sepulchral monuments and other wrought stones were worked up in the building; for the boundary wall of the city was now far greater, being in every direction carried out, and for this reason it was that they urged on the work, employing alike whatever came to hand. It was Themistocles, too, who persuaded them to build the remaining walls of the Piræus (for this had been begun by him during the year of the archonship which he filled at Athens), thinking the place highly favourable, as having three natural ports, and that, as they had become a nautical people, it would much contribute to their obtaining naval power. Indeed, he first ventured to tell them they should apply to the sea, and then immediately assisted them in acquiring the empire of it. By his counsel it was that they built the wall of that thickness about Piræus; for two wains brought stone, passing by each other upon it, and going contrary ways. Within there was neither rubble nor clay, but the stones were large and hewn square, fitted together in building, and those on the outside bound together with stone and lead. The height, however, was only finished to about the half what was designed, for his intention was to effectually repel all hostile attacks both by the thickness and the loftiness of the walls, and he thought that thus a few, and those the least effective, persons would be sufficient to man it, and that the rest might embark on board the fleet; for he chiefly devoted his attention to the shipping, perceiving, it seems, that there was a readier access for the king's (Persia's) forces against them by sea than by land. For he judged that the Piræus would be more serviceable than the upper city, and often counselled the Athenians that if ever they should be foiled by land, they should descend thereto, and with the navy make head against all opponents.

Freedom in Architecture.

Nothing can be more opposed to every legitimate principle of art and æsthetics than the attempt to reduce the different orders to so many express and immutably fixed types. The consistency so aimed at is attended with almost the worst species of inconsistency, because it totally excludes such modification as may be most suitable for the particular case. It is time for us to get rid of all the mechanical quackery to which we have so long submitted, and which has reduced architecture as generally practised to little better than a mere handicraft trade—to copying certain individual parts met with in former styles of the art without any regard either to the genius of the

styles themselves or to the circumstances of the building required. What puerile trifling it is to affect scrupulous nicety as to the express shape and proportion of every little detail belonging to columns which are to be stuck up by way of portico before a dowdy house or other building, which is thereby only rendered a grotesque absurdity. In most other matters people think of attending a little to consistency and common sense, or should they fail to do so they must submit to the derision of their neighbours. But in architecture the most ridiculous incongruities and *disparates* are tolerated—tolerated, they are even applauded, and *bêtises* that would hardly be endured in the preparations for a temporary fête may be perpetrated with impunity in buildings intended to be permanent.

GENERAL.

Mr. Pearson, R.A., has been invited to report on the restoration of the ruinous parish church of Mundesley, Norfolk.

The Society of Miniaturists will hold their next exhibition at the Grafton Galleries about the middle of October.

The Halifax Town Council have accepted the design marked "Victoria," and Messrs. George Buckley & Son, Halifax, the authors, are now instructed to prepare working drawings, specifications and bills of quantities, and obtain tenders for carrying out the various works required in connection with the erection of a police-station and court-house, at an estimated cost of 11,600*l.*, the buildings to be on the old infirmary site.

The Late Miss Gibson, of Durham, has bequeathed 300*l.* to Durham University to found a scholarship which is to be competed for triennially, the candidates having to write an essay on British archaeology or local history. Miss Gibson bequeaths an oil-painting by Romney to the National Portrait Gallery, and leaves a substantial sum for the erection of a stained-glass window in Durham Cathedral.

The Norwich Town Council have increased the salary of Mr. A. E. Collins, city engineer, architect and surveyor, from 600*l.* to 800*l.* per annum.

Mr. Milo Griffith, the Welsh sculptor, died at his house in Chelsea on the 9th inst. The statues of John Batchelor at Cardiff and Sir Hugh Owen at Carnarvon are his work; but his countrymen did not award him the patronage he merited.

The Late James Christie, of Regent Street, has bequeathed to Sir John Gilbert, R.A., or, if he should not be living, to the National Portrait Gallery, the portrait of Sir John, painted by himself, and presented by him to the testator. His pictures, prints and other works of art are bequeathed to the Rev. J. H. Christie, of the Brompton Oratory.

The Hawick Archaeological Society have resolved to erect a memorial-stone in the cottage at Hawick in which Robert Paterson, the prototype of Sir Walter Scott's "Old Mortality," was born. Paterson, who spent many years of his life repairing the decaying tombstones of Covenanters, died at Bankend in 1801, aged eighty-eight years.

The Local Government Board have decided to issue an order authorising the Metropolitan Asylums Board to purchase a plot of land on the Victoria Embankment from the Corporation of the City of London, for the purpose of erecting new offices upon it. The cost of the site is not to exceed 53,000*l.*

Birdforth Church, which dates from the fifteenth century, and was originally built as a wayside chapel, has been restored. The original building was of brick, surrounded at the western end by a turret, on which was placed an old wooden structure similar to the one which graced the old church at Scawton, on the Hambleton Plain. The restoration has been effected at the expense of Lord Dawnay. The old building has been reroofed with French tiles, and the pigeon-cote turret has been rebuilt with clamp bricks. The interior has been refloored and resealed, and the windows reglazed.

The Architecture, Building Construction and Modern Practice Classes, King's College, will open on October 4, under Professor Banister Fletcher, Mr. Banister F. Fletcher, lecturer, Mr. Phillips Fletcher, assistant lecturer, Mr. James Bartlett, demonstrator, and Mr. Banister F. Fletcher, studio instructor. A course of about thirty lectures will be given on Monday evenings from 7 to 8 P.M. Opening lecture, October 4. The lectures will comprise the subjects in which candidates are examined at the Royal Institute of British Architects' examinations for building surveyors, which examinations take place in April and October in each year; the examination for membership of the Society of Architects; the subjects in which candidates are examined at Carpenters' Hall in June in each year; also subjects required in the examinations at the City and Guilds Institute and the Science and Art Department; and the examination for sanitary inspectors in sanitary building construction held at Carpenters' Hall.

The Architect.

THE WEEK.

It is proposed to hold an exhibition of Christian art in Paris during the year 1900. It cannot form a part of the international exhibition, for after consideration the authorities decided that space could not be assigned for a special section, for if one were tolerated many similar applications would be sure to follow. The project has been initiated by the Prince DE LA ROCCA, and he has been enabled to obtain the aid of a committee consisting of thirteen cardinals, 300 bishops and a great number of other notabilities. The Italian Government have set aside all prejudices and will aid in promoting an exhibition which is likely to bring profit to Italy. There will be subdivisions to represent the art of different countries. Great Britain is not likely to require much space, for although enormous sums are raised every year for vestments, altar-plate, ornaments, pictures, &c., they are expended on foreign products which are generally devoid of the qualities which constitute art. The amount of money exported from Ireland if expended on Irish examples would do much to relieve poverty. The ecclesiastics are not absentees, but they imitate them in expending all the sums they can obtain for the benefit of strangers. Meanwhile, in the interest of good taste it would be an advantage if an exceptionally high import duty were imposed on foreign ecclesiastical properties.

NEITHER civil engineers nor contractors for engineering works are much given to value anything for its beauty. Sir WILLIAM ARROL, who is both engineer and contractor, should therefore be doubly indifferent to form. Yet we find him after the opening of the New North Bridge in Edinburgh advising the Corporation to undertake a costly work solely because it would increase the amenity of the city. All visitors to Edinburgh remember the gas works which are found in the valley near the new bridge. They do not improve the landscape, and they will look more out of place when the improvements to which the reconstruction will give rise are undertaken. Sir WILLIAM ARROL advised the removal of the works elsewhere, and also that only picturesque houses should be permitted to appear on the site. Sooner or later the change will have to be made, and we hope Sir WILLIAM ARROL's excellent speech will expedite the determination of the Town Council to deal with the problem.

QUARRY BANK, in Staffordshire, has a population of about 7,000, but at the present time it is not a desirable place to seek an abode. There are coal mines underneath, and as the coal is abstracted the buildings subside, being more or less shattered in the process. Lord DUDLEY, the owner, is under no restriction about his workings, and incurs no liability for damages to houses. It was possible at one time for the Town Council or individuals to purchase the minerals from his lordship, which would remove the cause of all the subsidences; but as the opportunity was neglected, it is now too late for complaints. Yet it is not pleasant to contemplate streets of dilapidated houses and to see shoring in progress at every turn in Quarry Bank. It is calculated that the underground operations will require a further period of six months; and during that time subsidences and other dangers must be expected. Lord DUDLEY has given a sum of money to aid in the reparation of some of the houses, but it seems an useless expense to pay for work which at any moment may be rendered useless.

THE Local Government Board appear to have resolved that every petty authority if it is to be responsible for the carrying out the by-laws within the boundaries, is also to have absolute authority. That would appear to be the conclusion to be derived from the conflict of authorities in Blandford. The Town Council as urban authority gave one of their members power to replace an ordinary shop window

with a bow window projecting about 1½ foot over the public pavement, but in line with the shop windows on either side. The County Council, as contributors towards the maintenance of the highway, requested that the projection should be removed on the ground that it was an encroachment on the footway. The Town Council refused to acknowledge any power of the County Council in the matter, whereupon 31%, a year's moiety of the grant for the highway in question, was withheld by the County Council. The Local Government Board were appealed to, and after holding an inquiry supported the Town Council by ordering the county authority to pay the 31%, with 13% as the costs of the inquiry. There is so much difficulty in obtaining sanction for bow windows or other projections that all architects will be disposed to side with the Blandford Council. At the same time it would be well to know why the action of the County Council was disapproved, for it was inspired by experience. We hope the Local Government Board will not allow unlimited opportunities for the discussion of the question, but will issue a statement announcing when a county council can interfere with the action of an urban council or other subordinate authority.

ANOTHER prehistoric canoe has been found in Ireland. In this case the place which yielded the relic was Lough Elia, or the Lake of Swans, near Strokestown, in the county Roscommon. The canoe was embedded in the mud below the lake, and not far from the remains of a crannog. The canoe is 33 feet 6 inches long and 2 feet 10 inches wide near the stern, and tapers to about 1 foot 9 inches in width at the bow. It presents the unusual and interesting peculiarity of having been repaired by the addition of slabs of oak where the sides had become defective. These slabs are cut so as to fit closely to the sound portions of the sides, and were attached by large numbers of broad-headed nails of iron. It is not, therefore, impossible that the period of usefulness of this canoe may have been prolonged from the Bronze into the Iron age. In the lake was also discovered a bronze basin or cauldron over 19 inches wide and 7 inches deep. It weighs about 3½ lbs., and was wrought with the hammer from one piece of metal. Both relics belong to Mr. G. A. P. KELLY, M.A., of Cloonglasny-more, Strokestown.

THE Deputy-keeper of the Public Records in his last report announces that the new block of the Public Record Office facing Chancery Lane having been completed in 1895, as stated in his last report, the House of Commons voted a sum of 20,000*l.* for the financial year 1896-97 towards the erection of another block, which will connect it with the portion erected between 1850 and 1871. The cost of this fourth instalment of the General Repository of Records is estimated at 50,000*l.* The site having been cleared by the demolition of Rolls House and Rolls Chapel, the work was begun in the month of February 1896. Among the work done during the year, the list of rentals and surveys, so far as it deals with documents formerly scattered among the Miscellanea of the Exchequer, has been completed in manuscript and placed in the Search Room. The researches in foreign archives are in progress. Mr. BLISS, who is at the Vatican, has completed the Calendar of Petitions to the Pope between the years 1342 and 1419. The text of the Calendar of Papal Letters between the years 1342 and 1362 was also completed at press. Some materials for another volume of his Calendar of Papal Letters were collected. Mr. HORATIO F. BROWN has continued his researches in the Venetian archives. By the end of 1896 nineteen sheets of a new volume of his Calendar of documents and entries relating to English affairs had been passed for press. This, when completed, will bring the work down to the death of Queen ELIZABETH. Don PASCUAL DE GAYANGOS has prepared twenty-four sheets of a new volume of his Calendar, relating to Spain, Brussels and Vienna, beginning with the year 1544. Major MARTIN A. S. HUME has prepared the text of another volume of his Calendar. Mr. J. H. ROUND has passed for press four sheets of a Calendar of early documents in France relating to England.

FRENCH CRITICISM OF MR. RUSKIN.

BY A CORRESPONDENT.

THE first article of any importance upon Mr. RUSKIN which we can remember as appearing in French periodicals was one in the *Revue des Deux Mondes* for July 1, 1860. It was entitled "Une Nouvelle Théorie de l'Art en Angleterre." On August 15, 1861, another article was printed with the title "De l'Influence de la Littérature sur les Beaux-Arts." Both were by M. J. MILSAND. The *Revue* about that time was endeavouring to put forth more exact notions about English ways than were current in France. The long series of articles by M. ALPHONSE ESQUIROS, those by M. TAINÉ, M. E.-D. FORGUES, M. CLARIGNY, M. DUPONT-WHITE, M. LAUGEL, M. E. MONTÉGUT and others are evidence of a desire to arrive at the truth, which is most creditable to a periodical that is deservedly esteemed throughout the world. In the case of Mr. RUSKIN there was more than usual courage shown. From the peculiarity of their publication his books were soon classed in England as curiosities, and care was taken by purchasers to keep the pages uncut. That was not favourable to a dissemination of Mr. RUSKIN's opinions. The volumes were not translated into French, and when M. MILSAND assumed the office of interpreter he could not rely on his readers having an elementary knowledge of the subject. In England we have been familiar with Mr. RUSKIN's apparent inconsistencies, but they were treated lightly among us, for we knew that a man who endeavoured to judge of things from many points of view, and who put himself in the place of a variety of men living in different times and places, and tried to see things as they did, could not be expected to run always in one groove. Hence it was, no doubt, that M. MILSAND, in his titles at least, avoided the temptation to make his articles biographical or individualistic, and the English writer became almost impersonal and secondary to the theories he devised.

If a subject could have a tongue it would ask of every critic, like old GRAHAM of Netherby of young LOCHINVAR, "O come ye in peace here, or come ye in war?" and in a good many cases the answer would be indecisive. M. MILSAND said he came forth as "un pauvre critique" in the defence of painters and other artists. Such a position recalls the schoolboys who will allow nobody to abuse their fags but themselves. But what M. MILSAND really maintains is that art has to obey certain definite laws which arise out of its conditions and no others. To insist, as Mr. RUSKIN was supposed to have done, on a faithful observance by the painters of laws which belong to literature would be to turn their art into a state of confusion, for its own natural laws would be neglected, whilst the newly-imposed laws would not be obeyed. But in saying so much Mr. RUSKIN was considered as only the latest and most revolutionary of the theorists who have taken upon themselves the guidance of artists. M. MILSAND believes that every true artist should be a lawgiver to himself, and the palmy days of art were those in which artists dwelt apart from the world as in a sanctuary, communing with their own thoughts and respecting the traditions of their predecessors in the school, days when one could say to a Pope *procul esto* and bar his admission to the workshop. But when by degrees the public got the upper hand and insisted on being gratified, and plausible speakers and writers instructed the public about what was indispensable for their gratification, which they did not know before, it followed that the artist was compelled to sacrifice his art and to become like the other performers who entertain votaries of pleasure. According to M. MILSAND's conclusions, Mr. RUSKIN is almost as complete an expression as can be found of the good and the evil that literary influence can accomplish in the plastic arts. The good is a profound sentiment of the moral conditions which the artist is bound to fulfil, but the evil is the turning of pictures and sculptures into books, and making them correspond with the ideas of the romance writer, the historian, the botanist, the geologist and the anatomist. Farewell to the magic of art, exclaims M. MILSAND, farewell to the emotions it alone can excite, if it must play the rôle of science or ethics, or even poetry, and if the painter and sculptor must abandon the aptitudes and sensibility which are their peculiar gifts in order to pose as thinkers or as poets. We can perceive, then, from the

starting that M. MILSAND is endowed with the logical keenness which is characteristic of the French race when it deals with words. He will have no overlapping of things, and although schools of aestheticians maintained for centuries that all the arts have common principles, he insists that the plastic arts and the literary arts cannot be confounded without risk to both.

But what is the science that is known as æsthetics? In M. MILSAND's explanation of it Mr. RUSKIN would be likely to find something which he would approve, but a great deal which he would hold to be false. When WORDSWORTH says, "Heaven is about us in our infancy," and accompanies us with splendid visions until manhood perceives them fade into the light of common day, and "nothing can bring back the hour of splendour in the grass, of glory in the flower," he was in a measure anticipating M. MILSAND. The more one investigates the more one discovers, he says, that æsthetics has against it all the laws of the universe and of human nature. The logician can find laws of thought within himself, but the æsthetician, on the contrary, is a man of reflection who tries to comprehend varieties of production that come from a mental condition of which no trace remains when a man becomes competent to reflect. What has happened in history corresponds with individual life. When in Greece the national genius had expressed itself in art, the rhetoricians and scholiasts appeared to lay down the laws of beauty. In modern Europe a similar race was found after SHAKESPEARE and MICHEL ANGELO had performed their work, and there was no longer original inspiration. In fact, says M. MILSAND, the science of æsthetics is a putrid generation, a decomposition of the imagination.

Apparently, what M. MILSAND aims at teaching is that the visions, thoughts and emotions which belong to the creative artist are not to be acquired from books. It is difficult to define the period when they arrive to the artist who has had experience of their power, and it is therefore allowable to suppose he possessed them in childhood, although in an elementary state. WORDSWORTH, from his own account, was an embryo poet when he was a child of ten:—

I held unconscious intercourse with beauty
Old as creation, drinking in a pure
Organic pleasure from the silver wreaths
Of curling mist, or from the level plain
Of waters coloured by impending clouds.

It is easy to imagine that a boy who was destined to be an artist would be still more impressed with such scenes. Mr. RUSKIN's father believed it was his duty to bring his son amidst scenes which would act upon a sensitive mind, and accordingly the boy was acquainted almost from his infancy with the most beautiful scenery that was to be found in England, France and Switzerland. How he felt before the scenes is recorded in descriptions that were never surpassed, and it is only natural for Mr. RUSKIN to expect that the thoughts which arose in his mind in the English lake district or amidst the Alps should be as easily excited by a painted landscape.

The early acquaintance with landscapes of all varieties has, however, caused a confusion of ideas with Mr. RUSKIN. The impressions he received in the Alps and Italy were revived by TURNER's pictures, and he confounded the secondary with the original influence. TURNER, we know, grumbled when he found meanings were read into his pictures which he had never contemplated, and which they were still incapable of suggesting to him, in spite of the eloquence of his votary. But it is the old story. The eye sees what it brings the power to see, and as the primrose by the river's brim, the daffodils and other wild flowers excited emotions in WORDSWORTH which words could not express, so certain paintings and drawings have had the power of reviving associations in Mr. RUSKIN's mind of the most delightful kind, while before others he was as indifferent as WORDSWORTH would be with the delicate plants of a conservatory. His whole advice to painters might be summed up in a few words; it was simply, "Paint me pictures which will affect me like the perspectives of TURNER, the continental towns of PROUT, the birds' nests and primroses of WILLIAM HUNT. I am unmoved before RAPHAEL's greatest works, but I cannot resist anything which recalls Caterham or

Chamouni." This conversion of a personal need into an universal requirement may be said to be a peculiarity of the English poetic nature. DANTE is the only exception abroad. But no men are so little affected by it as the French, and on that account we believe M. MILSAND is not entirely correct in all he says about Mr. RUSKIN's endeavour to make pictures become books. It arises from what the Elizabethans would call a fine madness, and it is hardly to be subjected to the tests of modern logic. But the effect on art has not been advantageous. The painters who endeavoured to please Mr. RUSKIN have not produced masterpieces.

But M. MILSAND is not indifferent to the services which Mr. RUSKIN has rendered to art. He maintains it was the English writer who swept away the old superstition of the beau-ideal, a theory which sterilised the imagination by turning it from nature. To him also is owing the overthrow of the no less dangerous doctrine that in the grand style there should be no sign of anything that was peculiar or individual. He has also successfully fought against the belief that the artist was to consider himself as a workman and a master of processes, and has demonstrated that no one can communicate an emotion who has not felt it, for the great masters have succeeded because they have reproduced themselves in their works. It is remarkable to find a French critic attributing so much power to Mr. RUSKIN in 1860, and one can hardly believe that M. MILSAND described effects which were to be seen in French ateliers. But there is no use, he says, in endeavouring to judge of Mr. RUSKIN by occasional expressions of his thoughts. In his writings, says M. MILSAND, we find an intense and profoundly just sentiment of an art that is living and large as nature and man, and which sentiment could only have its source in an universal sympathy, in a genius for loving and a force which compels us to yield to the beauty of whatever is described. Even under the endeavour to confound the domain of the painter with that of the writer we find a desire to animate art by attaching it to the movements of our thoughts and the force of our moral nature, a profound perception of the influence that the good and bad qualities of character can exercise over the works of man's hand, whether he is painter or carpenter. In fact, M. MILSAND believes that among Mr. RUSKIN's ideas few have so much chance of endurance as those relating to the ethics of art. It is as a moralist especially he values him, and he considers that much is to be gained by men of all nations who will attend to what he says and endeavour to paint and carve, not to suit the fashion of the moment, but to express the beautiful and the true according as they appear to the artist's own consciousness.

(To be continued.)

ELECTRIC TRAMWAYS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from page 180.)

THE double-trolley system was introduced to obviate the difficulties of the earthed return; as its name indicates, it consists of two wires, on which run two trolleys. The current is led to the car by one trolley and back to the station by the other. This method enables a high insulation to be kept up, and it considerably reduces the danger of a shock due to falling wires, as only a comparatively weak shock is possible if the insulation is good. The great difficulty is at the crossings, and the appearance of the wires is very objectionable. Owing to the introduction of electric welding and improved rail bonds, this system is never erected now, as it is more expensive and unsightly, while it is very little better than the ordinary single trolley.

Third Rail System.—This is practically the trolley system, except that the conductor is on the ground level instead of overhead. This system is only applicable to a railway, *i.e.* a line which is enclosed from the public, as, of course, it is an impossibility to allow traffic over the conductors, which are bare. The conductor is usually supported on insulators, sometimes wood and glass, and sometimes wood treated with wax. The conductor is sometimes stretched at intervals by means of weights and

levers. The system of making contact is either by a slipper or a trolley wheel, as in the overhead system. This method of line construction is far and away the cheapest when it can be adopted.

Conduit Systems.—There are many systems which come under this heading, but there are few which have been used practically. The idea of the system is to place the conductor in a conduit, in a similar way to the mechanical cable system. The conduit is in various methods, built of cement, concrete, iron, &c. In some cases one conductor only is used, the return being by the rails; in others both conductors are insulated, these being by far the greater number. The conductors are usually fixed to the conduit by means of insulators, the contact being usually a "rubbing" one, which collects the current from the conductors and delivers it to the car. The number of conduit systems are almost innumerable, and they are all expensive. The conditions under which they are useful are not very extended, being chiefly confined to city thoroughfares where overhead wires are impossible or prohibited. It is, of course, necessary to have a slot in the road and a ploughpiece carrying the contacts. If anything goes wrong with the conductors it is almost impossible to remedy matters without taking up the roadway. The chief cause of trouble is, however, that of electrolysis. The conduit, as a rule, becomes the sewer for surface-water in heavy storms; mud falls down and electrolysis is caused by the leakage. With any successful conduit an elaborate drainage arrangement must be provided, and even then there is the difficulty of mud, stones, &c. The difficulty of electrolysis has not yet been overcome in a satisfactory manner, while want of accessibility must always be urged against it. As before mentioned, the chief use for this system is in situations where the overhead trolley has been prohibited, where the streets are narrow and overhead wires would be a serious obstruction, and where the ordinary traffic is very heavy. In the latter case, the conduit and the accumulator systems clash, and are in competition unless the district is hilly, in which case the conduit has the advantage.

Closed Conduit Systems.—These systems are all designed with the object of removing the slot in the roadway and of closing the conduit. They are thus sometimes referred to as "surface-rail" systems. The slot in the road being dispensed with, it becomes necessary to use some surface contact. This is usually done by providing surface studs, and in some cases by utilising sectional rails for the purpose. The whole of the ingenuity of inventors has been expended on connecting and disconnecting these rails or studs, so that they shall be switched on when under the car and off when the car leaves them behind. The usual means of making and breaking these contacts is to have a magnet on the car which attracts an armature in the closed conduit, which makes the stud "live" until the car has passed over, when the armature of course falls again, breaking contact.

The use of studs is much better than utilising the rails, as there is less liability to obtain live metal in other places than the car. The conductors in the conduit are insulated, thus the difficulty of electrolysis is overcome; the studs are usually insulated, in some cases by being sunk in porcelain blocks which are again protected by an iron shoe. At any rate, there is no great need for perfect insulation, as the pressure is only on the stud for a very short time. The current is collected from the studs, when used, by means of a trailing bar which makes contact with them. The studs are raised a little above the roadway, thus enabling the bar to keep in contact. Before one stud goes out of contact the next contact is made, so there is no discontinuity. The car is, of course, of the usual construction, the only difference being that the trolley is absent. There is no doubt that, speaking generally, these systems are preferable to the open conduit, but, of course, there are many details to be perfected before they can rank in reliability with the overhead trolley.

The great advantages of this system over the open conduit are as follows:—It is impossible for mud or water to cause trouble, there is no danger of electric shock to horses or the public if properly designed, all cables are insulated throughout, so there is no possibility of electrolysis. Surface conductors are only "live" for a few moments, so the effect of electrolysis on them is insignificant, there is no slot in the roadway, and a source of danger to pedestrians

and cyclists is removed. The first cost and cost of maintenance is lower, or should be. In some systems there is no conduit at all, only the surface contacts, the cables being laid in the ground adjacent to the rails. There is a great future before these surface contact systems in large towns where there is heavy traffic, and also for the city end of suburban lines, as the same car can be worked on both systems, the change being made when the traffic becomes dense, or at the limit inside which overhead conductors are not allowed. The trolley can be clamped, and the surface contacts brought into action without stopping the car.

Various new Systems.—A system which is very like the surface contact is about to be introduced. In this system the overhead wires are abandoned. The necessary contact between a fixed conductor and the car is obtained by having a contact wire or ribbon stretched along as great a length of the car as possible. This conductor may be as much as 50 feet long, varying, of course, with the length of the car.

The contact wire or ribbon upon the car makes a rubbing contact on its upper surface with contact pieces or trolleys suspended transversely to the track from the arms of ordinary street trolley poles, so as to lift and swing slightly in the direction of the car movement, when the travelling car contact comes underneath and presses upwards. When short distances are permissible between the street poles, say 18 or 20 yards, the travelling car will make contact continually, as it will come into contact with a second pole before leaving the first one. When a distance of say 40 yards is the minimum allowed between the poles, a contact stud or plate is placed on the track, similar to those already mentioned. This is placed midway between the poles. It is switched on by the action of an arm fixed near the rear end of the conductor on the car just before it leaves the pole contact, and off by a similar arm fixed to the front of the car just after contact has been made with the next pole. The current is of course conveyed to the poles by means of insulated cables laid in the ground. It is anticipated that with this system the cost will be only 25 per cent. in excess of that for the simple trolley, while the objectionable overhead conductor will be dispensed with. The poles can be used for street lighting, as they are at about the correct distance apart. The stay-wires at curves, necessary for the ordinary system, can be dispensed with, and also there is less complication at crossings. It is of course premature to pass any opinion on this system till it has been tried practically.

There is another system which involves the use of an entirely new principle in electric traction, but no really practical trials have yet been made. This system involves the use of alternating currents, and is virtually a transformer, the fixed part of which is in the roadway and the movable part on the car. The fixed part consists of a trough-shaped iron circuit buried in the middle of the track; a thick copper conductor runs the length of the track, and returns underneath the iron, thus forming one turn of wire on the transformer with half the magnetic circuit. The rest of the magnetic circuit is on the car, with windings. This circuit consists of a mass of iron approaching the ground, of a similar shape to the buried iron. If alternating currents are passed through the buried conductor, currents will be induced in the winding on the car without any actual passage of current between the road and the car, the energy being transmitted through the air gap by means of magnetism.

(To be continued.)

HOTEL DE VILLE, ANTWERP.

EXAMPLES of Renaissance architecture appeared in Belgium about the same time as in France, that is, at the close of the fifteenth century, but they were more slow in attaining popularity. The consular house of the Biscayens in Bruges, which, according to GAILLIARD, was constructed in 1495, was the first experiment in the new style. It is supposed to have been designed by some Italian or Spanish architect. Then followed a period of hesitation, and it was not until after an interim of about thirty years that signs of the influence of the Renaissance were again observed in

examples of interior decoration and ecclesiastical sculpture. The fine chimneypiece of the Franc de Bruges was executed in 1529 by a local sculptor, who was manifestly an adept in the style. One of the chimneypieces in the Hôtel de Ville of Oudenarde and the tabernacles in the churches at Leau and Tongerlo were of that time. It is not until 1537 that we can find another example of a building that is true Renaissance, viz. the old registry at Bruges. The publication of a translation in Flemish of VITRUVIUS in 1549, and of five books of SERLIO between 1539 and 1553, by PIERRE COECK, a painter and architect who was patronised by CHARLES V., gave an impulse to the foreign mode. The entry of PHILIP—the heir to the throne—into Antwerp gave occasion for much display. It is remarkable that not one of the triumphal arches erected on the occasion was in the old Flemish style.

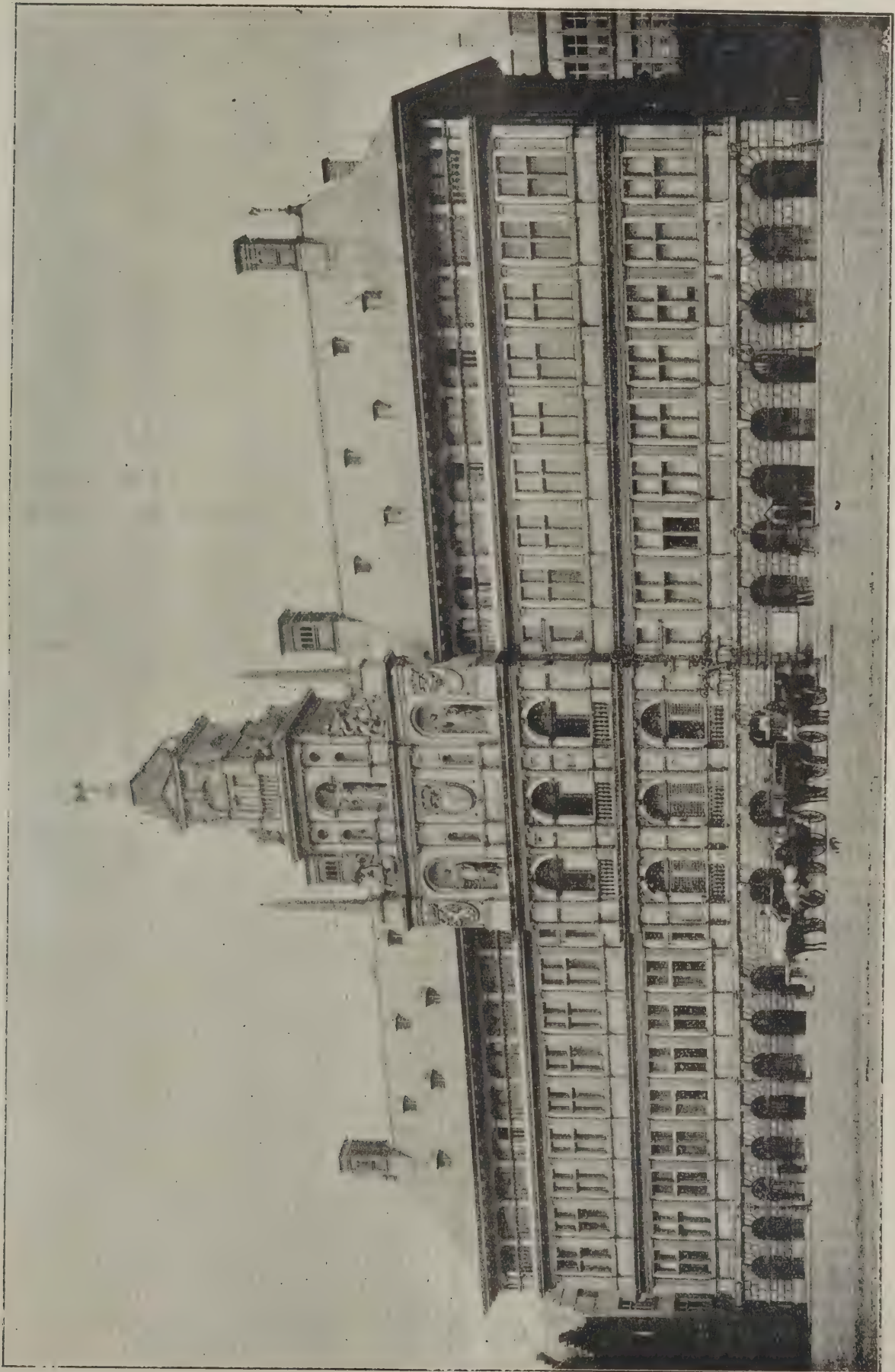
Although the employment of the later and transformed Gothic for civil buildings soon ceased to be common, it continued to be in favour for church work. The Renaissance style is found in such buildings as the Hôtel de Granville in Brussels, the College Vandale in Louvain, the hôtel de ville and some of the guild halls in Antwerp, &c. Among the architects who were most patronised were JEAN DE BREUCK, HENRY DE PAS, and FLORIS or DE VRIENDT. The most important work of the period was the Hôtel de Ville in Antwerp, which was constructed between 1564 and 1580, from the designs of CORNELIUS DE VRIENDT. It has a length to the public square of 305 feet. FERGUSSON found fault with the treatment of the central part, and especially with the unmeaning obelisks. But he adds:—"Notwithstanding this, there are few more successful designs of its class. It is free from all the extravagances which disfigure structures of its kind and age, and equally free, on the other hand, from the affectation of grandeur which so often deforms later buildings. Each storey here is complete in itself, and there is not a single ornamental feature applied which is either more or less than it pretends to be. In the present state of feeling on this subject it would be the height of rashness to compare this town-hall with its Mediæval rivals. But take away their towers, and place them where they can be equally well seen, and the Antwerp town hall will stand the comparison as well as any other building of its age or class. Except to the extent to which the design of any one man must be inferior to that of many, and that a foreign style must be more difficult than a native one, it meets most of the requirements of good and truthful architecture." The building was hardly completed when the civil commotions burst out, and not only interfered with the erection of new buildings, but caused the destruction of several ancient examples of architecture.

SANITATION AND CONSTRUCTION.

THE presidential address in the section of Engineering and architecture at the Sanitary Congress, Leeds, was delivered by Mr. Lewis Angell. In the course of it he said that the most striking feature of the Victorian era had been the development of the practical and useful. The predominating feature of the engineering of the ancients—bridges, aqueducts, pyramids—was massiveness, but through the intermediate ages, excepting in now obsolete fortifications, scientific engineering made no advance. It was not until the reign of Victoria that the profession of the civil engineer came into existence, and they had now arrived at a condition of *nil admirari*, and become as gods "directing the great sources of power in nature for the use and convenience of man." Engineering and architecture represented the constructive side of sanitary science. One branch of engineering had revolutionised war, but the works and objects of the sanitary engineer were not for the destruction, but the preservation of life and the promotion of health and comfort. If the millions expended in war had been devoted to life-preserving sanitation, what a different result would history have had to record. The science and the laws of sanitation were now well-known and established, and all he could hope was to drive home old-established truths by repeating line upon line and precept upon precept. Although the sanitary branch of engineering was a modern subject, they found very early records of sewers. Historically it was usual to quote Moses as the first practical sanitarian. The first "destructor" they read of was the Gehenna, or hell-fire, outside Jerusalem, where the refuse of the city was burnt. Destructors of a different type might be seen outside Leeds. England really originated sanitary work, but free and demo-

cratic America, having less sentimental notions respecting the liberty of the subject, had in many ways been in advance in the control of such matters. In New York and other States that great offender, the plumber, had for a long time been placed under official inspection. The President then recapitulated the succession of Sanitary Acts, which were at first, he said, only of a tentative and permissive character. Upon

the general engineering principles of town drainage, engineers were in the main agreed. The English water-carriage system was accepted as the cheapest, most efficient and least objectionable, and was universally extending, and would ultimately extend, to every civilised town in the world. The history of sewage revealed erratic procedure. Sewage was thirty years ago declared to be a "mine of wealth" if applied to land.



HOTEL DE VILLE, ANTWERP.

Sewage farms had had their day, however, and chemists, patentees and stockjobbers had failed. The question had now taken a new and interesting biological aspect. They were harking back to first principles, to the engineer's tanks and the resurrection of the microbe hitherto killed by the chemist with his patents and reagents. Probabilities indicated that microbes worked for good and evil, and that the good would prevail; that the purification of sewage would be effected by living organisms. Referring in detail to sewer ventilation, the President declared himself in favour of free and open ventilation. The cardinal conditions of health—pure air, pure water and unpolluted earth, with the accessories of wholesome food, proper clothing and suitable houses, the necessities of life—comprised the whole gospel of sanitation. In our own habitations there should be ample means of ventilation in all living-rooms, no connection between the dietetic water-supply and the drains, no connections with the sewer except for the discharge of sewage, that the drains should be trapped outside and freely ventilated, and that all discharges from cisterns, baths, &c., should be in the open air. The President commented on the decision of the Queen's Bench, by which the term public sewer applied to every description of drain and sewer except drains used for the drainage of one building only, or premises within the same curtilage. The Lord Chief Justice might well have said that the condition of the sewer laws was a scandal. Several recent attempts had been made to put the law on a more equitable basis, but the bills had been invariably blocked in the interests of property-owners. There was, however, a Nemesis in all this. The local authorities of the past would not provide the small staff of inspectors necessary for the proper supervision of buildings and house drainage, and unprincipled owners and "jerry" builders could on their own premises do very much as they pleased. The local authorities had now to provide not only a large staff to discover the defects of the past, but, at great cost, to remedy the bad work, which could have been prevented by proper supervision. The housing of the working classes was a prominent feature in sanitation. Whether this should be accomplished by flats or by workmen's trains was a matter for serious consideration. Much good had been effected in the Metropolis by the clearance of unhealthy slums and the substitution of piles of tenements, but it was questionable whether it was desirable to concentrate the working population on so limited a space, with only street gutters for the children's playgrounds. With the facilities now given by the very cheap workmen's trains and trams, it would be infinitely better to distribute the population. The requirements of the model by-laws of an open space—relatively small though it be—at the rear of houses, and a specified width of roadway in front, precluded the repetition of the old courts, alleys, slums and rookeries, as also the very objectionable back-to-back houses, which, unfortunately, continued to exist in many towns which could be named. Local government was a grand principle—in theory—but the procedure of some local governors, headed in newspapers as "disgraceful scenes," "scandals," "personalities" and "rowdism," led cynics to inquire whether local government was not, in practice, a fraud. Unfortunately, excepting in the great cities, local affairs were not only too frequently avoided by those most fitted to take part therein, but a very large portion of the population took no interest whatever in matters affecting their welfare, as evidenced by the scanty polling at local elections; but when an epidemic scare occurred, people who at other times are utterly careless of their local institutions or representation break out in hysterical denunciations of local management. After referring to the disposal of storm-water and the proper dimensions of house-drains, he said:—Sanitary principles, they were told, if carried to their logical conclusion would prohibit carpets, tapestry, curtains, architectural mouldings and reliefs—anything, in fact, which could harbour dust and dirt in houses; walls should be smooth, polished and without angles. In food people must so study what to eat, drink and avoid, and by an all-round anxiety to preserve health render life not worth living. There was the happy medium in all things which wisdom dictated. Small local practitioners took up sanitary shibboleths, and dogmatically ascribed to sewers, gullies or ventilators illnesses for which they could not otherwise account. Even those from whom they expected more science frequently gave their dicta without taking the trouble to investigate. Typhoid and diphtheria were generally ascribed to sewers and drains, but nearly every large outbreak of enteric fever had, upon careful scientific investigation, been distinctly traced to contaminated milk or water, and not infrequently to shell-fish, while diphtheria had been ascribed to personal contamination in schools. The municipal engineer should have had a liberal education to safeguard him against the narrow motives and influences by which he was surrounded. He should be something more than a sanitary "expert." He should have practical experience in general engineering. At present the office of engineer was open to any brass-plate man who could obtain responsible official positions upon the mere testimonials or votes of good-natured friends. The Sanitary

Institute, as also the Association of Municipal Engineers, had established examinations to test the knowledge of aspirants for public offices. Such examinations might not be an absolute proof of general fitness, but as an examiner he said they afforded *prima facie* evidence that the candidates who passed were not mere quacks, and local authorities would do well to require diplomas or certificates before making an appointment. It should not be competent for anyone not holding a qualifying certificate from some recognised examining board to present himself as a candidate for any of the higher municipal offices. Subject to such evidence of qualification, local authorities might have the selection and appointment of such officers, which appointment, subject to good behaviour, should be as permanent as in the Civil Service, carrying with it superannuation. They had long advocated that the skilled and responsible municipal service of the country, offices created by Parliament, should be allied to the Civil Service on a system somewhat analogous to the county surveyorships of Ireland, which should include the medical officer and the engineer, extending also so far as he acts independently to the chief sanitary inspector. A new and unexpected force was already making for sanitation, in the shape of a demand from the working classes. Labour representatives on local authorities were eager in promoting sanitary inspection, perfect drainage, improved dwellings, public baths, recreation-grounds, &c., to the great advantage of the working classes. Sanitary works and a sanitary staff, of course, meant rates, but rates for preventive sanitary measures are paid grudgingly. As a matter of social economics, the value of health, comfort and prosperity was to be credited as against the loss of labour, waste of capital and cost to the nation consequent upon sickness and pauperism. Without health all other advantages were diminished or lost, therefore the conditions of health, so far as they were under control, should be a subject of the education of the people; the elements of hygiene should be taught in Board schools, in high schools and in colleges, and illustrated by practical object-lessons supplied by landlords.

Mr. Lemon (Southport) moved a vote of thanks to the President for his address.

Mr. Richardson seconded and Mr. Rippin (West Ham) supported.

The motion was carried by acclamation.

THE PARTHENON.

THE following translation of a letter from Dr. Dörfeld appeared in the *Times* on Thursday:—

"The Parthenon is doomed!" Thus begins an article in your issue of August 14, which has created a sensation not only in England but throughout Europe. Is the Parthenon really doomed? Is this gem amongst the monuments of the world irreparably lost? Is it impossible to save it?

As a student well acquainted with the Parthenon, and as a member of the committee appointed by the Greek Government to superintend the repairing of it, I think I may assert that the temple is by no means yet doomed. The condition of the structure is certainly not satisfactory. Earthquakes and fire, rain and sun, frost and heat, several bombardments, and more especially the unfortunate explosion of the Turkish powder magazine by the Venetians under Morosini in 1687, have all contributed to annihilate entirely large portions of the temple and severely to injure those still preserved, and even to destroy in many places the beautiful white marble. One has only to read the reports of the three distinguished European architects—the Englishman, C. F. Penrose, the German, T. Durm, and the Frenchman, T. Magne—on the state of the temple, in order to satisfy himself that the structure has indeed suffered severely, and that the condition of certain portions is even dangerous. But, according to the undeniably authoritative opinion of those architects, the damage is not so serious as your correspondent describes it; and, on the contrary, the preservation of the existing structure for hundreds, and perhaps thousands, of years is still possible. One thing only is necessary, viz. that the proposed repairs shall be carefully and expeditiously carried out. The same conclusion has been arrived at by the committee of Greek and foreign architects and archaeologists to whom the Greek Government has entrusted the task of superintending them. As the opinion of all these experts with regard to the mode of restoration shows few divergences, the work might be taken in hand at once, those repairs being undertaken first upon which all the experts are agreed.

Last winter a solid scaffolding was erected along the western portion of the temple in order first of all to replace the specially damaged epistylum beams of the opisthodomus by new ones. The stones required for this purpose had in part been already brought from Pentelicon to the Acropolis and the machinery obtained for raising these huge blocks, and work was about to begin when war unhappily broke out and arrested the progress of operations. The funds for the work of restora-

tion were granted by the Greek Archæological Society, which derives its large revenues from a lottery sanctioned by the State. This year, unhappily, owing to the disastrous war, the lottery has hardly produced anything, and the society has consequently no funds at its disposal to prosecute the works. The repairs have therefore been temporarily interrupted, and who knows when they may be resumed? For the Parthenon this is a deplorable matter, and the consequences may be most serious should a severe earthquake shake the mountain rock on which it stands.

Your correspondent then proceeds to point out how excellently, since the erection of the scaffolding, the remaining portions of the celebrated frieze, the wonderful masterpiece of Phidias, can be seen and admired, and suggests in this connection whether it would not be better to place the frieze itself in a museum, and to replace it on the temple by a copy. That suggestion I heartily endorse. Not only are the marvellous works of a Phidias exposed on the temple to a gradual process of disintegration under the influence of weather, but in their present position they cannot be properly seen and appreciated. Now for the first time, from the scaffolding which enables one to approach and study them at leisure, their great artistic merit stands fully revealed. If a modern sculptor or architect could set them up about 12 metres from the ground, in a gallery a little more than three (*sic*) metres broad, he might well afford to disregard scoffers and critics. And must we allow valuable Greek originals, numbered amongst the finest sculptures of the world, to perish slowly in a place where they might very well be replaced by copies? Your correspondent's assumption that the Greek committee has rejected the suggestion lest it should seem to justify *ex post facto* Lord Elgin's spoliation of the Parthenon is erroneous, for it was the English member of the committee who combated the proposal. Moreover Lord Elgin's action has been denounced not so much because he conveyed some of the sculptures into safe keeping in London, as on account of the barbarous manner in which he destroyed some parts of the temple—*e.g.* the mouldings of the south side—in order to remove the sculptures.

In conclusion, your correspondent rightly praises the Greek Archæological Society for the "wonderful progress" made in Greece with regard to the care bestowed upon the antiquities of the country. Certainly those who, having seen the Acropolis and the other ruins, and especially the museums, twenty years ago, revisit them now must be amazed at the progress to be witnessed on all sides. In Athens the ruins are protected from injury by iron railings, and the museums, which used to be described as stables, can stand comparison now with those of London and other European cities. This progress is undoubtedly due in part to the Archæological Society, but chiefly and in the first place to Mr. P. Kavvadias, the Director-General of Antiquities, especially since he has combined the secretaryship of the Archæological Society with the direction of the Antiquities Department of the Ministry. His energy deserves recognition, and your correspondent should not have omitted to mention his name.

FEVER HOSPITAL CONSTRUCTION.

A PAPER was read on "Fever Hospital Construction" by Mr. Edwin T. Hall at the Sanitary Congress in Leeds, on the 16th inst. The author said that the organised attack on such enemies as smallpox, scarlet fever, diphtheria, &c., was the outcome of the latter half of the Victorian era. Even in the county of London no hospital specially set apart for scarlet fever existed until 1849, when the London Fever Hospital was opened; and in the country generally local authorities first derived their power to provide hospitals for infectious diseases under the Sanitary Act of 1866. After enumerating the various powers granted for the erection of hospitals, he said that when public infectious hospitals were first erected in England it was common to devote a part of the site to smallpox and another part to all other infectious diseases, one set of staff quarters being common to both. It was, however, found that the danger from smallpox was great, not only to the sick patients in other parts of the hospital, but to the surrounding district, and separate hospitals were instituted for smallpox. In London the Metropolitan Asylums Board in 1885 came to the momentous conclusion to abandon land hospitals for smallpox and to establish floating hospitals on the Thames at Darent. The happy result followed that the disease had been practically exterminated in the Metropolis. The means by which this result was obtained demanded careful consideration. The value of isolation was shown in a remarkable degree and it was demonstrated that the fast travelling tide of the river caused by friction movement in the air even in the calmest days sufficient to carry away and oxygenise heavy gases. The perfection of the Board's ambulance service had greatly contributed to the result, and in any scheme of hospital construction for a town of any size too much stress could not be laid on the necessity for an ambulance station and an organised ambulance service. On the question

of the maximum size of an infectious hospital he had not been able to find any data to prove that any limit need be set. Given an adequate area of land and an adequate staff, a hospital might be of any size. The site for any hospital should be as open as possible. If one could be found surrounded by roads, it would be better, because all roads were channels for wind currents. It should be on elevated ground, so that drainage might be readily carried away, and should be as compact as possible. Much had been said as to the maximum number of patients per acre that should be put on the site, but he was not aware of any data that justified any one of the arbitrary figures suggested. The area required should be determined first in regard to the facilities which naturally existed for a rapid change of the surrounding atmosphere, and next the necessity for a zone between the infected buildings and the boundaries. The one-storeyed hospital was the medical ideal, but the practical suggested and permitted of the two-storeyed pavilion. There should be two entrances only to a hospital—one for the staff, patients and stores, and the other for the hearse, coffins, &c., the latter being so placed that it was out of sight of the patients. Having described the internal arrangements of several large hospitals, Mr. Hall then said the factor first to be considered in planning was how many patients should be put in a pavilion. In cases of scarlet fever, it was considered by medical men most economical from the nursing point of view to have not less than fourteen in a ward. The Asylums Board had fixed the number at twenty, and they might well accept that as a good rule for a large hospital. The best height for a ward from a practical point of view was 13 feet. Any greater height was not aerially of any value to the patient, and any less height in a large ward looked oppressive. It was of great importance to insure a uniform temperature to all parts of a pavilion, and he believed the best form of heating was by low-pressure hot-water radiators beneath windows. He deprecated horizontal pipes around the walls of a ward, and those in trenches were not to be tolerated at all. It was far better to put all horizontal pipes in the open basement beneath the pavilion. There should, in addition, be central fireplaces, which gave cheerfulness to the room, and were most valuable extractors of foul gases. In his judgment, a central stack was much better for an infectious ward than a stove with horizontal flues carried to the external walls. He believed in the artistic treatment of a ward as a refining as well as a curative value to patients, and thought that the surface of the walls of a ward should be of impervious material, faced with Parian, Keene's or Robinson's cement, painted in various artistic colours to rest and please the eye. In addition to the ordinary pavilion of a hospital, there should be what were technically termed isolation pavilions for the reception of cases of which the diagnosis was not certain. After dealing exhaustively with the fittings of a hospital, he said he would recommend as the motto for the inside of an infectious hospital, "Let nothing be hidden." In conclusion, he urged on all local authorities the desirability of making their hospitals architectural in treatment.

In the course of the discussion which followed the question of cost was raised. Mr. Hall, in reply, said that the cost of the Park Hospital would be under 400*l.* per bed. That, however, did not include the cost of the land, which was 13,000*l.* The cost of St. Thomas's Hospital, which was not an infectious hospital, was 500*l.* per bed.

GLASGOW ARCHITECTURAL ASSOCIATION.

ON Tuesday evening, the 14th inst.—the vice-president, Mr. George S. Hill, in the chair—the honorary president, Mr. James A. Morris, delivered a lecture on "Attainable Ideals." The lecturer exhibited on the walls a unique collection of working drawings, which he had specially obtained from some of the principal English architects, including the late John D. Sedding, John Belcher, Ernest George & Peto, Ernest Newton, C. F. A. Voysey, R. Schultz, Balfour & Turner, and Dunn & Watson. With these as his text, the lecturer showed how lofty ideals and noble sentiments were bound to raise and ennoble the work of an architect, notwithstanding the apparently insuperable checks which beset him. He referred reverently to the late John Sedding, who though dead yet spoke powerfully to us. "His drawings show abundantly his vivid imagination, his keen desire for perfection and the infinite labour he gave in seeking it, his nervous directness of touch, his refinement, breadth, simplicity and power." He spoke of Norman Shaw as, of those living, the first to build again on English soil on English lines, and asked that Scots architects might turn more towards the simple dignity of their own country's ancient work. He called attention to the care bestowed on the gardens, and said that the simple beauty of a fountain, a sundial or a dovecot often appealed to one more than buildings of massive grandeur. Mr. Alexander M'Gibbon proposed a vote of thanks to the lecturer. The Chairman expressed the sincere obligation of the Association to those architects who had so kindly lent their drawings. He then seconded the vote of thanks, which was heartily accorded.

NOTES AND COMMENTS.

THE people of the United States appear to be becoming more and more restrictive, as is usually the case when an economical error finds approval. The time seems to be fast approaching when every State will regard neighbouring States as foreign countries. A case indicative of the tendency of the time has occurred at St. Paul, Minnesota. A new capitol is to be erected, and the Commissioners, acting on the advice of their architect, obtained stone from quarries outside the State, because it was considered to be more enduring than any stone to be found in Minnesota. The outcry that followed could hardly be more violent if an act of high treason was committed. However, it is satisfactory to find that one newspaper is courageous enough to resist the phrensy which selfishness inspires. The *Pioneer Press* says:—"If this abuse was dictated wholly by considerations of State interest and State pride, it would not shut wholly out of view that the highest and noblest consideration of State interest and State pride is that which concerns the character of the building itself. To the people of the State at large, and to their children and children's children, it is of infinitely more importance that the architecture of the building should be worthy of the State and represent the best artistic beauty and nobility attainable with the means provided, than that it should be simply an advertisement in stone of somebody's private interests in a local quarry. It is a fortunate thing for the State that the selection was in the hands of a Commission, superior to the narrow provincialism which would sacrifice the beauty of the structure to the clamour of local interests." It is possible to neglect local interests overmuch, but the conditions under which elected authorities exist do not allow an error of that kind to be often repeated.

THE Musée Carnavalet is not, we believe, included in Messrs. Cook's programme of the sights of Paris which are worth visiting, but we suppose no English antiquary has visited the old house without wishing that London could possess a similar exhibition. The rooms recall Madame Sévigné and the fine ladies whose wit, beauty and learning gave charm to the court of LOUIS XIV. But the contents were mainly reminiscent of the Paris of that era, and more especially of the Revolution. Vivid as are the scenes in CARLYLE'S "French Revolution," they become still more impressive after a few visits to the Musée. If numerical tests are applied the Musée Carnavalet is not as popular as the Musée Guérin, although one is free and the other costs at least a franc. Its situation is not adapted to allure strangers or citizens, and French people sometimes say they have had more than enough of the blue stockings of the age of LOUIS XIV. and of the frail but patriotic THÉROIGNE DE MÉRICOURT, the MAILLARD who served as Goddess of Reason and other questionable demoiselles with whom began the Women's Era in which we have to live. The Musée is, however, undergoing a transformation, and it is not unlikely to become one of the most popular resorts. M. GEORGES CAIN, who has painted so many pictures to the honour of the Vendéans and the Royalists who were opposed to the Revolution, some months ago accepted the curatorship, and having wisely devoted himself at first to the study of the works which are under his care, is now taking measures to display them to the utmost advantage. His aim will be to demonstrate the grace which was to be found in Paris not only in the grand days of LOUIS XIV., but even amidst the terrible scenes of the Revolution. There are more works of interest in the Musée Carnavalet than can be seen. It is, therefore, decided to give all of them a turn, and consequently the aspect of the rooms will vary from time to time, and the constant visitor may expect to have his assiduity rewarded by the sight of novelties.

M. CHARLES GARNIER is not to be envied at the present time. He is naturally anxious for the stability of his opera house, which is a guarantee of his fame, but it would be only mock modesty on his part if he did not feel convinced that the building is an adornment of Paris which would be very much poorer if by any accident the safety of the structure were endangered. But the architect is not master and dare not do what he likes with his creation. It is part of the national property, and therefore an army of officials

have power over it in various ways. Men of that class are alike all the world over, and it is no doubt a pleasure to them whenever they are able to ignore the architect. One opportunity which they realised is just now causing much anxiety to M. GARNIER. The building is lighted by the aid of electricity, as every opera-goer is aware. But it is not generally known that the generation of the electricity is accomplished in the basement of the building. The machinery was introduced and the process arranged in spite of M. GARNIER'S opposition. That was hardly prudent on the part of officials who are supposed to be men of science. It is true the basement of the opera house is of massive construction, with piers and vaults in which stone was not used sparingly. But however large a margin was allowed for contingencies it was not calculated that the piers were to be subjected to the effect of constant vibrations of a novel kind, for neither in Paris nor in London have adequate demonstrations proved what is the actual effect on masonry of such generators as are to be found beneath M. GARNIER'S building. There are other risks which have followed the introduction of electric lighting. M. GARNIER is now engaged in preparing a report to the Minister of Fine Arts on the subject. Of course it will be referred to engineers; but after the downfall of bridges and the collapse of reservoirs, which now are, apparently, only commonplace incidents, official engineers will do well to be less confident about their formulas, especially when they have to be applied to a building so varied in character as is the Paris Opera House.

DEPARTURES from by-laws appear to be punished rather severely in Paisley, and, as elsewhere in Scotland, defendants in such cases are tried by the Dean of Guild, who is the building authority. On Friday Mr. GOLD, a builder, was charged with a series of breaches of the regulations. The alleged offences were deviating from the plans passed by the Dean of Guild Court, leaving the paving of a court incomplete, deficiency in drain-pipes, unfinished closets, leaving a gable exposed to damp, constructing a ceiling of the height of 9 feet 4 inches instead of 9 feet 6 inches, allowing houses to be occupied before a certificate was granted by Master of Works. Fines amounting to 30s. were imposed. Defendant's counsel gave notice of appeal.

THE new illustrated book, "The Chippendale Period in English Furniture," by Mr. K. WARREN CLOUSTON (DEBENHAM & FREEBODY and E. ARNOLD), must not be taken as a reproduction of Chippendale designs. It is a treatise on the furniture and decoration of the eighteenth century. CHIPPENDALE and his contemporaries appear as a part of a group which in addition consisted of Sir WILLIAM CHAMBERS, the brothers ADAM, SHEARER, HEPPLEWHITE and THOMAS SHERATON. CHAMBERS'S influence is explained as it deserves, for, although the wits of the time made merry over his Chinese exercises, shrewder men translated them into forms which seemed less strange and gained reputation for originality. Mr. CLOUSTON is apparently an enthusiast for the style. At all events he has an expert's knowledge and describes an immense number of examples in such a manner as will compel admiration from those who may not believe in the superiority of CHIPPENDALE and his imitators. The illustrations are charming. Some appear to be reproductions of fine engravings, others of original drawings; but there is such general uniformity of treatment and lightness of touch it becomes impossible to say which was drawn by an eighteenth-century Frenchman and which by Mr. CLOUSTON. The book is certain to receive much admiration from amateurs, which it undoubtedly deserves.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: NORMAN STAIR IN PRECINCTS.

INTERIOR, HER MAJESTY'S THEATRE, HAYMARKET

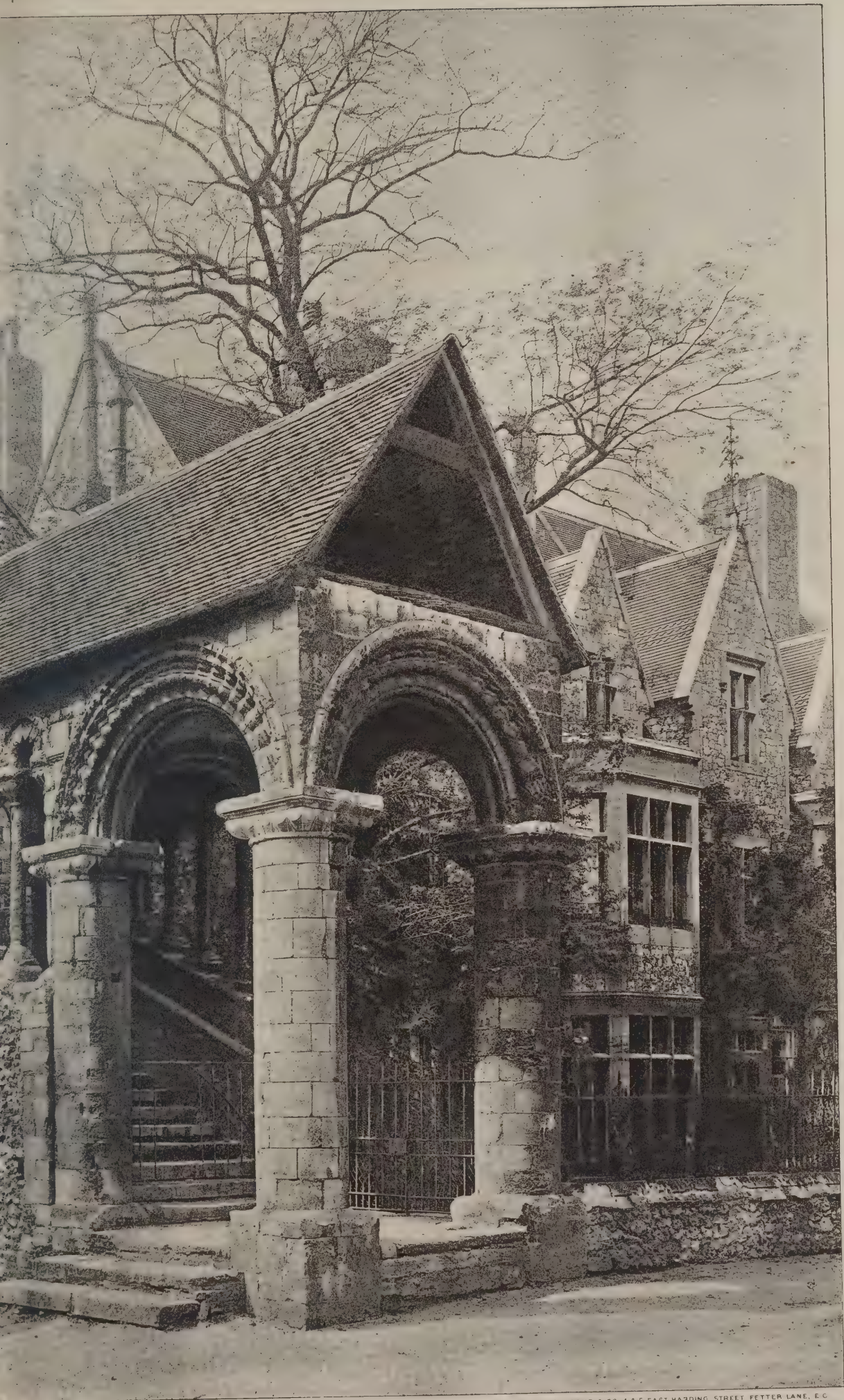
THE FOYER, HER MAJESTY'S THEATRE, HAYMARKET.

GRAND STAIRCASE, IMPERIAL INSTITUTE





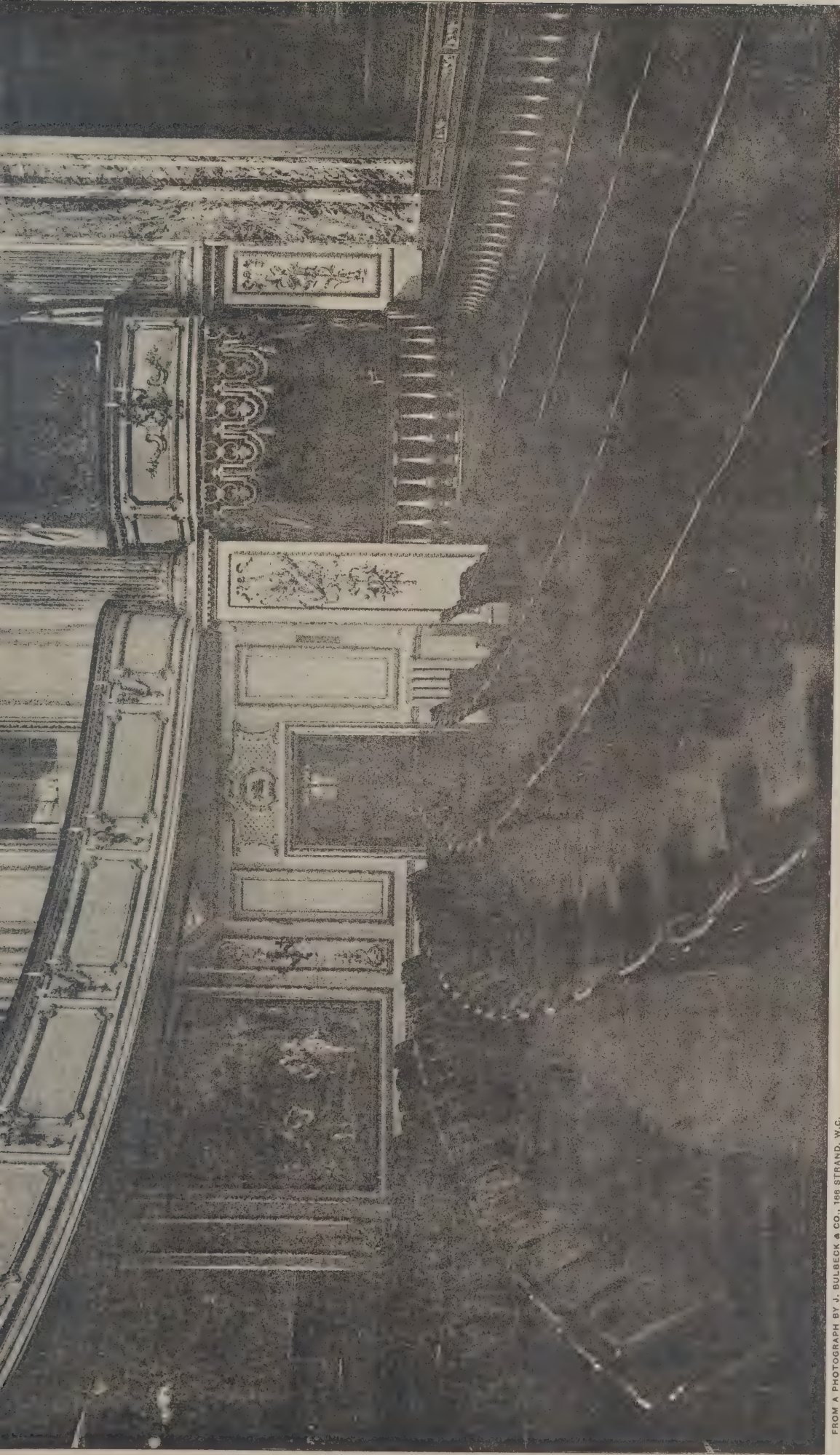
PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.



INK- PHOTO SPRAGUE & CO 4 & 5, EAST HARDING STREET FETTER LANE, E.C.

The Architect, Sept 24th 1897.





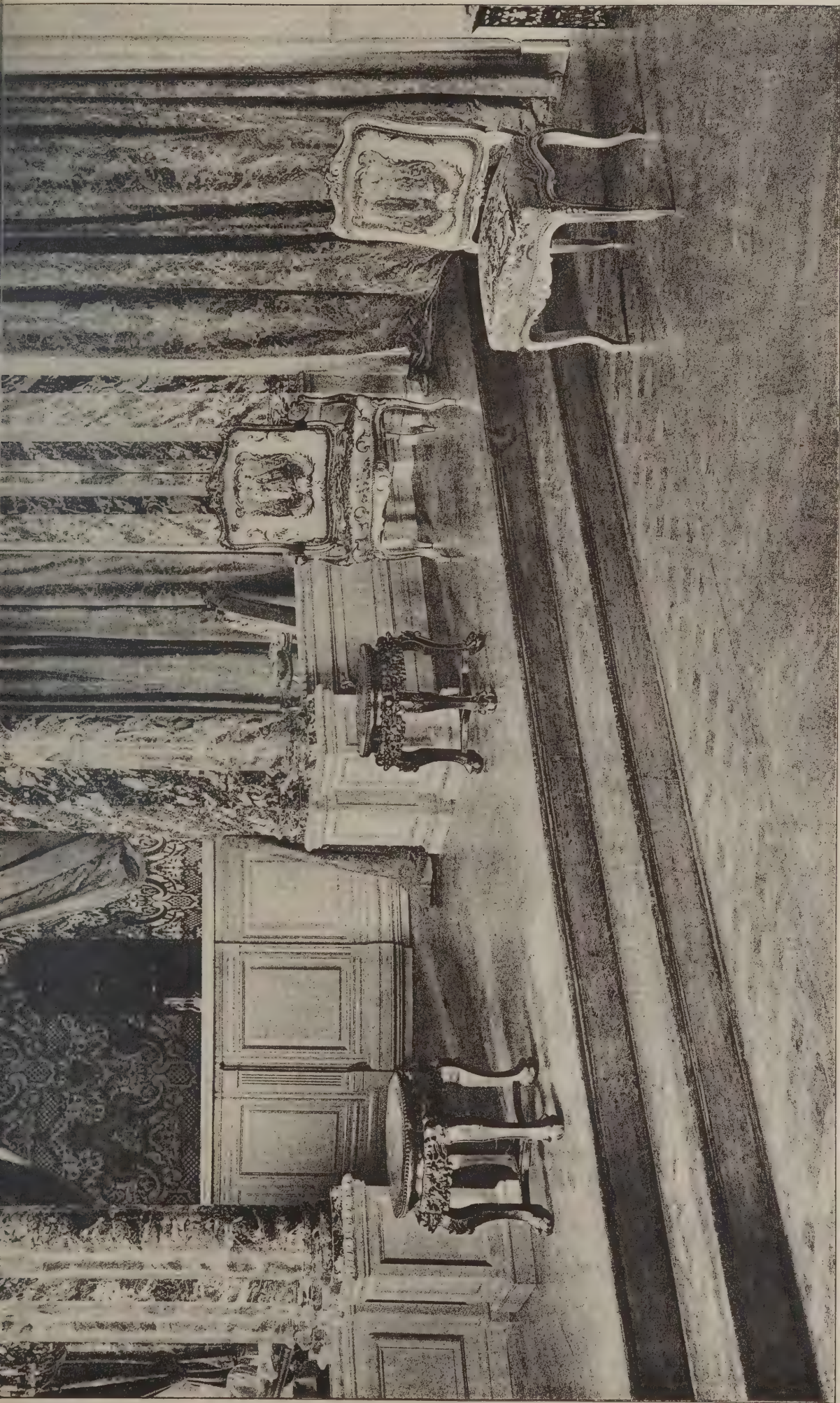
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INTERIOR: HER MAJESTY'S THEATRE, HAYMARKET.
The Late CHARLES J. PHIPPS, F.S.A., Architect.

The Architect, Sept 24th 1897.





FROM A PHOTOGRAPH BY J. BULBECK & CO., 166 STRAND, W.C.

INK-PHOTO, SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

THE FOYER: HER MAJESTY'S THEATRE, HAYMARKET.

The Late CHARLES J. PHIPPS, F.S.A., Architect.

The Architect, Sept 24th 1897.





PHOTOGRAPHED BY BEDFORD LEWIS & CO

INK PHOTO SPRAGUE & CO 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

GRAND STAIRCASE: IMPERIAL INSTITUTE.

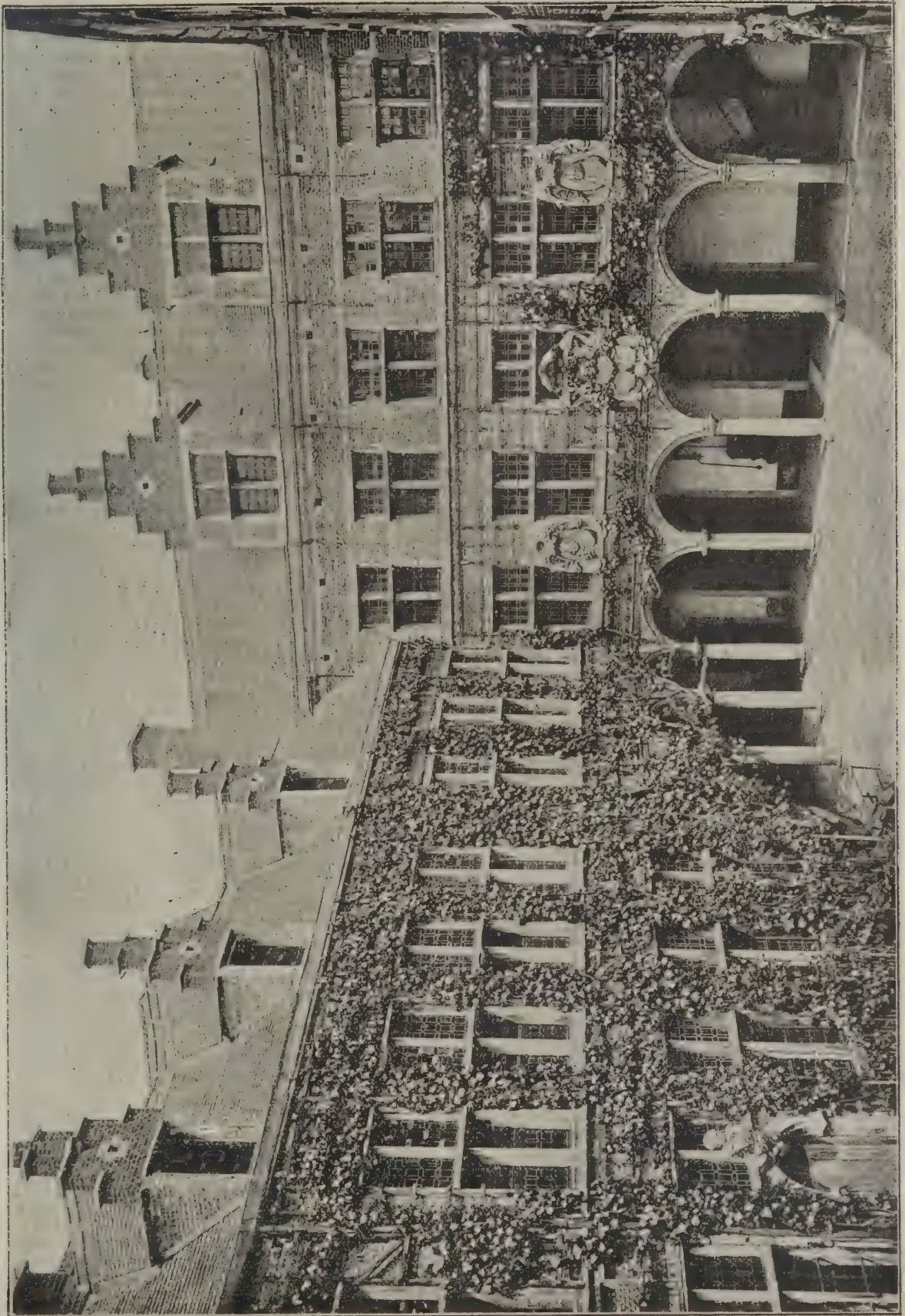
T. E. COLLCUTT, Architect.

HOUSE OF THE PLANTIN FAMILY, ANTWERP.

EVERY visitor to Antwerp who cares to form a mental picture of the sixteenth century should not fail to visit the house and printing office which belonged to CHRISTOPHE PLANTIN. The property was purchased by the municipality at a cost of about 50,000*l*. It is preserved in a manner which does credit to the authorities, for they endeavour to uphold the memory of the man who was the foremost printer and publisher of his time. His name is not only associated with the property which is known as

the Musée Plantin, but it is also attached to one] of the finest streets in the city.

PLANTIN deserved the respect he has obtained. By birth a Frenchman, he managed to secure the patronage of the Emperor CHARLES V. and of his son and successor. This gave him the privilege of printing the service books and Bibles for churches in the empire and colonies. It was practically a monopoly of the ecclesiastical printing for all Christendom. PLANTIN could not have obtained so much if he did not possess learning as well as character. He was recognised as one of the most versatile scholars of the age,



THE HOUSE OF THE PLANTIN FAMILY, ANTWERP.

and was competent to test the accuracy of any book printed by him, whatever the language. Throughout his life his enthusiasm for books exceeded his financial interest in them.

It was about 1550, when the Renaissance had gained a firm footing in Flanders, that CHRISTOPHE PLANTIN set up his printing-presses in the street which is now known as the Rue Haute Rivage. The surroundings of the place in those days are not to be judged by their existing state. A more eligible site for such a business as PLANTIN's could hardly be found in Antwerp. It was near the river and the despatch of his folios to foreign parts was facilitated. If an imprimatur were needed the cathedral was close at hand. The Dominicans who would occasionally have to be consulted were not far off. From his influence with the Court PLANTIN could select any site he pleased, for there were reasons which made his residence in Antwerp a necessity. It was an advantage to the Government to enable the subjects of the empire to be independent of foreign printing, and moreover there was an opportunity afforded to interfere with a new variety of English trading, for Antwerp had become the printing and publishing office for the translations of the Scriptures by the Reformers. WILLIAM TYNDALE for a time resided in Antwerp to direct the publication of his Testament.

It was probably owing to imperial subsidies that PLANTIN's works were erected in a style that amazed the sixteenth century. GUICCIARDINI described them as among the wonders of Europe, and apparently they surpassed all the secular buildings which were then to be seen in Antwerp. PLANTIN's printing office, says ISAAC D'ISRAELI, was "magnificent in its structure; it presented to the spectator a countless number of presses, characters of all figures and all sizes, matrices to cast letters, and all other printing materials, which BAILLET assures us amounted to immense sums." If compared with some of the modern printing offices of Belgium PLANTIN's establishment would not look like a marvel, but in all such cases the standard of the time should be applied.

PLANTIN's love for his work is suggested by the union of his residence and works, which have been erected around a courtyard. He wished to be always able to have conversation with the scholars he engaged to read his proof-sheets, with his compositors, type-founders, engravers and binders. They all appear to have formed one family, and it may be one as happy as could be found in Antwerp. PLANTIN was also, we imagine, an experimenter. There is a small room in the house which was apparently used as a laboratory for type-founding on a small scale, and it may have been closed to all but the master. The conditions of his employment, however, prevented the introduction of novelties such as the italics of ALDUS. And in his ornamentation he had to be sparing. A suspicion of innovation would have injured his reputation among the clergy; accuracy and legibility were his principal aims. CHRISTOPHE PLANTIN lived until 1589, but his printing offices in Paris and elsewhere were afterwards conducted by his sons-in-law.

On visiting the premises we can easily imagine that we have arrived at a moment when the PLANTINS and their employees happen to be away, but are soon expected. This arises from the care taken to avoid the appearance of an ordinary museum. The rooms contain no more furniture than would be seen in them in the sixteenth or seventeenth century. In the large dining-room, which was, we suppose, generally used as a place of meeting for principals, artists, engravers, &c., examples of books produced by the PLANTINS are to be seen, as well as proofs of plates, title pages and ordinary pages bearing corrections. TURNER was not more careful with the mezzotints of the "Liber Studiorum" than was RUBENS with plates copied from his drawings for missals. He was most elaborate in his written instructions, and suggested effects with his usual vigour of hand. In the printing office there was apparently no lack of liberty. The readers sat together, and could, when necessary, discuss difficulties without fear of interrupting labour. We can see the proofs tied up in small parcels as if awaiting for a resumption of the hours of labour, and the quill pens are ready to be used. Compositors and pressmen also worked under favourable conditions, an abundance of light being one of them. In the arrangement of the

place everything is done to suggest that all things are left as they were in the days of the PLANTINS, and from courtyard to attics there is not a trace of theatricalism.

MUNICIPAL ENGINEERING.

A LECTURE on the "Sanitary Advances in Municipal Engineering" was delivered in Leeds by Mr. H. Percy Boulnois, city engineer of Liverpool. He began by calling attention to the multitude of subjects which a city engineer was expected to know something about. These included amongst many others, sewerage, bridges, water, road-making, tramways, street lighting, architecture, surveying and building. Marvellous progress had been made in municipal engineering during Her Majesty's reign. The municipal engineer, or town surveyor was practically unknown before the Queen came to the throne. He took great credit to himself and his brother officials for the work which had been accomplished in the face of great opposition during this comparatively short period. Municipal government theoretically was splendid; practically, it often failed. It failed principally because that government was ever changing. As each succeeding November came round fresh men took seats on the controlling bodies. The consequence was that the municipal engineer had no sooner educated one committee to a proper standard than he had to start to educate another. This was very much against advancement. Then, again, in small towns men got into municipal bodies very often for purposes of their own. It had been found that a ready "spouter" was more likely to be elected than a man who had the interests of the place at heart, but who could not speak very well. They were all agreed upon the marvellous strides that house drainage had made during the last few years. This was in no small measure due to the wonderful work accomplished by their chairman, Mr. Pridgin Teale. His book particularly drew attention to the defects of sanitation in this direction. It aroused interest in the subject, and that was more important even than legislation. Education was first, legislation afterwards. Sewerage used to be exceedingly defective. The drains were badly constructed—mere elongated cesspools. But the municipal engineer had changed all that. He had taken up the matter scientifically. He had properly graded the drains, and consequently large communities were now able to live together with almost perfect immunity from disease. He drew attention to the difficulties experienced in insuring that sewers shall be self-cleansing, and described the various methods of flushing which have been adopted. By means of automatic flushing tanks placed at the head of the sewers, or by large tanks which might be placed over the sewer manholes, the whole of the contents could be passed into the sewer. A tank of this description, which could pass 2,000 gallons of water to the sewer in 30 seconds, was described. Liverpool flushed all its sewers, including those of private houses, large and small, twice a year, at a cost to the local authority of over 4,000*l.* per annum for private flushing alone. If a householder wished to have his dwelling flushed out of its turn it was done at a nominal charge, according to the rateable value of the premises. Thus not only were the drains of a house flushed, but if defects in the main drains existed they were reported and remedied. Great progress had been made in sewage disposal. Much, he thought, might be said for the septic system, under which decomposition was allowed to proceed in tanks, under safe conditions, the effluent being passed through filters. In this way nature was followed, and not arrested, as it usually was by most processes of chemical treatment. Under the septic system, decomposition, that great law of nature, was allowed to step in and, by breaking up the constituent parts of the sewage, rendered the effluent the more amenable to nitrification. He wished Mr. Cameron all the success he deserved with reference to the discoveries he had made on this point, and that wish was emphasised by the fact that that gentleman was at one time his assistant. With the important work of scavenging the lecturer dealt at some length, recommending refuse destruction by burning over every other method of dealing with the enormous accumulations of house and trade refuse which had daily to be collected in every large city throughout the country. Want of time, remarked Mr. Boulnois, prevented him from alluding to sanitary advances in connection with water supply, ventilation, heating, &c., but he dwelt upon the question of sanitary road-making, and pointed out that a properly paved roadway upon a good bed of Portland cement concrete was impervious and absolutely sanitary, whereas a macadamised road for busy traffic was unsuitable on account of its porous nature. A street properly paved with Australian hard wood approached as nearly as possible perfection in street making from all points of view. Turning to the debateable question of the housing of the labouring classes, the lecturer urged that the persons for whom the benefits of the various Acts of Parliament were intended are the "labouring" classes and not the "artisan"

classes, who had better wages and could afford to live in houses provided by private enterprise. With regard to the labouring classes, whose wages were precarious and sometimes very small, it was essential that they should be housed in cheap homes at a rent of about 1s. per room per week, and that these houses, though sanitary in every respect, should not be made too attractive, or they would induce the artisan classes who could afford a dearer class of house to occupy them. Such houses could not be built on the ideal as to how these people ought to live. It was this higher ideal which had practically prevented the benefits which should have been derived from the various 'Labouring Classes' Dwellings Acts being enjoyed by the classes for whom they were passed. He stated that in Liverpool cheap houses were now being erected by the Corporation, which were letting as fast as they could be erected at 1s. 3d. per room per week, and that the net return for these houses would be nearly 5 per cent. per annum on the outlay. The lecture was illustrated by a variety of lantern slides, and throughout it was listened to with marked and close attention, the various points raised being followed with much interest.

Mr. Pridgin Teale, chairman, remarked that Leeds citizens must have been deeply interested in the way in which the lecturer had met the difficulty with regard to the housing of the working classes by a compromise between the self-contained cottage, to which they had been accustomed, and the palatial tenement houses, which were all the less popular for being larger, and which could not be erected at a cost that the people for whom they were intended could pay. Being fond of wood pavement he was glad to hear of a sort of wood that was what Leeds wanted.

THE BRITISH MUSEUM.

THERE are not many Blue Books which are as satisfactory reading as the annual returns of the British Museum, and this year the document is of more than average interest. The Trustees endeavour to adapt the great institution under their control to the wants of the times, and now it can be said with truth that there are no museum galleries in Europe which contain more objects that are deserving of study or which afford more opportunities to students. The appreciation of the collections is suggested when it is found that the number of visitors to the Museum (in Bloomsbury) was 581,906 during last year, the highest number reached since 1890. In the reading-room there was a further decrease, but that is accounted for by the growth of local libraries in the Metropolis. But if readers declined there was an increase in the volumes consulted, the number for 1895 being 1,405,866, while last year it was 1,428,535.

The acquisitions for the various departments have been important. For the library the most remarkable is Macho's French Bible, or rather abridgment of the Scriptures, printed at Lyons for Bartholomew Buyer about 1477, one of the rarest and most important of old French books, the first containing woodcuts, the first in which the place of imprint is specified and preceding the first actual translation of the Bible into French by more than forty years. Only five other copies are known, and only one of these is perfect. The slight imperfection of the present copy is owing to two duplicate leaves having been bound up by mistake and the right leaves omitted. The late Sir A. W. Franks presented a strange proclamation of Henry VIII. for diminishing extravagance in living:—"Prouysion made by the King's hyghnes and his counsaill for puttynge a parte the excessyue fare and redusyng the same to such moderacion as folowyngly ensueth." Imprinted by Richarde Pynson.

Miss Frapp has given Barrett's "History of Bristol," bound in nine volumes, and interleaved with water-colour and pencil drawings, chiefly executed by herself; engravings, lithographs and other illustrations of Bristol, and accompanied by a collection of Bristol municipal seals.

Among the older manuscripts acquired during the year one of the most important is the so-called gospels of St. Grimbald, a fine copy of the four gospels in Latin, written and illustrated early in the eleventh century in the monastery of Newminster (afterwards Hyde Abbey) at Winchester. It is decorated with miniatures of the evangelists and elaborate borders in gold, silver and colours in the best style of English art of the time. At the end is a copy of a letter from Fulk, Archbishop of Reims, to Alfred the Great, recommending Grimbald, a monk of St. Bertin, who was invited by Alfred to England and became first abbot of Newminster. The following additions to the manuscripts are also interesting:—

Six volumes of notes and drawings made or collected by the late Professor John Henry Middleton, chiefly for his work, "The Remains of Ancient Rome," 1885.

Four volumes of rubbings of brasses selected from the collections of Sir A. Wollaston Franks in order to supply the deficiencies of the several series already in the Department.

Descriptions of brasses in English churches, by the Rev. Henry Addington, nineteenth century.

Eight volumes of collections made by Thomas Willement, with coloured drawings, &c., relating to the history of stained-glass, nineteenth century.

The drawings have been enriched by the purchase of one of the finest known works by Michel Angelo, representing the Lamentation of the Virgin and the Disciples over the body of Christ. It is in black chalk, and on the verso is a sketch in red chalk, apparently for one of the captives designed for the tomb of Julius II. This drawing is from the collection of the Earl of Warwick.

The original design for the engraving of Venus in a landscape, by Domenico Campagnola, has been presented.

Two portraits of San Carlo Borromeo, one taken after death, in black and red chalk, by Ambrogio Figino; and a sheet of studies in red chalk, drawn on both sides, by Andrea del Sarto, have been taken from Lord Leighton's collection. Among the studies are two for the head and figure of St. John in the picture of the Virgin and Child with St. John at Hertford House, and a study for the figures of St. Bruno and St. Onuphrius in the picture of the Madonna with Saints, now at Berlin. The following English drawings have been secured:—

An album of thirty-four pencil sketches, chiefly groups of French peasantry, by Richard Parkes Bonington.

Eighteen sketches of figures, by John Constable, R.A.

A drawing in sepia and Indian ink of a cart passing along a country road, by Thomas Gainsborough, R.A.

Sixteen original designs for the series of prints entitled "Industry and Idleness," by William Hogarth, eleven of them being finished drawings for the engraver, and the remaining five first sketches, including two for subjects not used in the engraved series.

Two portraits of ladies, black and red crayons, by John Hoppner, R.A.

Figure of a cavalier, a pen and ink sketch, and two sheets of pen and ink sketches of stags and hinds, by Sir Edwin Landseer, R.A.

Portrait of a gentleman, a life-sized head, black and red chalk, attributed to Sir Joshua Reynolds, P.R.A.

A sketch book of forty-three leaves containing pen and ink drawings, by George Romney.

A portrait of Samuel Palmer, the water-colour painter, by Henry Walter.

View of Roslin Castle and the companion in water colours, by Hugh William Williams.

The additions to the Egyptian and Assyrian antiquities usually appal from their quantity. The soil might be supposed to produce antiquities as soon as one crop is removed. Such an item as "A collection of 4,762 Babylonian contract and other tablets belonging to the period which lies between B.C. 3000 and 2000," and "A group of circular clay tablets inscribed in Accadian with public accounts, lists of revenue and produce, drawn up for the city of Ur, about B.C. 2300," must give rise to doubts whether it is possible for any individual to be acquainted with the contents of the Department. Another wholesale acquisition is "A collection of blue and green glazed *faience* figures of gods, priests, animals, &c., of the period which lies between B.C. 1000 and 600." The archaeologists, if there are any, who can appreciate collections as if they were to them no more than individual objects are to be envied. To the majority of people who have an interest in antiquity an addition like the following seems more easily grasped, and is therefore more interesting:—"Four painted *cartonnage* cases made to resemble the forms and faces of the dead bodies over which they were placed. They are all made of waste pieces of papyrus, and judging from the style of the Greek writing which is found upon them, cannot be older than the second century of our era. Names of the people for whom they were made appear in demotic, and mythological and other scenes are painted upon them in a manner which suggests that their true significance was not known to those who copied them on to the cases." It is curious to find with the Egyptians some decorators who were little better than machines, yet the absence of interest in their work after so many years becomes a quality which is more prized than spirited execution.

In the Department of Greek and Roman antiquities many valuable additions are to be found. Foremost comes from Clazomenae in Ionia a sarcophagus with gabled cover, painted with representations of battles, an inroad of Cimmerians into Asia Minor, funeral games, animals and decorative patterns; Ionian art of sixth century B.C. There is no finer example of terra-cotta in the Museum. The battle scenes now appear to be little more than monochromes, but the animation seen in them is marvellous. There are other figure scenes which are symmetrically arranged, and architectural ornament. The production of so large an example of terra-cotta without any wind ing or irregularity in the lines indicates the skill attained by the Ionian potters. The sarcophagus is placed in a position where it can be studied on all sides and within as well as without.

The following are some of the acquisitions illustrative of Mediæval art:—

Circular gold medallion with a bust of Our Lord in cloisonné enamel; Byzantine work of the tenth century. Portable altar of porphyry mounted in copper gilt, and engraved, having at the corners the emblems of the Evangelists in champlevé enamel, from Avignon; French work of the thirteenth century. A holy water bucket of gilt copper, with translucent enamel medallions, probably Spanish, of the fourteenth century, obtained in Saragossa. A reliquary of rock crystal and silver gilt in the form of a church; French, fourteenth century. A pair of altar candlesticks of copper gilt, and engraved in open work with monsters and with large crystal balls, from a church at Adana, near Iskanderun; French work of the thirteenth century. Reliquary in the form of a figure of the Virgin seated, with shield of arms in champlevé enamel, copper gilt and engraved with figures of Our Lord and two disciples; French, thirteenth century, from the East. Small seal of green stone with a figure of the Virgin; Byzantine, tenth century. Copper badges enamelled with armorial and other devices; from Spain, fifteenth and sixteenth-century work. Pair of candlesticks of bronze engraved with minute ornament, outlined with silver; Venetian, early sixteenth century; and three German brass salvers of the fifteenth century, one of them of unusual size. A hook of iron, inlaid with bronze of Arab work, and two other pieces of similar work inlaid with silver. Bronze celestial globe, made from the design of Abu'l Husein Abdelrahim es Sufy in the year of the Hejira 834 (= A.D. 1430). Another made by P. Petit, 1659. A cup dial of copper gilt, made by Bartholomew, Abbot of Aldersbach, in Bavaria, 1554. A cube dial by D. Beringer, seventeenth century. A copper gilt folding dial by Hans Troschel, 1609, another of ivory by the same maker, and a third, of ivory, by Conrad Karner. A brass square with radial index, German, dated 1573; a gunner's level engraved with Mars, and another by G. Z., 1619. Square dial made by J. Ramminger, of Stuttgart, 1704. Bronze model of a church with square tower; Italian, early fifteenth century. A brass case with an elaborate inscription and designs; it appears to have belonged to some object made for Marc Antonio Fregoso, son of a doge of Genoa, in 1516. A statuette of the Virgin and Child; Flemish, late sixteenth century. A carved horn box, medallion portrait of Victor Amadeus III., of Sardinia.

Terra-cotta figure of Neptune, a design for a fountain, probably Florentine work of the sixteenth century, presented by Baron Ferdinand Rothschild.

A pear-wood mould for making relief portraits of George Duke of Saxony, 1530-39, a work of unusual excellence; a cuirbouilli powder-flask, with a fleur-de-lis, sixteenth century; a casket of the same material of the seventeenth century and an engraved gourd.

Although numerically not in excess of the average the most valuable additions of any one year of the present century have been made to the Department of Coins and Medals. Altogether the additions amount to 1,492, of which 296 are gold and 881 silver. Among the British coins a few are described; one is a gold stater of Eppillus, a chief who ruled in Kent, son of Commius and brother of Tincommius and Verica. The only other specimen of this coin is in the collection of Sir John Evans. Another is a gold stater of Epaticcus, son of Tasciovanus and brother of Cunobelinus (Cymbeline), king of the central districts of Britain. Various other rare coins of Tasciovanus, Cunobelinus and of the Iceni have been acquired. One of the pennies bears the name of Jaenberht, Archbishop of Canterbury, A.D. 766-90, on the obverse, and that of Offa on the reverse. It was during Jaenberht's episcopate that Kent was conquered by Offa, and it was by his authority that this archbishop was allowed to issue coins. There are also pennies issued between A.D. 793 and 914 by Archbishops Aethelheard, Wulfurd and Plegmund. Another Canterbury coin is of the reign of Eadweard II., A.D. 975-79. Numismatists may set more value on an unique coin of the highest historical importance, as it was struck in London in A.D. 872, when Halfdan held the City for a short time before his assumption of regal power in Northumbria. The monogram of the name of London on the reverse was afterwards copied on the coins of Alfred the Great.

Other British coins of more interest are a unique penny struck at Darenth, Kent, and another struck at York, having a view of the tower of the Minster, in the reign of Æthelstan, A.D. 925-40. A large series of coins of Cnut, Harold I., Harthacnut, Eadweard the Confessor and Harold II., and a penny of the last which was struck at Chelsea, being the only evidence of the existence of the mint, are also added. A half-crown and a shilling of the reign of Elizabeth show that "milling" was understood, if not practised, in that reign. The golden five-broad piece, known as the Juxon medal, has at last found a worthy asylum in the Museum.

Some of the Greek coins are remarkable for their beauty, others for their historic interest. A nummus of the town of Terina (B.C. 440-400) bears on the reverse an exquisite winged figure holding a wreath and a caduceus, and seated on an overturned amphora. One of the seven varieties of the Lysimachian gold stater is of rare beauty. A head of Apollo on a tetradrachm

of Chalcidice is of the highest art. On a stater from Cyrene (B.C. 431-321) is a quadriga driven by Nike and seen from the front. A splendid gold Syrian stater is of great value, both historical and numismatic, for it represents the statue of Zeus in the temple of Antioch, holding the golden Victory which Alexander Zebina (B.C. 128-123), when hard pressed for funds, melted down to coin into money for the payment of his army, "Jovis solidum ex auro signum Victoriae tolli jubet." A tetradrachm of Lacedæmon is also precious, first, on account of the portrait, the only one extant, of the famous tyrant Nabis, B.C. 206-192, and next on account of the reverse inscription, from which we learn a fact mentioned by no historian, viz. that Nabis assumed the title of king.

There is much else among the acquisitions in the departments which will repay attention, and in fact the British Museum becomes more and more attractive as time runs on, and regular visits to it are necessary on the part of all who desire to become acquainted with the branches of art which are represented by the collections.

DISINFECTING PROCESSES.

IN the section of Sanitary Science at the Leeds Congress a discussion on the subject of "Disinfection" was opened by Dr. Spottiswoode Cameron, medical officer of health for Leeds, who said he would try to point out the way in which they treated infectious diseases in Leeds, and he would state a few of the difficulties he had personally encountered, in the hope that those who followed would help him out of them. Medical officers had, generally speaking, to deal administratively with the subject of disinfection, but there was a large and increasing army of men who were able to deal in the laboratory with the processes which he and others had to put practically into force. Medical officers looked to such men for guidance in the selection of the agents they employed. They might roughly divide infectious diseases, with regard to which they employed disinfectants, into two classes. There were diseases, like smallpox and typhus, where the infection went from person to person in an epidemic form, and there were diseases, such as typhoid and probably cholera, where the germs were more localised, and were contained more or less in the secretions or excretions of the body. In diseases like typhus and smallpox it had always seemed to them there that the most important thing to attack was the clothing of the patient, and the same was the case with scarlet fever. They might disinfect clothes in two ways. They could reform them altogether by burning them up, and that was the line adopted during an outbreak of smallpox in some of the smaller districts of Yorkshire. But that was not, strictly speaking, disinfection. Fortunately they had an agent which was capable of absolutely destroying bacterial organisms, and that agent was heat. The question was how to apply it, and here they had been tremendously helped by the investigations of Koch and by the masterly exposition of the subject by Franklin Parsons in the report of the Local Government Board. They had also had the assistance of a man like Washington Lyon, who had invented a machine which to a large extent carried out the conditions they sought; but there were one or two little difficulties in the application of heat by means of steam, which they were in danger sometimes of overlooking. If they put the garment saturated with the poison of fever or smallpox into a chamber in which steam, developed from water, at a pressure of 10 or 15 lbs., was allowed freely to escape, there was no doubt that in, say, fifteen minutes the bacteria would be destroyed. But if they took the water away, and had only the steam, and if then, in order to be doubly secure, they superheated the steam, they ran the danger of producing no result whatever. Their very anxiety to do the thing thoroughly might lead to their doing nothing at all. The points they had therefore to consider were, first, the selection of their apparatus, and secondly, the way in which it was worked. He was not saying anything against Mr. Washington Lyon's excellent machine, but was urging that care should be taken not to superheat the steam. He need not enlarge on the necessity of using separate vans and staffs for the conveyance of the clothing to the disinfector, and for its removal respectively. Then, how were they to deal with infected houses? In Leeds they emptied the house, stripped it of its paper, and dealt with the walls in various ways according to circumstances. In some cases, where the walls were painted, they washed them with a weak solution of corrosive sublimate, and afterwards washed it off. The object was to get the original coating of the walls away and leave a perfectly clean coating. Then in a great many cases they put a pan of burning sulphur in the middle of the room and closed the windows and doors. The latter proceeding was a debateable one. He was not prepared to say it did any good, but he was quite certain it did no harm. The question was, Why did they do it? From the time of Homer it had been the practice to burn sulphur where a place was infected, and if they had not done so, it would have been supposed they had not read their Homer properly, and that was an accusation they would not

like to have brought against them. But the practice had this advantage. The sulphur created such a horrible smell that it induced the people to open their windows and doors freely. It was all very well for the inspectors to open the doors and windows, but in the absence of such an inducement to keep them open as that he had described, many people would close the doors and windows as soon as the inspector's back was turned. In the matter of personal disinfection the difficulty was the choice of material. In Leeds they used about the weakest disinfecting agent, namely, carbolic acid. He admitted it was a weak one, but they used a good deal of it. They used it for one reason, because they could get the acid, in its impure form, of guaranteed strength in phenols at a very low price, and they could ascertain it did possess this strength. There were other and more powerful disinfectants in the market—and some of them were said not to be poisonous—but his difficulty was this: how were they to test them, and to know that the material sold to them was of the strength of the sample submitted for examination? He did not mean to say that a manufacturer would knowingly palm an inferior article upon them—far from it—but how was a manufacturer to know himself that he was now sending out the same material that he had put on the market six months or two years ago? They would agree that there was a risk with the adoption of improved chemical processes, of the later material being less powerful in its germ-destroying properties than the original samples. In this matter he hoped bacteriologists would come to the rescue of medical officers, and enable them to test by some standard method the germ-destroying strength of the disinfectants they were using.

Professor Delépine, who followed, describing experiments on tuberculosis organisms, said the bacteria resisted exposure to sulphurous acid for a very considerable length of time, and without showing any loss of vitality. Even chlorine produced very little more effect on them. The use of hyper-chlorate was then suggested. No doubt chlorine in itself was a very powerful disinfectant, but it required the presence of moisture by combination. He advised the use of hyper-chloride of lime for the purposes of experiments. As it was, however, no use obtaining it in its pure state, they employed simple bleaching powder, and it was found that when it was kept in contact with a certain amount of water for a few hours an active hyper-chlorate was generated. On a weak solution being applied to walls impregnated with the tuberculosis germs, thorough disinfection was obtained in a few hours. An exposure of a few minutes was generally sufficient. These experiments led him to try the action of hyper-chlorates on other germs, and in every case it was effectual, a weak solution destroying the vitality of anthrax spores in a very brief period.

Mr. Henry Kenwood, medical officer of health at Stoke Newington, read a paper on the "Disinfection of Rooms by Formic Aldehyde Vapours." He described a lamp which he had had made for the purpose of generating the vapour, and gave a number of conclusions as to the relative efficiency and advantages of different methods of charging rooms with the vapours.

THE ATMOSPHERE OF LEEDS.

A PAPER by Messrs. Henry Crowther and Richard Reynolds, entitled "A Decade of Sunshine Observations," was read at the Sanitary Congress. They said that ten years ago the Leeds Philosophical and Literary Society added daily records of sunshine to its meteorological observations. It was obvious that the area of the city would include localities varying in the amount of sunshine which they enjoyed, and the following three stations were selected for observations:—(1) The Society's museum, situate in the centre of the city, elevation above the sea 145 feet; (2) Woodhouse Cliff, one and a half miles north-west from the centre of the city, elevation 330 feet, residential suburb; (3) Lawnswood Cemetery, Adel, four miles north-west from the centre of the city, elevation 475 feet, on the fringe of the city. During the years from 1887 to 1896 the sunshine registered was—At the Museum 10,140 hours, at Woodhouse Cliff 12,250 hours, and at Adel 13,512 hours. The deficiency at the Museum from Adel was a mean percentage of 25·4 for the ten years, the deficiency at Woodhouse Cliff from Adel being 9·4 per cent. The recording station at Adel was selected under the belief that the sunshine there was but little obstructed by the smoke of the city, and that Adel consequently represented the type of the normal atmosphere of the locality. Woodhouse Cliff was about half-way between Adel and the Museum, and its records of sunshine were nearly always intermediate between those of the two other stations. When the observations had been continued for a year or two they were recast in order to distinguish any differences between the records of Sundays and working days. The mean for the ten years was as follows:—Museum—Sundays, 169 hours; other days, 140 hours. Woodhouse Cliff—Sundays, 193 hours; other days, 171 hours. Adel—Sundays, 203 hours; other days, 191 hours. It was thus seen that on days other

than Sundays the normal sunshine at Adel lost 26·7 per cent. at the Museum, and 10·5 per cent. at the intermediate station of Woodhouse Cliff. On Sundays the loss was less, being 16·8 per cent. at the Museum, and 4 per cent. at Woodhouse Cliff. Truly, here was a reason for calling the first day of the week Sunday. Some would be likely to feel surprise that the practical cessation of manufacturing smoke for above thirty-six hours should not produce a greater improvement in the sunshine of the central station. But, putting aside any preconceived ideas, they must accept the fact that the agencies still operative on Sundays were responsible for 16·8 per cent. of the diminished sunshine. These were, firstly, the natural haze of a valley station with its river; and, secondly, and chiefly, the products of the burning of coal for domestic purposes. They would recognise that the producer of manufacturing smoke had in a large number of cases brought science to his aid in diminishing the amount of unconsumed carbon which he threw into the atmosphere, and that he reaped the reward of this good deed. On the other hand, the householder, with his tens of thousands of fireplaces, had had little done for him in guidance towards the same laudable object. The use of gas as a fuel for domestic purposes might be extended in the future. But much was possible in the arrangements for burning coal for domestic use, and Leeds was justly proud of the contribution to solving the problem made by Mr. T. Pridgin Teale in the fireplaces that bore his name. Accompanying the paper were a number of tables, one of which showed the total amount of sunshine for each day of the week during the ten years. Over-refinement in theorising upon these data, said the authors of the paper, was needless, but the partial improvement of the central station on Saturdays was clear, as was the case on Thursdays, probably due to the Wednesday half-holiday of those tradespeople who must attend to their businesses on the Saturday. It was evident that if the people had more holiday there would be more sunshine. The records of sunshine already given were the results of more than 10,000 observations, and their interest to many would be prospective rather than retrospective. Were they improving or deteriorating? If the same influences operated in the same way, they ought to find that the increase of population and of manufactories during the period would have the effect of making worse what was bad before. The population of Leeds in 1887 might be taken as about 350,000; in 1896 it was assumed to be 400,000. If the atmosphere held its own against this increasing stress and strain it was something to the good. The deficiency at the Museum as compared with Adel for the five periods of two years each was as follows:—1887-88, 24 per cent.; 1889-90, 33·4 per cent.; 1891-92, 30·5 per cent.; 1893-94, 20 per cent.; and 1895-96, 19·3 per cent., or a mean deficiency on ten years of 25·4 per cent. The answer might be considered satisfactory and encouraging. The last two-year period placed the atmosphere of the central station in a better position than any of the preceding two-year periods, and this had occurred in spite of the steady increase of both population and buildings. Whilst regarding these results as encouraging, they felt that their legitimate application was as a stimulus to further endeavours to attain the blessing of a purer atmosphere.

Dr. J. B. Cohen, lecturer in organic chemistry at the Yorkshire College, read a paper on "Air Pollution in Towns." Pure water and wholesome food, he said, had so long been recognised as essential to the general health of the community that they now claimed the strictest supervision on the part of every municipal body. It seemed remarkable therefore that the air, the consumption of which exceeded in weight five times that of liquid and solid food, should be subjected to no more searching test than that furnished by the daily meteorological record, which gave no information as to its purity at all. Yet it was much more important to know the extent of atmospheric pollution than its temperature, pressure, dampness or the direction of its currents, however valuable they might be. For example, it was of more vital interest to ascertain that the number of bacteria on a certain day in February last year in a certain volume of air (5½ litres) was *nil* on Woodhouse Moor and from 5 to 20 in the close courts and slums of the centre of the city; that on another day in July it was 1 on Woodhouse Moor and from 4 to 35 in the same courts in the city; and that on another day in September it was again *nil* on the Moor and from 14 to 96 in the courts. If a daily record was kept of the bacterial condition of the air, in addition to its temperature and pressure, they would have some direct evidence of its purity in different parts of the town, and, granted that the experience of others confirmed his own, they would find that the bacterial conditions would be a fair test of the sanitary condition of the places in question. He had no hesitation in saying that the courts which furnished the higher bacterial numbers should cease to exist in their present condition. Smoke was another source of pollution of a town atmosphere. It seemed to be very little affected by the critical remarks which were constantly being levelled at it. Whether smoke was a necessary evil or not, whether it arose mainly from factory or

domestic chimneys, did not affect the fact that it was a considerable evil. In the atmosphere of Leeds something like 8 cwt. of soot was constantly floating, which was the permanent representation of the 20 tons daily discharged into the air. He doubted whether any one would care to dispute that health was affected by a smoky atmosphere. No one could dispute the fact that the discomfort and dirt arising from the smoke were very great. The only part of the damage which could be measured was the extra outlay for washing. But the amount of the washing bill was an insignificant item compared with the lowered vitality and moral tone of the community. The problems they had to face were how to purify the atmosphere from its bacterial impurities which arose from overcrowding and insufficient sanitary accommodation and from the smoke. Those problems, like that of river purification, were rendered particularly complex, not from any inherent difficulties, but from the fact that long habit and a deplorable want of foresight had shackled them with "vested interests." To begin with, boiler chimneys, which were accountable for much smoke, required some more rigid and intelligent system of inspection. It had been demonstrated that a boiler chimney need not smoke. The present system of inspection, which placed the duty in the hands of the municipal authority, was doomed to failure. Smoke inspectors should be empowered to advise, and the adviser must be a man who knew his business. The domestic hearth was more difficult to deal with. If gas was charged at a rate more nearly approaching its cost, its consumption for heating purposes would be more general. From a careful study of the subject he felt in a position to state that gas fires judiciously used were thoroughly healthy and efficient heating appliances. In conclusion, Dr. Cohen said he wished to claim for air the same attention and rigorous supervision which was now bestowed upon food and water. Under the shadow of a smoke cloud in the closely packed courts which fringed the open drain that custom taught them to call a river, neither a clean atmosphere nor a clean anything else could ever exist.

DUNDEE INSTITUTE OF ARCHITECTURE.

SEVERAL members of the Institute visited Edinburgh on the 18th inst., and with a party representing the Architectural Association of the latter city, drove to a number of places of interest. The McEwan Hall was first visited, and there Mr. Clarke, inspector of works, described the features of the building. The party then proceeded to Blackford Observatory, where the members were received by Professor Copeland and Mr. Ramsay, his assistant. Mr. W. W. Robertson described the circumstances connected with the erection of the observatory, and the Professor and his assistant were awarded a vote of thanks for their descriptions of the contents of the building. Craigmillar Castle was then visited, Mr. Thomas Ross, the president of the Edinburgh Association, conducting the party over the castle and explaining its history. The party proceeded by way of the Queen's Drive to Holyrood, but time did not permit of a visit to the Palace.

ANCIENT RUIN IN MATABELELAND.

MESSRS. T. G. NEALE and George Johnson returned some few days ago from an expedition ranging over a wide stretch of country, which they undertook more for the purpose of exploring and locating undiscovered ruins, than of working those already "pegged out" by the company. The country traversed, says the *Buluwayo Chronicle*, chiefly in the north, embraced the lower Shangani, the lower Umvumque, the lower Sebakwe, the lower Gwelo, and the lower Inyati districts, most of these being unexplored before in search of ruins. In all Messrs. Neale and Johnson located more than eighty-five new ruins, and one of them appears to be unique and of quite exceptional interest from an archaeological point of view, as it differs entirely from any known to the discoverers, and they speak from a knowledge of upwards of 200. In shape alone this ruin resembles the celebrated Zimbabwe ruins, but the walls, which are perfectly intact, about 15 inches thick and 15 feet high, seem to be made in a different way and of a new form of masonry. They do not consist of either bricks or tiles, but appear in one solid piece of glazed material, as if burned after they were erected in position. If this impression of the discoverers is borne out on re-examination, then we have a new method and material of building hitherto alien to the country and probably to be referred to a different race of people from the ordinary ancient workers. The ruin shows the remains of a well-shaped doorway and also, which is an unusual feature, an aperture about 4 feet high and 3½ feet wide placed some distance up the wall and which was without doubt a window. Altogether, the ruins are a proof that the original inhabitants were a people who had attained a high standard of excellence in the art of building. Some fine gold was found in the debris, but Messrs. Neale and Johnson were

unable to properly explore the ruin owing to its distance from water. The tradition that there exists an extraordinary ruin in the country, the building of which still has in position massive stone doors, and which is regarded with superstition by the few natives who know of it and whose doors have never been opened, Messrs. Neale and Johnson heard sufficient evidence of to regard as an actual fact, but owing to its being situated in a very unhealthy district they have had to postpone visiting it for the present. The explorers, it may be worth stating, found the natives perfectly submissive, and Somabula, with whom they had some conversation, said the idea of a rising was over.

READING NEW POST OFFICE.

THE postal needs of Reading having outgrown the accommodation, a new building has been erected in Blagrove Street, near the Board School offices, and adjoining the stable entrance of the Queen's Hotel, and is thus as near as possible to the railway stations—a great advantage, seeing that the main object of its construction is to free the headquarters of the enormous parcel traffic and the letter-sorting. Henceforth all the carts and letter and parcel carriers will start from the new office, and the traffic of the up and down road coaches and also from the stations will go direct through the new premises.

The new building is carried out in local red brick, with Bath stone dressings and rough grey granite bases for the main columns, with glazed bricks running shoulder high. Inside the utmost has been made of the site, and a notable feature is the ample daylight afforded to every part. For night work what appears to be almost an excessive number of gas pendants and brackets have been placed. An excellent feature is the heating, which is fed by a boiler in the basement. The ground floor is occupied by the large rooms required by the parcels and letter sorters, who number over 100, and the postmaster's comfortable private office. The arrangement of the basement includes a fine storage room, fitted with a lift for raising and lowering baskets, &c., commodious and well-lighted kitchens for clerks and also for letter-carriers, each provided with roomy and well-fitted ranges and other appliances, and excellent lavatories. The foundations and also the walls are of such strength that as the town and its business grow an upper storey can be added at will.

The work has been very satisfactorily carried out from plans prepared by the Office of Works by Mr. Tucker, of Reading, the contractor, under the careful supervision of Mr. Askew, of the Office of Works.

BIRMINGHAM NEW TELEPHONE EXCHANGE.

TO meet the rapidly increasing demands on the means of telephonic communication in Birmingham it has been expedient, indeed necessary, to erect a new exchange of imposing dimensions at the corner of Newhall and Edmund Streets. The site has an area of about 830 square yards, with a frontage to Edmund Street of about 35 yards and to Newhall Street of about 25 yards. The building, which is of four storeys (basement, ground floor, and first and second floors), is in a modern Renaissance style, and is executed in Ruabon red brick and terra-cotta. The façade is divided by bold piers, with highly decorative treatment of the upper portion, which consists of arches and gables ornamented with a profusion of moulded terra-cotta. A number of the windows, including those at the corner, stand forward as bold bays from a deeply-arched recess, and are set off with terra-cotta balustrades. The upper portions of the piers are embellished with a flat fretwork design in sunk panels, which contrasts with the high relief floral embellishments of the arches and spandrels. At the top of the façade there is an open balustrade of terra-cotta, broken by the gables and by small pinnacles. Some of the principal gables are decorated with large floral medallions, and are surmounted by an open tracery, while others are pierced by the chimneys, which, owing to the internal arrangements, were required to be carried up the outer walls of the structure. The chimneys have, therefore, been made a portion of the decorative scheme. The main entrance to the building is through a wide arched doorway, guarded by elaborate wrought-iron gates, in Newhall Street. In the basement, which is practically on a level with Edmund Street, apartments have been fitted up for the caretaker, the local staff and the local manager. There is, moreover, a call office, which, when opened, will be a great convenience to the public; and adequate accommodation has been provided for the carpenters, the wayleave men, the faultsmen and fitters, the electrical inspectors and the engineering inspectors. Access to these rooms will be obtained from an entrance in Edmund Street, an entrance which will also be used by the operators. Upon the first floor Mr. Coleman and Mr. Cotterill have their offices, ample provision being made for the district manager's staff, and for all who have business to trans-

act in that department. The second floor is mainly devoted to the "exchange" or switch-room, an extensive apartment 104 feet in length and 40 feet in width. As, however, the whole of the room will not be required at present a portion has been partitioned off as a dining and retiring room for the lady operators. Adjoining the switch-room is the test-room, and beyond this are the cable shaft and a useful lift, while adequate cloak-room and lavatory accommodation has been provided, together with a private staircase leading to the entrance in Edmund Street. A kitchen and scullery have been fitted up, so that the operators may have their meals on the premises on the co-operative principle. The building has been made fire-proof; the rooms are to be illuminated by electricity; they are admirably lighted, well ventilated and warmed.

The building, which was designed by Messrs. Martin & Chamberlain, and erected by Mr. Thomas Rowbotham, is now complete, and forms an important addition to the group of handsome structures in Edmund Street and Newhall Street.

TESSERÆ.

The Cathedral of Verona.

IN regard to the cathedral of Verona antiquaries have much disputed. It was certainly completed by A.D. 806, and the epitaph to an archdeacon, Pacificus (who founded seven churches in the city, and was himself a skilful artist in wood, stone and metal), tells that he ordered repairs thirty years after the death of Charlemagne, namely, 844. The apse and lateral walls near the chancel may be of the original structure, otherwise this grand and characteristic building cannot be referred, in any part, to date earlier than the twelfth century. A genuine and still intact specimen of the ninth century is the crypt of St. Zeno, founded to contain the tomb of that saintly Bishop of Verona, by Pepin, King of Italy. With low semicircular vault, supported by forty columns irregular in their shafts and capitals, this sole remnant of the original church embodies an idea yet new in Italian architecture; and a mysterious gloom, a brooding presence of antiquity, give most impressive effect to those dim aisles and crowded pillars under its low-arched roof. As to the architects of this period little is known, except that the Comasque builders still retained the pre-eminence and privileges they had enjoyed under the Longobard kings, confirmed to them by Charlemagne, with exemption from all local statutes and burdens; and like favour being extended towards them by the popes, they were allowed to fix their own wages, while practitioners not of their society were forbidden to enter into rivalry against them.

Giotto.

If, as is asserted, the Middle Ages centre in Dante, they centre also in Giotto, his friend and companion, scarcely his inferior in power. He is the first of the universal artists, who were perhaps goldsmiths, architects, engineers, engravers, sculptors and painters in all vehicles, who could design cathedrals and paint frescoes on their own walls, like Leonardo, or Dürer, or Michel Angelo. Cimabue was nobly born and attained notice and influence early. His advance in all before him is marked. But the best thing he did was to discover, and value and educate to surpass himself the shepherd's boy whom he found one day drawing a ram's head on a tile in the hill pastures that look down on Valdarno. Giotto's chief works are at Padua and Assisi; some remain at Rome, and at Ravenna one of the most beautiful contrasts in the world is in St. Giovanni Evangelista, where one of the chapels is ornamented like the Arena at Padua with Giotto's blue backgrounds and lovely faces, and the solemn mosaics of the roof are all in Syrian purple and sea green. His greatest architectural monument is the Campanile at Florence; the Arena Chapel at Padua gives an idea of the universality of his powers. He was very ugly or irregular of feature, and seems to have enjoyed the circumstance greatly. He never left off making jokes, great and small. A century of Giotteschi, or disciples of his, succeeded him before any one again reached the mark he had made. Orcagna is the next to do so. As a colourist, to this day no man has excelled or can excel the qualities of the blonde faces one sees at Padua and Ravenna. His blues, warm whites, golden tints on hair and ornament, with many subtle uses of Indian red and other pigments and various greens, are all matter of professional study to this day.

James Prinsep.

Although he lived for no more than forty-one years, James Prinsep must always be classed among the earliest and most enthusiastic of English archaeologists in India. His versatility was remarkable. At his death in 1840 he was assay master in the Mint at Calcutta, where he succeeded Professor Wilson in 1833. He was an excellent assayist and analytical chemist, and well acquainted with almost every department of physical science; a draughtsman, an engraver, an architect and an

engineer, and one of the most profound and learned orientalists of his age. In 1828 he communicated to the Royal Society a paper on the "Measurement of High Temperatures," in which he described, amongst other ingenious contrivances for ascertaining the order, though not the degree, of high temperatures, an air thermometer applicable for this purpose, and determined by means of it, probably much more accurately than heretofore, the temperature at which silver enters into fusion. His activity while resident at Benares has more the air of romance than reality. He designed and built a mint and other edifices, he repaired the minarets of the great mosque of Aurengzebe, which threatened destruction to the neighbouring houses; he drained the city and made a statistical survey of it, and illustrated by his own beautiful drawings and lithographs the most remarkable objects which the city and its neighbourhood contains; he made a series of experimental researches on the depression of the wet-bulb hygrometer; he determined from his own experiments the values of the principal coins of the East, and formed tables of Indian metrology and numismatics, and of the chronology of the Indian systems and of the genealogies of Indian dynasties, which possess the highest authority and value. When transferred to Calcutta he became the projector and editor of the "Journal of the Asiatic Society of Bengal," a very voluminous publication, to which he contributed more than 100 articles on a vast variety of subjects, but more particularly on Indian coins and Indian palæography. He first succeeded in deciphering the legends which appear on the reverses of the Greek Bactrian coins, on the ancient coins of Surat and on those of the Hindoo princes of Lahore and their Mohammedan successors and formed alphabets of them by which they can now be readily perused. He traced the varieties of the Devanagari alphabet of Sanscrit on the temples and columns of Upper India to a date anterior to the third century before Christ, and was enabled to read on the rocks of Cuttock and Gujarat the names of Antiochus and Ptolemy and the record of the intercourse of an Indian monarch with the neighbouring princes of Persia and Egypt; he ascertained that, at the period of Alexander's conquests, India was under the sway of Buddhist sovereigns and Buddhist institutions, and that the earliest monarchs of India were not associated with a Brahminical creed or dynasty. These discoveries which throw a perfectly new and unexpected light upon Indian history and chronology and which furnish, in fact, a satisfactory outline of the history of India from the invasion of Alexander to that of Mohammed Ghori, a period of fifteen centuries, are only second in interest and importance, and, we may add likewise, in difficulty, to those of Champollion with respect to the succession of dynasties in ancient Egypt. These severe and incessant labours in the enervating climate of India, though borne for many years with little apparent inconvenience or effect, finally undermined his constitution, and he was at last compelled to relinquish all his occupations and to seek for the restoration of his health in rest and a change of scene. He arrived in England, but the powers both of his body and mind seem to have been altogether worn out and exhausted, and he only lingered for a few months among his countrymen.

Italian Villas.

There are in Italy, and particularly in Rome, a vast number of charming habitations which, under the most simple forms, bear the stamp of a refined taste, and prove to the attentive architect that credit may be obtained in bestowing care upon the most humble production, and this reflection should be a consolation to those who profess an art, in which a very rare combination of fortunate circumstances can alone furnish the opportunity of being entrusted with the execution of great works. If such men as Bramante, Vignola, Palladio, Sangallo and Peruzzi have discovered in antiquity models for the buildings which they have erected, if these successful practitioners of the art have known how to apply even in their slightest works such admirable distribution, so agreeable an arrangement of parts, that refinement, too, which constitutes the great charm of their works, why should we not when similarly circumstanced endeavour to emulate them? It is with the liveliest feelings of interest that we behold the great artists whom we have just mentioned bestowing upon the simple habitation of the citizen the same degree of spirit, care and refinement of taste which they have manifested in the erection of temples and sumptuous edifices. They have embellished everything, and their pencils have thrown a charm over the modest retreat of the philosopher in no way inferior to that of the palace of the prince. Penetrated with the importance of their art, they have taught us how to rid it of the prejudices of routine and the extravagances of caprice, they have taught us to take nature for our guide and her imitators for our models, and have in some measure restored architecture in bringing back the art to its true intent. We ever perceive them skilfully availing themselves of the peculiarities of the site, and fulfilling with admirable address the various requisites of the design. Manifesting ingenuity even in the minutest detail, they never appear to have worked at random; they

seem to have felt that nothing could be considered beautiful in architecture which was not authorised by some recognised utility; that true genius did not consist, as some moderns have thought, in waging war with reason to create novelties and produce bizarre effects, but rather in the art of successfully applying the means which nature points out, which the site furnishes and which the work in hand demands. It is in thus fulfilling these conditions that they have succeeded in imparting to each work its proper character, and it is thus that, ever guided by good taste, they have been enabled to make us lose sight even of the very difficulties they had to combat. Indeed, the greater part of their works bear the impress of that rare simplicity which, like some revealed truth, always appears so intelligible to those to whom it is disclosed. Their buildings are picturesque without being confused, possess symmetry but are not monotonous, and being carefully executed frequently unite, to express ourselves in terms of art, the freedom of the sketch with the precision of the more finished performance. We contemplate, with unceasing admiration, the ingenuity displayed in the application of the various materials, such as marble, stone, brick, wood, &c., few examples of which are to be found elsewhere.

Greek and Christian Art.

To an artist, merely as a man who delights in seeing and recording natural beauty, the great difference between Greek and modern Anglo-Christian life would be that art and nature met in Greek life, and do not meet in ours. The Greek saw enough of beauty to know how much it is worth. Our life, artistically speaking, is a continual struggle against ugliness. An Athenian's life is described, not untruly, as a continual, rejoicing, unreflective embrace of beauty. Ugliness he had, and absurdities, and his eye was quick to note them. Aristophanes's sketch of the fat man in the torch-races, blown and incapable, may perhaps be remembered by some of us, with many others (as the poet, the sycophant and the messenger gods in the comedy of the "Birds"). But every citizen of Athens lived continually out of doors—"for ever delicately marching through transparent liquid air"—in the finest atmosphere on earth. He saw Hymettus and Pentelicus, and Ægina and Salamis in distance, though it is true he considered Ægina "an eyesore." He saw Athena and Theseus, the forms of his gods and heroes, all around him, and he saw daily the living frames of strength and beauty from which the great statues were conceived. The Greek was his own model and type; he idealised man because he really knew the beauty of man. He thought the beginning and end of art was to set forth or represent his gods and himself, which was well; and he thought his gods must first be like himself, which was not so well. He surrounded himself and his heroes with beauty, subject and auxiliary to his own beauty, exactly as the Goth carved flowers round the niches which held the statues of his saints. He studied animals, the horse in particular, as his companions (one cannot attach much importance to Myron's celebrated cow), considering himself the fairest of all animals. Accordingly he seized on animal character with success when he tried. Greece, as Mr. Maurice said long ago, and as every one says now, represents to us the power of the man, of the human soul unconscious of the Divine teaching which is yet with him—not taught to look beyond himself—and contented with the glorious things within his reach, and poetry and plastic art were the most glorious of these things. His art, then, was the natural expression of an excusable self-admiration or self-respect.

Etruscan Art.

Strength, no less than delicacy and grace, were among the qualities that distinguished the arts of the Etruscan nation, who cultivated with success all the arts that embellish life. The minds that could conceive and the hands that could execute the admirable designs on the Etruscan vase with that wondrous precision, delicacy and beauty, were not thereby rendered incapable of constructing great architectural masses—the Cloacæ or the Cyclopean wall. Volterra, Cortona and other cities speak through their many-sided stones. The Cloaca Maxima is in these great days of constructive science not deemed a mean exhibition of architectural intelligence; while their cavern-hewn sepulchres, with their monolith portals, are additional evidences of that universal feeling pervading the human breast, of perpetuating the memory of the dead through the agency of art. No fancy can hope to estimate and no powers describe the extent of their artistic acquirements. Mystic mirrors, whose purposes have excited the conjecture of the antiquary, testify to the engraver's talent; no object and no purpose were beneath the attention of the artist, and all were alike elevated into importance by the skill with which he endowed them. The subjects often appear of the most inconsistent character as decorations for the chambers of the departed. Scenes of festivity and mirth, the Symposium and the Dance, are intended to represent the enjoyment of the soul in another state of existence; and their only idea of its future happiness was through the means which during life the deceased person enjoyed. For as the materiality of the soul constituted a con-

dition of belief, a reference to their previous modes of life and a beatification of it expressed their idea of a future state. Nor were there wanting more serious and gloomy views, as is exemplified by the Medusæ and monsters, with demons, genii, furies and the whole tribe of revengeful personifications. These terrific agencies are contrasted by some of the most exquisite combinations of animal and vegetable forms, which, if we have now lost their mystic significance, remain as examples for decorative purposes worthy of our emulation. Far distant epochs, different tastes and ideas of pecuniary cost, may explain varieties of style. Thus, while Veii affords specimens of animal-painting of rude but archaic interest, *The Chamber of the Boar-Hunt at Corneto*, from its incontestably genuine Hellenic design, is allowed to be one of the most instructive examples of pictorial art in Etruria. Though they have existed on some of the tombs for more than 2,000 years, the colours on the stucco are wonderfully brilliant, and "as fresh," says Mr. Dennis, "as when first laid on." Instances might be multiplied, but it is sufficient to add that through the instrumentality of the art of painting (though we know so little of their language) we are able to learn more of the Etruscan religious belief, their poetical views of the transit of souls into unseen worlds, and their various conditions when arrived there, than from any other source.

Palladio.

Palladio is to be admired for his daring and originality, for his starting up in the midst of error, when art began to grow fanciful and trifling, for his care in shunning the evils of his time and borrowing from the beauties of the past. To test Palladio too severely by the models of antiquity is unfair and impossible, because the modification and change necessary to the structure destroy the parallel. To test, too, Palladio by the mean experiment of subordinate variations is ungenerous, because Roman architecture itself imposed with its parts much more than it charmed by its minutiae. Palladio's great achievement, too, was the adaptation of the orders to domestic habitations in which antiquity became subservient, and in which the whole array of detail was subsidiary. One great reason why many condemn Palladio is because he leads them occasionally into error, and too loosely scatters his decoration. Tell them of a palace or a church designed by him, and they will tell you of an incorrect member or a broken tympanum; or speak to them of originality, and they will shout for a precedent. The source of beauty, however, may have been misunderstood, and the elements of grandeur may have been mistaken. Beauty belongs to no particular form, but to the harmony of relations blending in that form, and the same principles which adjusted the lovely outlines of antiquity may enter into the composition of larger and grander objects.

GENERAL.

A Memorial of the late Bishop of Wakefield is to be erected in St. Mark's Church, Noel Park, N.

Turner's Cottage, Sandycombe Lodge, Twickenham, was sold on Tuesday for 1,200*l.*, or about eighteen years' purchase at present rental.

A Committee, consisting of Messrs. Anderson, M'Laren, Page and Stewart, has been appointed to make arrangements for the formation of an Architectural Association in Perth.

M. Blondel, one of the ablest of the Paris architects, died last week in his seventy-sixth year. Among his late works is the Bourse du Commerce.

A Stained-glass Window, the subject of which is "Christ blessing little Children," has recently been inserted in Emmanuel Church, Lockwood, Huddersfield, by Miss Shaw, of Torquay, in memory of her late father and mother, Mr. and Mrs. Bentley Shaw, of Lockwood.

St. Clement's Church, Liverpool, was reopened on Sunday, the 19th inst. The ventilating and heating apparatus has been renewed; walls painted warm stone colour, the pews, woodwork and fittings have had the old paint burnt off and been repainted, grained (light oak) and varnished; pillars painted and finished in red granite with suitable gold capitals and bases; and the body of the church has been fitted with incandescent light.

Mr. George Carrick, a member of the firm of Welchman, Carrick & Jackson, solicitors, of Wisbech, Cambridgeshire, has just been elected town clerk of that borough. Mr. Carrick is the eldest son of the late Mr. Joseph Carrick, of Wigton, and commenced practice in Wisbech about twenty years ago.

A Proposal is being considered to establish at Swansea, as a great manufacturing centre, a branch university college, in association with either Aberystwyth or Cardiff, as the Newcastle College is associated with Durham. The suggestion is that scientific and technical courses might be taken at Swansea in preparation for the Welsh University degree.

The next Ordinary Meeting of the Society of Engineers, will be held at the Royal United Service Institution, Whitehall, on Monday, October 4, when a paper will be read entitled "Filter Presses for Sewage Sludge," by Mr. James Croll.

The Architect.

THE WEEK.

CONTRACTS for repairing footways in the City are not desirable trusts unless a very liberal price is allowed. There are crowds always in motion who use strong language if particles of stone are in circulation and who no less resent screens, although put up for their protection. The police have to be wary, for the complaint of a passer-by who looked too curiously at the operations and believed he was touched by a fragment of flagging would be followed by official reprimands. Messrs. MOWLEM & Co. have had a long experience of the difficulties and are painstaking in order to satisfy the public and police as well as the Commissioners of Sewers. It is rarely they are summoned, but some months ago they were compelled to appear in the Summons Court, when the case was dismissed. This week they were again summoned because while repairing a flagstone in Wood Street they had not set up a screen. It appears the screen had been standing for hours, but when the repairs were nearly finished the protection was laid low in order to make it unnecessary for the frequenters of the street to use an abundance of objurgations. But a screen must be kept upright regardless of strong language, and, while complimenting the firm on their efforts to insure the safety of the citizens, the alderman inflicted fines. It is difficult to please all parties in London, and in this case the Commissioners of Sewers should pay the amount levied.

DURING several years the lady chapel of Gloucester Cathedral has been closed, but it was reopened on Wednesday after reparation. It is one of the latest parts of the cathedral, as it was erected between A.D. 1472 and 1498, while there are other parts of the building which date from A.D. 1089. Much skill is seen in the planning, for the chapel does not interfere with the light of the large window in the choir, which, in spite of the ungraceful figures, is most effective. The lady chapel was originally splendid in its appearance. In style it resembles the choir. The present chapel appears to have taken the place of one founded in the thirteenth century by RALPH DE WYLINGTON, who gave a rent for the support of two priests, who were to celebrate Divine service in perpetuity. FOSBROOKE gives a copy of an agreement which was entered into with RALPH DE WYLINGTON respecting the two priests. They were to receive a salary of two marks and a half yearly, with eighteen pennies yearly for cheese and candles, two monk's loaves, a knight's loaf, three gallons of convent beer and one of second beer, three dishes of the better broth of the convent, two messes of flesh, and they were to have the use of vessels from the bakehouse. They were to dwell in the abbey in a lodging provided by RALPH. The document is curious as a revelation of the treatment of clerics who were not members of a monastery. Beneath the east end of the lady chapel is a passage which was intended as a means of communication between the land on the north and south side.

THE Brighton School Board have investigated the subject of payment to the standing surveyor, and information on the subject has been sought and obtained from a great many school boards throughout the country. It appears that in some cases the surveyor is paid by fees, and in others partly by fees and partly by a fixed salary. In Brighton it has hitherto been the custom to pay the surveyor entirely by fees; but seeing that the number of schools has largely increased of late years, and that the amount paid to the surveyor for the supervision of repairs has also grown considerably, the committee are of opinion that the time has arrived when a change may with advantage be made. The following figures show the sums which have been annually paid to the surveyor during the last six years for the supervision of general repairs and small alterations and additions carried out at the various schools:—1891, 114*l.* 7*s.*; 1892 and 1893, 231*l.* 16*s.* 3*d.*; 1894, 81*l.* 0*s.* 11*d.*; 1895, 256*l.* 2*s.* 6*d.*; 1896, 243*l.* 15*s.* 8*d.* For all new schools and important enlargements for which a loan has been obtained it has been the custom to pay a uniform commission of 5 per cent. for the preparation of the plans, &c., and the super-

vision of the work; whilst 2½ per cent. has been paid for the preparation of the quantities. A fee of about 10*l.* 10*s.* or 12*l.* 12*s.* has also been paid for extra plans provided for the Education Department and the Town Council. In the future it is proposed to continue the commission at the rate of 5 per cent. for all new work, but such commission is to include the preparation of all plans required. It is also proposed to reduce the commission on the quantities from 2½ to 1½ per cent. As to the supervision of general repairs, with regard to which there has been no fixed rate of commission, and the charge has been fixed on the basis of the time occupied, the committee think it will be an advantage that the surveyor's remuneration for these duties should be by a fixed salary, and they propose that in future a salary of 125*l.* should be paid to the surveyor for the preparation of plans, and the supervision of all works where the cost of any single job shall not exceed 50*l.* This salary will include attendance at committees, &c. For all works which may cost more than 50*l.* a commission of 5 per cent. will be given. It is estimated that the amount paid to the surveyor for the supervision of repairs, &c., including the salary of 125*l.*, will be about 175*l.* per annum. The anticipated saving will not be more than 50*l.* a year, but occupation has been found for the sites and works committee in the inquiry.

WE have lately noticed some cases in which tenders were allowed to be withdrawn or revised. It appears that in the United States the subject is now receiving attention. The *American Architect*, referring to one case, says:—A certain amount of discontent has been expressed at a decision of the supervising architect of the Treasury Department in regard to the award of the contract for the new public building at Paterson, N.J. The bids for the building were publicly opened August 10, and that of Mr. C. A. MOSES, of Chicago, was found to be more than thirty thousand dollars less than any other. Mr. MOSES was, apparently, led by this discovery to revise his figures, and ascertained, to his own satisfaction and that of the supervising architect, that he had made mistakes in his calculations. He was, in consideration of this, allowed to withdraw his bid and the certified check which he had deposited as security for entering into a proper contract in accordance with his bid; and all the bids were rejected, and a call for new bids issued. The consequence of all this is, as the other bidders contend, that while Mr. MOSES has reason to congratulate himself on the ruling of the supervising architect, by which he was saved from losing a large sum of money through a clerical error, the others, who were careful enough not to make mistakes, find that they have gone to the trouble and expense of making their estimates for nothing, and that, in addition to this, all their tenders have been made public, so that they are at a disadvantage in estimating a second time. They think, naturally enough, that if Mr. MOSES were allowed to withdraw his tender that of the next lowest bidder should have been accepted. It is probable that the law, which regulates very strictly every detail of the award of contracts for public buildings, would not permit this to be done; so that the rejection of all the bids was the only way in which the supervising architect could relieve the Government from the odium of taking advantage of a mistake, to the injury of a citizen; but the other bidders are certainly right in feeling that they have something to complain of. It is said that the supervising architect has given notice that, hereafter, bidders who withdraw their tenders in this way will forfeit their certified checks; and this is certainly no more than justice.

ALTHOUGH very few know it, it is a fact that the Pension Office in Washington is the largest brick building in the world. It has been subjected to much criticism, but it can stand it, for as time passes along there are many things observed that escaped notice when it was newer. In all there are over 10,000,000 bricks in the building. General MEIGS took liberties with bricks that no other architect had ever attempted. He not only used them exclusively for the structure, but he used them in constructing the stairs throughout the building. In the matter of stair building bricks have often been used for the riser, but the step has always been of iron, wood, slate or stone.

FRENCH CRITICISM OF MR. RUSKIN.—II.

BY A CORRESPONDENT.

BETWEEN 1860, when M. MILSAND endeavoured to reveal Mr. RUSKIN to Frenchmen, and the present time, when M. ROBERT DE LA SIZERANNE has attempted a similar task, French criticism has undergone many changes. The importance attached to heredity has revived SAINTE-BEUVE's process of seeking physiological causes for a writer's peculiarities by inquiring into the character of himself and his ancestors. Evolution has also exercised extraordinary influence on criticism, and much older systems under new faces have affected the thoughts of Frenchmen. Positivism, among others, which was never popular in England, has attained a development among critics which would surprise COMTE or LITTRÉ. As a consequence, M. DE LA SIZERANNE's essays present a method altogether different to M. MILSAND'S. To the latter the English writer was like a voice crying out in the wilderness, and the critic's duty was to consider what was said without any regard to the person who uttered the words. M. SIZERANNE, on the contrary, begins with a description of JOHN RUSKIN as a boy of fourteen, when in the year 1833 he descended at a hotel in Schaffhausen, along with his father and mother and a little girl, a cousin, of about his own age. It is the first glimpse of the writer which history grants us. We learn that the father was a most honourable man, who married rather late in life because he wished to pay off the debts his own father had incurred as a member of the firm of RUSKIN, TELFORD & DOMEQ, wine merchants in Billiter Street. The mother was kindly but strict towards her son, religious in the sense the word was then understood about Herne Hill, and jealous of every thing and every one who might attract the boy's attention from her. In consequence young RUSKIN was brought up as a solitary; he seems to have had no companions, no temptation to muscle-making mischief. Mrs. RUSKIN's dream was to see her son become a popular evangelical clergyman of the Clapham district, and apparently he was disposed to satisfy her. He studied grave doctrinal treatises as well as books of science. His state of mind may be judged from the efforts he made to ingratiate himself with Mdle. DOMEQ, the daughter of one of the members of the firm. He could not resist love's young dream, but as the charmer was Spanish, Parisienne and Romanist, it was characteristic that he felt it was his duty to convert as well as love her. This he attempted to do by dissertations on the Spanish Armada, the Battle of Waterloo and the doctrine of Transubstantiation. Mdle. DOMEQ enjoyed the fun, but Mrs. RUSKIN was too orthodox in religion, too firm in her toryism, to approve of a Spaniard, although of the converted class, as a daughter-in-law, and summarily put an end to the delusion. There was for a time the usual amount of mental disturbance on the lad's part, but he wrote some verses about a broken chain and cured himself in that way.

Happily for JOHN RUSKIN, there was an influence which counteracted his mother's puritanism. The elder RUSKIN was his own commercial traveller. Like men of that class, he was bound to endure the weariness of long evenings in inns and hotels. The majority of his fellow-travellers found a solace in strong drink, but Mr. RUSKIN was, fortunately for himself and for his son, an amateur. He could sketch and he could enjoy drawings. He spent his lonely evenings with his portfolios. Whilst driving in his excursions he saw lovely scenery, and he wished to share the pleasure he felt. As soon therefore as his only son was old enough to sit upright in a gig, he and his mother became the constant travelling companions of the wine merchant. In that way not only the beauties of England and Wales were explored, but also many of those on the Continent. Could there be a better education for an impressionable child, who appeared to be destined to make men acquainted with the splendour of the world that was around and above them, and which they had so long neglected? Young RUSKIN soon became an observer; then he wished to put his observations on record, and JOHN CLAUDIUS LOUDON was willing to oblige him, for such contributions as those signed "Kata Plusin" did not every day reach the editor's hands. They were what they professed to be, derived

from nature, and ever afterwards the author was faithful to the principle which inspired his youth. Critics may dispute Mr. RUSKIN's conclusions, but about the accuracy of his descriptions of works of nature or art there is no question, and there never was a writer who expended so much time and money in order to be able to present things as they are before the eyes of his readers.

Before he had reached Oxford as a student, JOHN RUSKIN had amassed information which was sufficient to puzzle most of the professors. What he was taught in the schools did not confute it, for in 1843 the "Oxford Graduate" brought out the first volume of "Modern Painters," the pages displaying an Erdkunde, or knowledge of a part of the earth's surface, of a kind which was hitherto unknown in the belles-lettres. Criticism of landscape painters' work was familiar, but even the Rev. JOHN EAGLES, "The Sketcher," who liked to compare a picture with the scene represented, appeared to see mere outlines, while the graduate suggested the possession of a vision which was at the same time microscopic and yet comprehensive. The remaining volumes of "Modern Painters" were marked by stronger powers of observation, which were likewise displayed in a different field in the "Stones of Venice" and succeeding works on art. The materials for them were not to be sought in the Bodleian. Like DICKENS, but in another sense of the phrase, Mr. RUSKIN could describe himself as an uncommercial traveller who was always on the road, and as a representative of the great house of Human Interest Brothers. As M. SIZERANNE says, "The history of his life is only the history of his encounters with nature, of the voyages that he renewed year after year, and which for two-thirds of his existence were with his parents, and alone after their death. He did not seek nature as a refuge from lassitude and disillusion, or as a distraction for idle hours; he went to her in the strength of his manhood, as to a deity who could renew his youth. She was not only the consoler, she was his love."

When M. MILSAND wrote in 1860 Mr. RUSKIN was to him only an eloquent writer on art. But in that year a change came over him. He felt that the house of Human Interest Brothers demanded something else from him than descriptions of the sublimities to be found among the Alps or the gorgeousness of Venetian palaces. He came down from his heights in the hope he could give a new interpretation to the Dismal Science, and, beginning with "Unto this Last," wrote book after book to suggest that the pursuit of wealth can be followed without a destruction of human feelings. In England, where life is so hard, it is excusable if we do not always take the sages seriously and look on them as intended to make sport for us. The more solemn they are, the more amusing we find them. The Ruskinian economics were only accepted as practicable by a select few, and the writer was recommended to return to the mountains and the palaces. But M. SIZERANNE looks on them with a seriousness that denotes conviction of their acceptance at a later time by a reformed world. When speaking of the master's seclusion of late years at Coniston, he says:—"The clouds generally assemble around the highest summits alone. Probably the summit of Coniston will one day appear still higher when to the mists of fiction death has added a supreme and holy obscurity. Then perhaps the innumerable tourists for whom RUSKIN has changed the stones of Venice into bread and the jewels of Pallas Athené into flowers will journey to see a spot where the man dwelt who inspired so many souls and enkindled the fire where so many flambeaux were lighted. The railways that he so strongly combated may bring there pilgrims of æsthetics from all parts of the world. If, however, ugliness should triumph, with the aid of science as an accomplice and of political economy as an ally, then he may be considered as a fabulous personage, the man who struggled alone against a world, not for truth which has its prophets, not for justice which has its apostles, not for religion which has its martyrs, but for beauty, the only principle that was without a champion, and which may never have another victory." A passage like the foregoing reveals how deeply M. SIZERANNE is impressed by Mr. RUSKIN's manner of writing and thinking.

The writer M. SIZERANNE has to describe is a far more complex being than came under the notice of M. MILSAND. How is the author of so many speculations to be made to

appear as the possessor of unity? Unless some one quality, subject or thing is made to stand out in high relief from an assemblage of qualities, subjects and things, no clear idea can be formed. M. SIZERANNE boldly assumes that with Mr. RUSKIN beauty is the sovereign power which controls all his works, or, we may say, is the master key to all their difficulties; and, moreover, it is to be esteemed as the panacea for all our social and moral evils. He maintains that Mr. RUSKIN looks at everything with the eye of a painter. History to him becomes a sort of public place put in perspective by CANALETTO, with figures that recall GUARDI or TIEPOLO. A clover leaf on a coin brings to his mind the struggles between the Florentines and Pisans, or the growth of the popular party in Florence. He thinks in images, and wherever possible he substitutes a plastic for a literary image. In order to impress a passage on his reader's memory he does not hesitate occasionally to print it in red. He is not a *littérateur* who paints, he is rather a painter who writes, and for whom words have the signification of drawings or models. He has, too, the rarest of all gifts, that is, a love for whatever his eye rests on. You will find reasoning as close in LESSING, says M. SIZERANNE, and MICHELET is more careful in his images; STENDHALL has psychology, TOPFFER humour, FROMENTIN technique, WINCKELMANN dialectics, THEO GAUTIER colour, REYNOLDS pedagogics, TAINE generalisation, CHARLES BLANC "la répertoire," but RUSKIN has love. His books are traversed by a breath of enthusiasm; if any part is chaotic it is because his hand has trembled with emotion.

It is not to images and pictures that Mr. RUSKIN would limit beauty. In times of religious doubt, when he could rail at the "insolence of faith" and the "insolence of science," light came to him amidst ideas of the beautiful. The Christian religion, as M. SIZERANNE points out, assumed a new aspect when he recollected how the Founder told His disciples to consider the lilies of the field which surpassed SOLOMON in all his glory, and appeared sometimes as a gardener, sometimes as a vinedresser. But while remembering the lily and other forms in which the saint and the artist can find delight, Mr. RUSKIN does not wish to see rich people go about as severely clad as the old Florentines described by DANTE. Let them wear magnificent robes, he says, but let them also clothe, feed and educate those who, without such care, appear destined to make nature's intentions worthless, for in a world of beauty they are embodiments of ugliness.

We might adopt the Lady CAROLINA WILHELMINA AMELIA SKEGG's formula and say, "Beauty is worth any price, but where is it to be found?" Mr. RUSKIN, as we all know, replies by answering, "In animal and vegetable forms so long as they are not altered to please men's fancies." He has no care for selection, for he does not believe we have taste enough for the operation. Nature, he believes, has plentifully created patterns; it is our own fault if we neglect to utilise them. M. SIZERANNE in such recommendations has to bear with much which is condemnatory of the French styles, but he appears to be fascinated with all Mr. RUSKIN says, and accepts his words as if they were the gospel of art. And if we ask why he is so loyal, he tells us it is because the master has founded his work on nature. With Mr. RUSKIN, he says, the passion for nature has been the beginning and end of all things. It has composed each feature of his physiognomy; it has dictated each of his works; it has directed the course of all his thoughts. While it has made him employ science, it has saved him from the vanity of science by revealing to him æsthetic relations which science fails to discover. Why is it, asks M. SIZERANNE, that Mr. RUSKIN is so great a lover of Gothic architecture? And he answers by saying, It is because in that style are to be found more suggestions of nature, of stems, branches, flowers, and leaves. It may be, adds M. SIZERANNE, that in the night in which we live both savants and magi are led astray by wandering lights, while shepherds are guided by a star. But if men like RUSKIN are wandering spirits still, if they have the desire for truth, if they are free from self-seeking and pride, whatever may be the oasis to which they are led, it will be for them as a Bethlehem. And with the old man who, during sixty years, has been exclaiming, "Glory to beauty in the heavens," some angels who have not departed from the

earth may join with him in the prayer, "Peace on earth to men of good will."

Considering the general state of France it is remarkable to find a writer of that country turning to England and Mr. RUSKIN for inspiration in doubts and difficulties. Every one of us must hope that what is sought will be found. If Mr. RUSKIN's philosophy is not accepted Frenchmen at least will have the satisfaction of knowing that in M. DE LA SIZERANNE's essays they have the best exposition of the doctrines of the English writer on art which can be found. The essays are comparable to TAINE's "La Fontaine" in being a sort of microcosm in which the reader can find a place for his special studies.

THE CATHEDRAL OF LUÇON.

By J. A. RANDOLPH.

AMONG those interesting towns in France around which still lingers the romance of history, the "overgrown village" of Luçon has a claim on visitors to that country which few can boast of.

It is true that Domestic architecture was, in its artistic sense, practically unknown to the inhabitants; yet from an architectural standpoint there is an undoubted attraction in its "cathedral," if it can be called such now the see is extinct.

Luçon stands in low-lying ground but a few miles north of La Rochelle, and about the same distance inland from the Atlantic sea-board. The marshes at the west of the town are unhealthy, the landscape about is uninteresting up to Nantes, and for miles round there is hardly a single attraction of note for the antiquary save La Rochelle, Nantes and Bressuire. The houses of Luçon are wonderfully plain and unattractive; the streets are irregular and atrociously paved; the road to the station is a ten minutes' uninteresting drive over a mixture of earth, sand and cobbles (and, when we saw it, of mud and puddles) in an attempt at a railway 'bus. All tends rather to dissuade the intending visitor than otherwise. However, there is the knowledge of the existence of a most interesting church to persuade the stranger to face any discomfort and any disappointment in the way of picturesque houses *en route* and in Luçon, apart from the associations of the place with the Red Eminence, who, when exiled to it after being disgraced at court, dubbed the see, of which he was bishop at the time of his exile, the looest and most miserable one in the country.

The cathedral is, for France, distinctly unusual in plan, having a square east end, which is lighted by a huge window divided by only a single mullion running up to the level of the spring of the window arch, and branching off to form two colossal lancets and a vast "open head." The church was originally smaller, and the Romanesque north porch and transept testify to its antiquity. The rest of the church, with the exception of the tower, is less ornate thirteenth-century than ours, and the tracery in some of the windows is more like our Early Decorated than the French Decorated. But the steeple is certainly the strangest architectural medley imaginable. The porch, a massive stone affair, designed by JACQUES LE MERCIER, Cardinal RICHELIEU's architect, is, of course, Renaissance in style. It stands in a hollow, which detracts from the elegance of the proportions of the steeple. Above it rise two storeys or stages, flanked by grouped columns, all round the tower, the belfry windows in the upper storey being, on each face, traceried "three lights" with a Renaissance treatment of detail that is as singular as it is graceful. The most curious elements in the construction are the parapet, the corner pinnacles and the crocketed spire of fourteenth-century style, placed as they are on a Renaissance tower—a daring but most happy innovation. The grouping of columns on the tower and in the west porch is treated in the same way at the church of the Sorbonne at Paris, also LE MERCIER's work, and this leads us to suspect that he was mainly responsible for the cathedral at Rennes, a noteworthy specimen of a Renaissance church with grouped columns up the twin west towers, the interior being singularly Italian, and very like the Araceli Church

in Rome. The porch, too, at Rueil, outside Paris, is much the same as that of the church at Richelieu; but, in spite of his rather monotonous work, which contains none of the graceful flowing tracery we associate with and admire in Gothic work, LE MERCIER showed in several ways remarkable freedom from anything approaching a "school," and perhaps his most striking example of this individuality, if we except the grand front of Rennes Cathedral, were the twin spires at Richelieu Church arising from the transepts. Indeed, the detail of the front at Luçon, without taking the grouped columns into consideration, as well as that of the front at Rennes, with the same proviso, are palpably inspired from the same sources.

There used to be a polychromed pulpit in the church, but this has been removed to the "Bishop's Palace," a simple but graceful structure on the south side, with an exquisite Gothic cloister, the detail of which is just tinged with Renaissance. The pulpit just alluded to is said to have been occupied on several occasions by RICHELIEU. His portrait, as Bishop of Luçon, is in one of the large rooms of the palace, among other contemporary portraits of bishops of the see.

In connection with the cathedral there is a charming example of a local Cambridge chime for the hours, half-hours and quarters, totally unlike anything we have heard before. The first quarter is on two bells and does not strike one as being anything out of the common. At the half-hour the first quarter is repeated, followed by the first bell of the first quarter and another bell; at the quarter to the hour the first two quarters are repeated, with the addition of a "descending triplet," the last of the three bells being the last bell of the half-hour; the hour is the same as the three-quarters, followed by a "descending quintet," with a pause between the third and fourth bells, the hour striking on a sixth and deeper toned bell. The introduction of a similar chime into our country would indeed be a welcome relief from the cut-and-dried inartistic and stale "Cambridge chime."

On the west side of the cathedral is an agreeable raised plateau with noble trees, where the fair is held; and the "market-place" is in the roadways at the west and north of the cathedral—an extremely picturesque sight on a bright summer's day.

At the eastern extremity of the town, behind the church, is a hideous covered market, an attempt at a diminutive classical pagan temple to all appearances, and not worth while going out of one's way to see. The shops of Luçon are nothing extraordinary in the way of "show," but the better-class section of them are decidedly good.

RUBENS AND ANTWERP.

THERE is no city in Europe which is more closely associated with the memory of a great artist than is Antwerp with RUBENS. It might be supposed he was the only celebrity. The reputation of the rulers of Antwerp has either vanished or has become odious, but RUBENS appears as a sort of guardian spirit. Sir JOSHUA REYNOLDS speaks of him as "canonised." And yet he was not a native of the city. Siegen, in Westphalia, has the honour of being his birthplace. It is true his father, the lawyer, JOHN RUBENS, and his mother, MARY PYPELING, belonged to Antwerp, and nobody would on that account venture to say that the painter was a stranger. His father had somehow made himself obnoxious to the Spaniards, and he emigrated to Cologne. There also he was considered as a disaffected person, and was exiled to Siegen, where the future painter and diplomatist was born on June 28, 1577, and was named PETER PAUL, after the apostles, whose feast was celebrated next day. In the following year the family was allowed to return to Cologne, and remained there until 1587, when JOHN RUBENS died. His mother went back with her children to Antwerp.

It was intended that young RUBENS should become a lawyer like his father. But he prevailed with his mother to allow him to study art. His masters were TOBIAS VERHAAGT, ADAM VANNOORT, and the more famous OTHO VENIUS. He spent four years in the atelier of the last. Then he left Flanders for Italy. Art was not apparently the only occupation of the brilliant young

man. He obtained an appointment with VINCENZIO GONZAGA, Duke of Mantua, and appears to have divided his time between diplomatic missions and the copying of pictures. When he gained repute as a portrait-painter he must have often aided the Duke's cause by conversations with his sitters. In 1608 he was again in Antwerp, having returned in the hope of seeing his mother, but that satisfaction was denied him. It was RUBENS's desire to go back to Mantua, but on the appeal of the Archduke ALBERT, who ruled the Netherlands, he remained. He received the appointment of Court-painter in 1609. Then he married, built the big house which is known to all visitors to Antwerp, and settled down to enjoy his honours and to acquire wealth. But he did not desert diplomacy. From his fame as a painter he possessed opportunities which were denied to the ordinary diplomatist, and he contrived to serve the interests of his sovereign as well as his own in Paris, Madrid and London. CHARLES I. gave him many commissions, and bestowed a knighthood on him. PHILIP IV. of Spain was no less liberal. The widowed MARIE DE MEDICIS ordered from him for the Luxembourg the allegorical series which is now in the Louvre, and of which no man can decipher the meaning. RUBENS was also accepted as the adviser-in-chief of wealthy amateurs, like Lord ARUNDEL.

The pictures of RUBENS are so numerous it is not easy to imagine how he could find time to execute them. His life lasted for not more than sixty-three years, and barely a half of it was devoted to art. It is true he would have the aid of most able assistants, but the larger part of each of his masterpieces displays the undoubted strokes of the giant's hand. In Antwerp and Brussels there are many of his paintings, and a public gallery is supposed to be incomplete from which examples of his scriptural and mythological works are absent. But to have a *coup d'œil* of RUBENS it is necessary to visit the Munich Gallery. There his versatility and power become more amazing than elsewhere.

RUBENS's first wife died in 1626; four years afterwards he married HELEN FOURMENT, a girl of sixteen, who was most useful to him as a model. In his picture in the church of St. Jacques, Antwerp, where he was buried, he has introduced both women as well as his father. He died in May, 1640, and few painters were able to leave so large a fortune.

ELECTRIC TRAMWAYS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from page 196.)

NOW that the chief systems of traction have been described it may be of interest to consider the details of various electric systems, giving descriptions of typical tramways.

Accumulator Traction.—The use of accumulators as reservoirs of motive power for driving tramcars has been neglected in this country, and is usually dismissed by referring to some of the early failures at Birmingham, Barking and elsewhere. The use of accumulators is the simplest form in which electricity can be applied to the propulsion of any vehicle, except perhaps on an enclosed railway, and the least expensive for street work when the traffic is not heavy. There is the difficulty—not an insuperable one—that accumulators have not proved a brilliant success. Now it is well known that in the last few years, great improvements have been made in accumulators, and that many very able men are at the present time engaged in the production of a suitable traction battery. The requirements are very severe. The accumulators must be light, and at the same time be robust. They must not be seriously injured by vibration or by heavy discharges. As the plates must be thin there is great difficulty in keeping the conductivity of the plates high enough to insure that they will be charged and discharged fully and evenly; the shedding of the active material due to "washing" and vibration is very serious, especially on the peroxide plate. However, even at present there are some successful accumulator tramways.

The Paris Tramways Company in 1892 experimented with accumulator tramcars on the St. Denis-Madeleine line, and the results were of such a nature that horse traction has been gradually superseded over their whole route. The success of this example is very gratifying, because the conditions are by no means easy, and are certainly not very favourable to the accumulators, as there are some stiff gradients to mount. The accumulators used until lately were entirely of the chloride pattern, *i.e.* the active material is obtained by the reduction of the chloride

of lead to spongy lead for the negative plate and peroxide of lead for the positive.

The battery for each car consisted of fifty-six cells, with nine plates of 20 cm. square, the total weight being 1,700 kilogrammes=1.7 tons (approx.), (older batteries weighed 3.0 tons). The method of putting the cells into place has lately been altered, as originally the cells were made up in boxes of 5, and these boxes were placed under the seats from the outside of the car. This method has much to recommend it; the weights to be lifted are small, in-



STATUE OF RUBENS, ANTWERP.

dividual cells may easily be examined and bad ones replaced. The cost of handling is, however, high, and the space required for the charging shed is large. With the newer type of battery the arrangement is to place the whole of the fifty-six cells in a case which is slung underneath the cars. This method is somewhat similar to that used with the London electric cabs. The battery can thus be attached from the car in from two to three minutes. The arrangements that have been described so far are ordinary, and typical of many experimental cars in use.

Lately a new form of accumulator has been introduced on one of the Paris lines which has altered the whole system on that line. The Tudor accumulator is used, *i.e.* the simple Planté type, the plates of which have been specially constructed to have an enormous surface. These batteries are not specially light, the active material being the merest skin on the surface of the plate, and the grid very heavy. However, as the active material is backed up by the conductor so well the efficiency of the active material is high. These cells are suited for extremely rapid charging, in fact, 20 minutes is sufficient for a full charge.

There is at each end of the line a contact pillar, to which the accumulators are connected for 10 minutes. This 10 minutes charge (at a very high rate per cell) is sufficient to run the car to the other end, where it is again charged for 10 minutes. This, therefore, renders removal from the car unnecessary, and the 10 minutes' wait at the end of the journey is the usual one. Although the current is very high, the charging current per square foot of surface is an ordinary one, as the surface is so enormous. The discharge rate per square foot is remarkably low, as the cells which are charged in ten minutes are discharged in about 50 minutes. For these reasons the cells should have a long life, and there is no doubt that a great advance in accumulators for traction has been made. Electric tramway working becomes simplicity in itself with this system, and the results of a year or two's work will be awaited with interest.

A great point of novelty in the general systems of working at Paris, however, is in the motors and brakes. The motors are of the shunt type, working the axles by means of a single reduction gear. The object of the shunt motor is that on running down an incline it will charge the accumulators, working as a dynamo, and this will act as a brake (a series motor would not do this charging successfully). The result of this is that after mounting a heavy incline the cells get a good charge when going down the other side, which must prolong their life considerably. This recuperation of the cells is on the St. Denis line one-sixth to one-fifth of the amount of discharge, and is a strong point of the system, and to it no doubt a great part of the success is due. The shunt motors are wound with extra strong fields in order to get a heavy starting torque, and when the speed is got up resistance is gradually taken from the armature circuit; this is necessary to prevent the rush of current through the motor at slow speeds. As there are two motors on the car they are controlled in the usual way by paralleling the fields and putting the armatures in series for starting.

When we consider the question of accumulator traction in a general way, the disadvantage that the car has to carry, not only the motors but also the accumulators, in addition to the passengers, makes the actual consumption of energy per car-mile high. For instance, on the Paris Tramways the weight of the car is about 14,000 kilogrammes, complete with motors and all accessories; the battery weighs an extra 3,000 kilogrammes, bringing up the total weight to 17,000 kilogrammes (about 17 tons), while the 50 people only weigh 3,500 kilogrammes ($3\frac{1}{2}$ tons, approx.). The ratio of weight of people to total would thus be $\frac{3,500}{20,500}$ in the case

of accumulator traction, this being equal to one-sixth of the total. In the case of a trolley car the weight of the whole arrangement, including passengers, could not be less than, say, 17,000 kilogrammes; thus the ratio would be $\frac{3,500}{17,000}$ = one-fifth of the total. It thus appears that the difference in weight is about equal to that of the passengers, in favour of the trolley.

Coming to the efficiency of the accumulator compared with the trolley system. In the former the losses after

the current leaves the dynamo are as follows:—1. The loss in charging the accumulators. 2. The loss of energy in the accumulators while standing. 3. The inefficiency of the discharge. 4. The loss in the motor. 5. The extra friction due to the weight of battery, and heavier built car needed. In the latter (trolley) the loss in the line and the inefficiency of the motor and gear have only to be considered.

The total losses 1, 2 and 3 average altogether 35 per cent. loss, so that 65 per cent. of the original energy reaches the motor. The loss in the motor and gearing (efficiency 70 per cent.) brings the efficiency down to $\frac{65 \times 70}{100} = 45.5$

per cent. at the axle, and the extra friction due to the battery will bring the efficiency down to say 38 per cent. at the axle.

In the case of the trolley the efficiency of transmission to the car rarely exceeds 80 per cent.; the efficiency of motor and gearing being 70 per cent., we get a total efficiency of 56 per cent. at the axle.

The cost of working of these Paris cars, spread over two years, came out as follows:—

	Cents.
Maintenance (10 c.) and attendance (6 c.) per car-kilo. ...	16
Motive power	18
Wear and tear of trucks and motors... ..	15
Labour... ..	8
Centimes per car-kilometre	47
Cost equals 8d. per car-mile (approx.).	

This is a saving of 30 per cent. over the operating expenses for horse traction on the same lines.

There are several details which are worth considering, and which tend to make or mar any accumulator system of traction. The permanent way must be kept in good condition, otherwise the excessive vibration set up will make the life of the accumulators very short. It is advisable to suspend the batteries from springs attached to the framework rather than to put them on the car. The strong springs on the car do not prevent shocks to the battery as well as the weaker springs required for the batteries only. A point worthy of consideration is that of the method of charging the batteries. This is nearly always done in parallel, and with this method the charging of many batteries cannot be carried out conveniently if one voltage is used. With ordinary batteries a large resistance must be put in circuit at first to keep down the current, and this must be taken out gradually as the voltage of the battery rises. It is obvious that considerable attention is required to keep the voltage constant under these conditions. A better arrangement is to have three voltages, each sufficient for one-third of the charge; the cells can then be plugged on to these in succession, thus preventing waste in resistances.

A still better arrangement is to use a battery which will stand the heavy current at first, and thus have only one voltage. By this means the current will be automatically reduced, as the voltage of the battery approaches that of the dynamo. All that is necessary is to plug the battery on to the dynamos, and take it off when sent out. There will be no excessive gassing if left on for days if the dynamo voltage is the correct one for the number of cells used, as the current will be reduced to almost nothing when the battery is fully charged. The current going into the cells is thus a measure of the state of charge of the battery. There are, however, very few batteries that will stand this charging at constant potential, but still there are some, for instance, the cell mentioned earlier.

Enough has been said to prove that the subject of accumulator traction is not one to be passed over, as it often is, by a few remarks as to the want of success in the past.

(To be continued.)

The Architectural Association will hold its annual general meeting on Friday, October 8, at No. 9 Conduit Street, W., at 7.30 P.M., when Mr. Hampden W. Pratt, F.R.I.B.A., will deliver his presidential address, and distribute the prizes, medals and certificates. The drawings submitted in competition for the various prizes offered by the Association will be exhibited; also students' drawings executed in the studio and school of design during the past session. The classes, which are held at 56 Great Marlborough Street, commence on October 11, and the studio reopens on October 12, at 6.30 P.M.

CHURCH BELLS.

THE last forty years, writes a correspondent of the *Times*, have witnessed the rise of an antiquarian hobby which concerns itself with church bells and more especially the few Mediaeval bells which still hang in church towers or lie cracked on belfry floors. The ancient founders cast very fine-toned bells and adorned them with elaborately moulded inscriptions and devices. But, though our churches have been noted and described in numberless publications, the bells till quite lately received little notice and were too often neglected in every sense of the word. The compiler of one of the latest accounts of the church bells of a county records that belfry keys were constantly handed to him with the friendly caution, "I'm afraid you will find a great mess up there, but, to tell you the truth, I have never been up myself."

The Mediaeval bells usually bear inscriptions, very commonly in rhyming leonine hexameters, pious invocations, or staves in honour of their supposed beneficent powers. The oldest founders rarely put on the bells their own names or the dates; but most of them have been identified by the foundry-stamps and other devices with which they ornamented their works. Large bells were introduced in England about the sixth century, the earliest founders being monastic. Dunstan concerned himself with bell-founding. The Croyland Abbey ring, cast by monkish experts, perished by fire in 1097. A manuscript in the library of Corpus Christi College, Cambridge, contains directions for bell-founding, by a monk of Evesham in the time of Henry III. The modern art of "change-ringing," which took its rise in the seventeenth century, led to rings of eight and even twelve bells being hung in some towers; but in very early times cathedral and abbey churches often had rings of heavy bells, and some of the oldest surviving parish churches, such as Brigstock and Brixworth in Northamptonshire and Bene't Church in Cambridge, were evidently designed to hold several bells. Change-ringing somewhat tended to rescue the bells from the neglect and disesteem into which they had fallen after the Reformation, but it also led to the disappearance of many Mediaeval bells, as ancient heavy bells were recast into smaller ones of larger number. Moreover, the oldest bells, being "long-waisted" in shape, were for that reason frequently made to give place to shorter ones, which the ringers deemed easier to raise.

The Mediaeval bells now surviving are comparatively few in number. In Surrey, out of 1,030 bells, only a trifle over 2 per cent. were found to date before the year 1600. In Lincolnshire the proportion was 17·5 per cent. In Norfolk about one bell in six dates before the reign of Queen Elizabeth. The monastery bells seem to have vanished when the monasteries were suppressed. Some disappeared in private hands; others were sold by the Crown. The Augmentation Rolls show that in Henry VIII.'s reign one lot of 100,000 lbs. of bells and bell-metal was sold for 900*l.*, with license to "convey, utter and sell" the same beyond sea. A very few monastery bells still hang *in situ*. Forde Abbey, in Dorset, still possesses one of the old bells, cast by the Brasyers, who had a foundry at Norwich about the fifteenth century, bearing their foundry stamp and a handsomely moulded invocation of St. Margaret.

The parish church bells were inventoried and valued under commissions about Edward VI.'s time, and some may have disappeared by private dishonesty, but such instances were probably few. Between that time and this the greater part of the old bells have disappeared from various causes. Many were sold from time to time, as money was needed for repairs, or even desired for secular purposes. At Norwich, in Queen Elizabeth's time, the Dean and Chapter were selling bell-metal wholesale. The Corporation were also selling parish church bells. Three Devonshire parishes gave away bells in aid of making a harbour, and the parishioners of a Lincolnshire village sold two bells and spent part of the money in scouring out their haven. Very many bells disappeared in the neglectful times of the eighteenth century. Five bells were sold from Salisbury Cathedral in 1777. King's College, Cambridge, sold several large bells in 1753. When such corporations made merchandise of their bells parishes were hardly likely to be more scrupulous. Bells were sold by incumbents, churchwardens and parishioners, sometimes with faculties, sometimes without, sometimes to save the making of rates for church repairs, sometimes for purely secular purposes. Strange and almost incredible things took place. Stories and traditions linger of bells stolen from churches. The people of a Hertfordshire parish are recorded as divided in their minds whether their ancestors sold a missing bell to a certain other parish, or whether the people of a third parish stole it. So little respect was paid to the bells that in a parish on the south coast smuggled goods were regularly hidden inside them, lashed fast to the clappers.

Many bells, old and new, have been, and still are, wrecked by careless and unskilful ringing, and, notably, by the slovenly habit of "clocking"—*i.e.* tying a cord to the clapper and jerking it against the bell in a manner which checks the

vibration. Two Mediaeval bells still lie cracked on the floor of a west country belfry, broken by lads who got into the belfry and hammered on the bells with heavy blows; nor is this a unique instance of such vandalism. And in our own day many noble old bells as well as many beautiful old churches have perished unnecessarily in over drastic and destructive restoration.

Although the oldest English founders very rarely dated their bells, a few instances exist to the contrary. Lancashire possesses a dated thirteenth-century bell, and Lincolnshire one dated 1323. A Sussex church has or had a bell by a Low Country founder, dated 1369. The Mediaeval English founders turned out such fine bells that there was small temptation to employ foreigners. In Scotland foreign work is less uncommon. A few bells of a Mechlin founder have been found in England, and one of these, hung in a bell-cot on the roof of a tiny seaside church in Gower, misled a popular author into supposing that a foreign foundry had existed in that secluded corner of Glamorganshire.

Norwich, Salisbury, Reading (and Wokingham hard by), Gloucester, and other English places had bell-foundries in the Middle Ages. London from early times was the home of a long series of founders, belyetters and potters, as the bell-makers were variously styled. Billiter Street in the City owes its name to them. Nearly all the London bells perished in the Great Fire of 1666, but the fine church of St. Bartholomew, Smithfield, still possesses a ring of five, adorned with saintly invocations and the device of Thomas Bullisdon, who was casting bells in London about the year 1500. Some of these craftsmen cast cannon as well as bells, in sign whereof a founder at Bury St. Edmunds used a foundry-stamp bearing both a bell and a cannon with a ball issuing from its mouth. The Brasyers of Norwich stamped their bells with a shield charged with three bells. William ffounder, a London founder, whose patronymic was Dawe, used a chevron between three ewers or lave-pots, as well as a bird device which may have been meant for a jackdaw. He cast guns for Dover Castle in 1385, and his bells reached Dartmoor and Cornwall. The Whitechapel Foundry, now carried on under the style of Mears & Stainbank, has been worked uninterruptedly for over three centuries under a succession of founders, beginning with R. Mot in 1570.

Bells cast after the Reformation no longer bore inscriptions invoking saints or claiming supernatural powers. The handsome and elaborate Lombardic capital letters were discontinued, and the black letter soon followed. Since then inscriptions have mostly been in plain Roman capitals, with founder's name and date, to which came to be added the names of churchwardens or parson. In the seventeenth century the inscriptions often degenerated into poor and irreverent doggerel, such, for instance, as that on the tenor of Bene't Church, Cambridge:—

This bell was broake and cast againe as plainly doth appeare
John Draper made me in 1618 wich tyme chvrchwardens were
Edward Dixon for the one whoe stode close to his tacklin
And he that was his partner there was Alexander Jacklyn.

Twenty counties, nineteen English and one Scotch, now possess printed accounts of their bells and the founders, with illustrations, from rubbings and "squeezes," of the surviving Mediaeval inscriptions and devices.

A recent revival of the art of scientific ringing, coupled with this antiquarian cult of ancient bells, may warrant the hope that the bells will now be more skilfully handled and better cared for—that parish idlers will no longer be allowed to crack them with random jangling, much less batter them to pieces. It may be hoped also that fine old Mediaeval bells will no longer be ruthlessly and needlessly recast. Sales of the bells, such as those which took place in the eighteenth century, should be no longer possible. Yet not many months ago a Mediaeval bell belonging to a small country parish was discovered in a neighbouring railway goods shed, presumably on its way to be sold, to find money for some church repair. Happily the bell was intercepted, and returned to its parish. There is ever some evil out of good and good out of evil. Of late years jubilees and other joyful commemorations have been responsible for the needless recasting of many fine Mediaeval bells. If, as we now so often hear, funds for necessary church repairs are hard to come by, there may be the less temptation to spend money in unnecessarily exchanging old bells for new ones. Lastly, whenever an old bell has received injury which renders recasting absolutely necessary, it is possible to preserve the inscription and foundry marks in the form of a circular ring cut from the bell. In this manner some very fine inscriptions have been preserved, and whenever a Mediaeval bell must be recast there is no reason why the inscription should not be thus saved and hung, as a candelabrum or otherwise, in the church itself.

The First Ordinary Meeting of the Liverpool Architectural Society will be held at the Law Library, Union Court, on Monday, the 4th inst., at 6 P.M.

NOTES AND COMMENTS.

FROM the peculiar system of responsibility for the conservation of French churches, it would appear as if accidents are to be expected more frequently than in the past. We have lately recorded some cases where buildings collapsed because they were not watertight. Another is to be added. The church or chapel of Gardes, near Cholet, in the diocese of Angers, is a favourite place of pilgrimage. A fortnight ago it was crowded by Vendéans, who came to assist in the annual solemnities. Fortunately the visits do not continue beyond a week, for on Friday last the vaulting in front of the high altar collapsed. Luckily the building was empty at the time, or the sacrifice of life might have been considerable. It is supposed the rain had entered through fissures which were neglected. Apparently there is no fund available for the restoration of the building, and it will be necessary to beg for money. Yet the chapel is supposed to be national property.

It is to be regretted that the arrangements between the French and English Governments concerning the exhibition of 1900 are not completed. There was lately a rumour that the negotiations were satisfactorily settled, but as yet there are no signs of any definite conclusions. The obstacle is the partition of the areas. England, of course, would have its section on a scale that would do justice to the variety of objects which would be contributed. But most other countries are no less ambitious. France can hardly be expected to sacrifice itself on so important an occasion, and the claims of Russia to a preponderating space must be respected. Meanwhile time is running on, and some departments are expediting their own work regardless of the delay elsewhere. The Minister of Commerce, for instance, has decided on the jurors who are to examine all objects offered for admission. The list will be equal to a good-sized volume. But as Englishmen have had to stand aloof until the Foreign Office gives the signal for action, it is not impossible that the English jurors will be fewer in number than was anticipated, and then the usual outcry about unfairness will be heard.

It is difficult for laymen to understand why there should be marked differences between the estimates of architects for the same work. With works of civil engineering there is more correspondence between the figures. But railway works consist in reality of fewer items than have to be considered in estimating the cost of a large mansion or hotel, although the cost in the simple case may be thirty or forty times as much as in the other. Architects can only proceed in their preliminary estimates on insufficient data. Builders, on the contrary, have "quantities" and other information at their service, and yet every week we see remarkable discrepancies in tenders. What can be made out of the variations between architects' estimates was exhibited in a leading article in the *Scotsman* on Tuesday *à propos* of the schemes for dealing with what is known as the North Bridge Improvement in Edinburgh. The city treasurer believes it is the duty of the Town Council to undertake the onerous responsibility of building on the sites which have become available. The *Scotsman* takes the opposite view, and in the first place endeavours to demonstrate that the treasurer's figures are not trustworthy. The architects' estimates are accordingly used as evidence of the incorrectness of the scheme. The writer says:—"What the treasurer speaks of as the valuers' estimate for rebuilding is 211,000*l*. But there is another estimate by the architects who designed the plan for rebuilding over the area. Their estimate is 172,000*l*., and manifestly the treasurer hangs a good deal on them, though he is not unwilling to accept the higher estimate of 211,000*l*. Now, how were these estimates arrived at? The architects went upon the plan of what is called cubing the property to be erected. That is to say, they multiplied the length of the building by the width, and that again by the height, thus getting the number of cubic feet in the building. Then they attached arbitrary prices per foot, varying from fivepence up to tenpence, and we believe it will be found that their valuation works out somewhere about 9*d*. per cubic foot. This was regarded as a rough and not quite satisfactory estimate, and Messrs.

ORMISTON & WALKER, valuers, were asked to make another estimate. They did so on the same plan, and brought out the result at 195,000*l*. This, as will be seen, was in round numbers about 23,000*l*. higher than the architects' estimates. Obviously any such mode of calculation must therefore be of a very doubtful character. But the Corporation, not being quite satisfied, asked the valuers to go into a more accurate method of valuation. They took a corner house. It was measured in detail, and the cost of the various work for rebuilding it amounted to 8,194*l*. The estimated cost of this same tenement by the architects without detailed measurements was 6,164*l*.—a difference of 2,030*l*. It is obvious from this single instance that the architects' valuation is one upon which no corporation or any private individual would rely as absolutely conclusive. Yet almost the whole of Treasurer McCRAE'S calculation depends upon the accuracy of estimates which may be as wrong as those of the architects." If the Corporation insist on premature valuations, they must not expect more than an approximation. Whether the amount put forth as the cost of the building is more vague than is customary, will depend on many considerations. But the majority of people, in common with journalists, cannot understand why architects' estimates should differ, except to a trifling amount, and the conclusion they will draw is, that finance is an architect's weak point, and it is less safe to trust them than ordinary builders.

As workmen are now disposed to take examples from all who are not industrious, and work the fewest hours, we hope those engaged in building trades will not adopt an imitation of the Chinese. According to the report of Consul CHARLES, neither masons nor carpenters begin work in winter much before 9 A.M. In summer they knock off work for a long two hours' siesta in the middle of the day, and at all seasons of the year smoke, drink tea, and rest whenever it suits them. According to the regulations of the Builders' Guild, wages, if the men find their own food, are 18*s* cash (about 5½*d*.) per diem. These wages are supplemented in the case of skilled labourers by their apprentices' wages, which are paid at the same rate. Apprentices are bound for three years, and as evidence of the scarcity of skilled labour it may be mentioned that on many works at least half the men are apprentices. As accidents are frequent in the trade, and especially among unskilled hands, the parent of the apprentice has to give an engagement in writing holding the boy's master free from all liability for loss of life or for injury incurred during the term of apprenticeship, but a present is expected in case of an accident. No interference is permitted, under the rules of the Builders' Guild, with a customer engaging any builder preferred by him. Touting for employment is punishable by a fine, to be fixed in public meeting. No outside firm is allowed to work until it has joined the guild and received a certificate, the fee for which varies. Assistants or foremen who endeavour to obtain business on their own account from persons for whom their masters work are liable to a heavy fine. Masters have to pay the guild at the rate of about one-twentieth of a penny per diem for every man employed by them, to form a fund to meet subscriptions for canal works, &c. A similar tax is levied on assistants to meet the cost of festivals, illuminations, &c. If trouble occurs between a builder and his employes and work is stopped, no other labour can be engaged until all outstanding accounts are settled. Breaches of the rules are punishable by fine levied in public meeting. Attendance is obligatory at meetings called to fix the quota to be paid towards subscription funds. Disputes between masters and men are not allowed in the guild house. They must be arranged in the tea houses or opium shops.

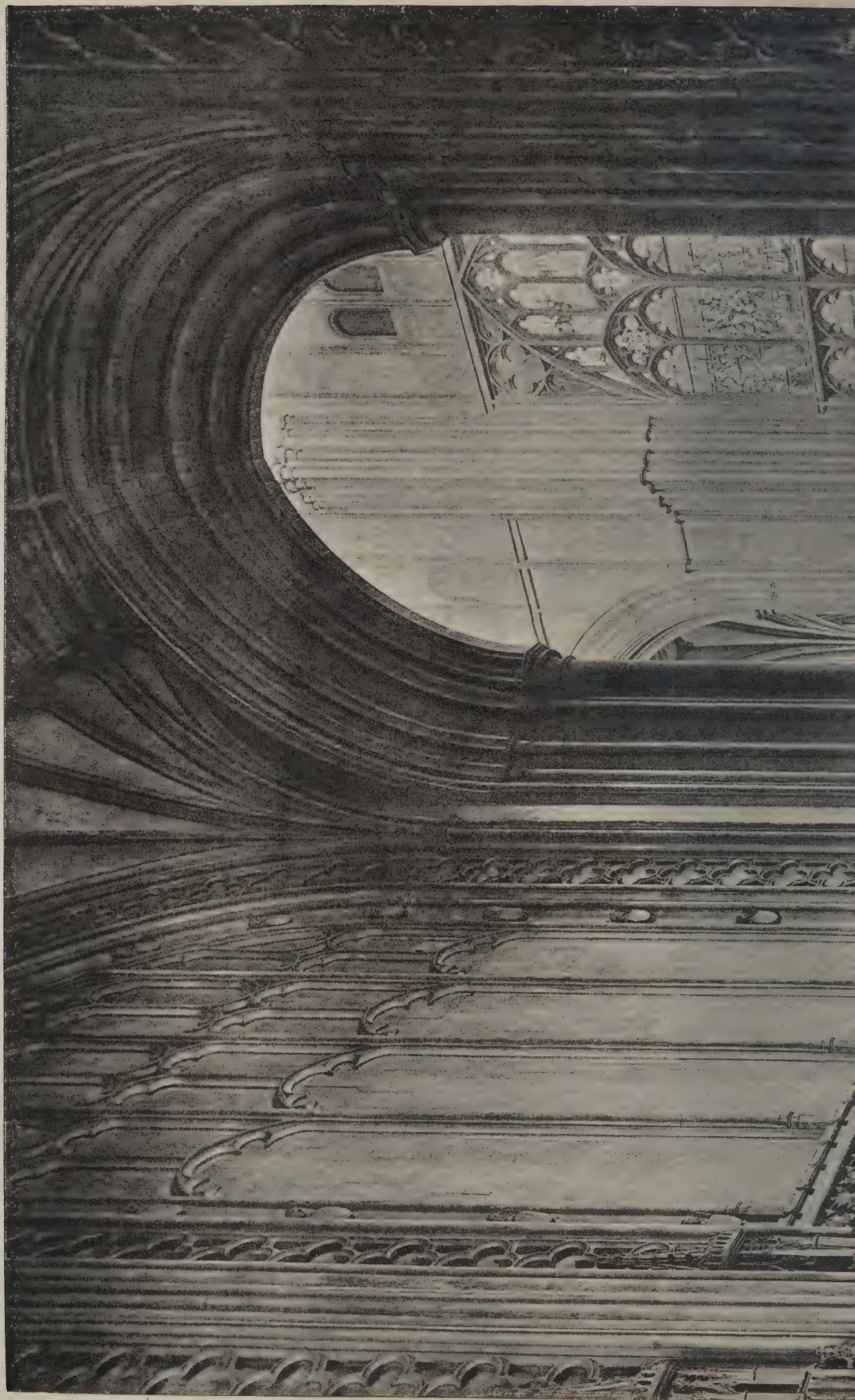
ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: DEAN'S CHAPEL. NORTH AISLE OF CRYPT UNDER TRINITY CHAPEL.

PROSCENIUM, HER MAJESTY'S THEATRE, HAYMARKET.

GRAND STAIRCASE, IMPERIAL INSTITUTION.

The Architect, Oct. 1st 1897





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CATHEDRAL SERIES, No. 77.—CANTERBURY: DEAN'S CHAPEL.

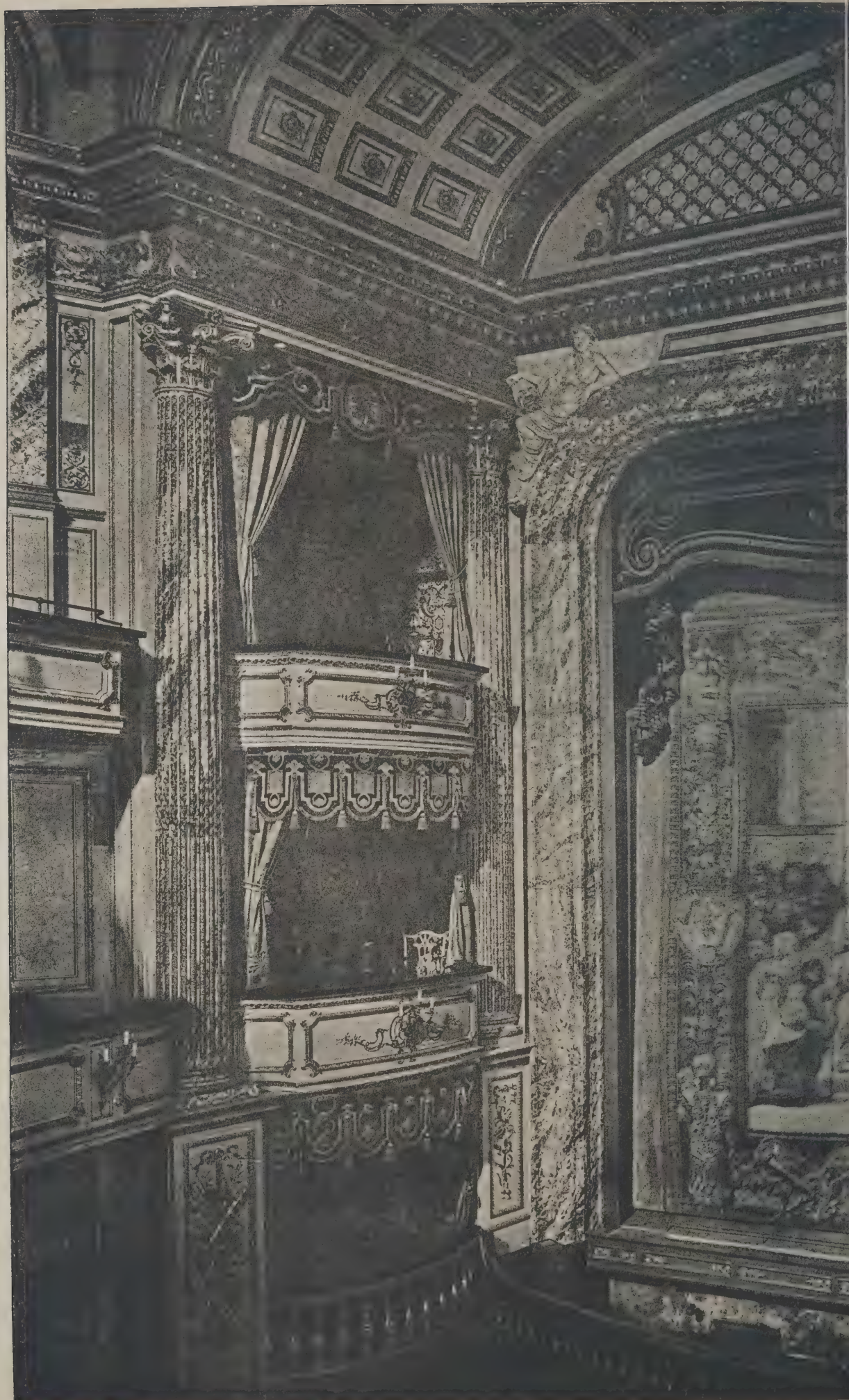




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CATHEDRAL SERIES, No. 78.—CANTERBURY: NORTH AISLE OF CRYPT UNDER TRINITY CHAPEL.



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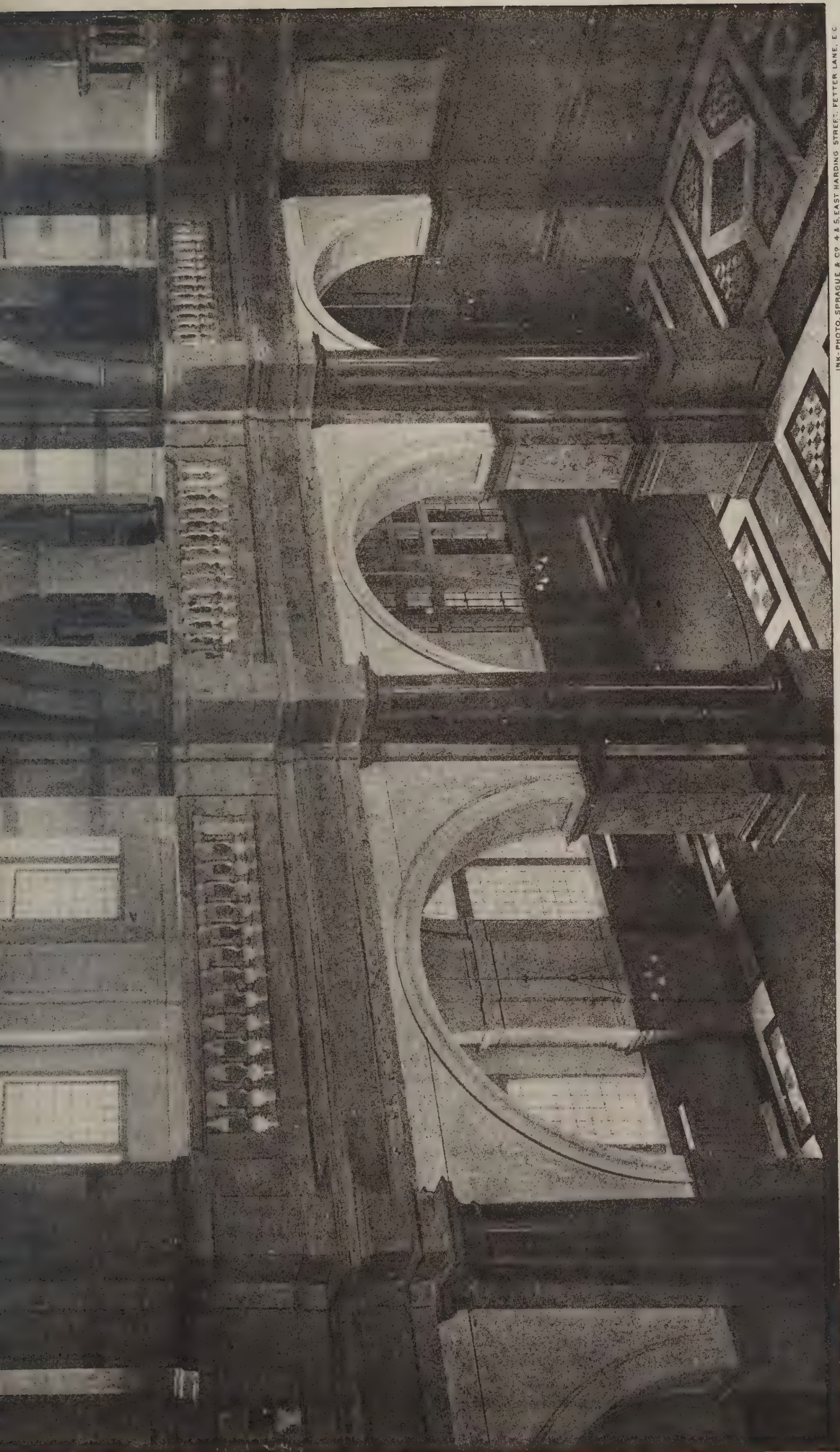
PROSCENIUM: HER M.

The Late CHAR



THEATRE, HAYMARKET.
HIPPS, F.S.A., Architect.





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GRAND STAIRCASE: IMPERIAL INSTITUTE.

T. E. COLLCUTT, Architect.

HIGH ALTAR, ANTWERP CATHEDRAL.

THE church of Notre Dame in Antwerp is the largest and the most remarkable of the numerous ecclesiastical structures erected in Belgium during the fifteenth century. On plan it shows a central nave and six aisles, those at the sides being divided into numerous chapels. The tower reaches a height of 122 metres, or about 400 feet, and would be more effective if the original plan of the architect, JEAN AMELINS or APPELMANS, had been faithfully realised.

The high altar is of a more modern character, and is not in keeping with the rest of the building; but in Belgium there are many diversities of style to be seen in the buildings, which are accepted as inevitable. The altar-piece is by RUBENS. In describing it Sir JOSHUA REYNOLDS says:—"This picture has not so rich an appearance in regard to colour as many other pictures of RUBENS, proceeding, I imagine, from there being too much blue in the sky; however, the lower part of the picture has not that defect. It is said to have been painted in sixteen days."



HIGH ALTAR, THE CATHEDRAL, ANTWERP.

LISKEARD CHURCH TOWER.

ON September 23 the Chancellor of Truro (Mr. R. M. Paul), assisted by Mr. Ponting, architect, Salisbury, as assessor, sat at Liskeard to inquire into a petition from the vicar and churchwardens for a faculty to take down and rebuild the church tower.

Mr. Borlase Childs, who appeared for the petitioners, explained that in 1876 a movement was set on foot to restore the parish church, and Mr. Richard Coad, an architect in Sir Gilbert Scott's office, was employed. One of the first points was what should be done with the ancient tower. Mr. Coad reported that for an expenditure of 200*l.* it could be restored. At that time it was impossible to tell its actual condition, but when the roof of the church was taken off it was found that the defects in the tower were most extensive. Mr. Coad then reported that the foundations were so faulty and the damage to the tower so very extensive that it was hopeless to attempt to restore it, and the contractor was directed to do some temporary work with the view at some later date of rebuilding a tower worthy of the parish and the church. In 1890 Miss Pedler died, leaving 1,000*l.* to be applied conditionally to the rebuilding of the tower. In 1894 the vestry appointed a committee to inquire into what should be done with regard to the tower. Some people had called the committee vandals and visigoths. But the inquiry was approached with an earnest desire to do what was right and proper. There was no prejudged opinion as to whether the tower should be taken down or restored. But in 1878 a faculty to rebuild would have been applied for if there had been sufficient funds. Now, Miss Pedler's legacy was available, but under the conditions of the bequest, unless the rebuilding of the tower was commenced within ten years of her death, and an additional sum of 2,000*l.* was raised, it would go to Truro Cathedral. So far as the petitioners were concerned this was in no way a fight for the thousand pounds. It would not be worthy of Liskeard. But the committee felt strongly that if the tower could not be restored, and its rebuilding was a necessity, they would be doing a grievous wrong if they did not take steps to secure the 1,000*l.* given by Miss Pedler towards the erection of a new tower. Mr. Fellowes Prynne, architect, was consulted by the committee, and reported on the condition of the tower. He described it as in a dangerous state and estimated that it could be restored for 700*l.* or 800*l.* But the restoration would not be satisfactory, for the tower would be so altered in character by buttresses that they would not know it again. Very little Norman work was to be seen now and the buttresses would have hid some of that. Consequently the committee came to the conclusion that the proper course to adopt was to build a new tower, treating reverently every stone in the old tower and embodying as far as possible all the features of the old structure. The present tower had been dealt with many times in many ways. On the south side the only Norman work was a few cockleheads, on the west and east sides there was not a single bit of Norman work, and on the north side were three windows of an early Norman period. These windows were the only bits of the old Norman church which could under any circumstances be reintroduced in a new tower, because the rest was rough cobble-work, and once taken down no power on earth could restore it. One other feature, which was distinctly Norman, was the small window which now looked into the body of the church, but originally looked over the roof of the old Norman church which formerly stood there. Next the committee advertised for plans for the new tower, and there were twenty-five competitors. Special instructions were given to those who competed to introduce as far as possible the architectural features of the present tower, consistent with the architecture of the church. Mr. Sedding, architect, was called in to assist the committee, and he selected a design sent in by Mr. Sansom, of Liskeard. In the plans now submitted was introduced every bit of work in the old tower which was capable of reproduction in the new. All the granite work of the new tower would be done with the granite taken from the old; the Norman windows would be placed, one each on the north, west and south sides, and the old Norman arch leading from the church into the tower would be re-erected inside the tower on the north side. At the request of the committee, Mr. Sedding also examined the tower, and reported that it was rent in various directions by cracks, apparently in consequence of defective foundation, and there could be no doubt whatever that the structure was in a precarious condition, and should be promptly prevented from further dislocation or the tower would collapse. Mr. Sedding added that any method short of rebuilding would be temporary only, for the tower needed a foundation, and that underpinning would be attended with considerable danger. He asked the court to grant the faculty because they were satisfied from the expert evidence that the tower could not be properly restored, and that it must be taken down and rebuilt. If it was not rebuilt it would come down of itself and solve the conundrum. It had been suggested that the rebuilding should be in such a form as to be practically a restoration of the present tower. But

anything more abnormal than building up in the twentieth century the replica of a tower commenced in the twelfth century, added to in the fifteenth, sixteenth and seventeenth, could hardly be conceived. Neither could nor would they do it. They wished to see not the replica of a Norman tower, so called, but a tower worthy of the church. People would not subscribe to build a replica of a Norman tower. But if the faculty were granted they would contribute liberally to a new tower, and the money would be raised in no time. He noticed with no small degree of surprise in the *Western Morning News* on the previous day a letter from the Royal Institute of British Architects. Whoever caused that letter to be reprinted went very close to contempt of Court.

The Chancellor: I agree with you that it ought not to have been printed.

Mr. Childs: It was most improper.

The Chancellor: The only thing is we must take no notice of these things.

Mr. Childs knew the letter would not influence the Chancellor's mind for a single moment. If the Royal Institute of British Architects had an earnest desire to preserve an ancient landmark their proper course would have been to send down members to make a careful examination and then oppose the petition. But they had not the pluck to do that. What they had to say, therefore, was not worth discussing, except that it was an unjust attempt to influence public opinion in Cornwall.

Messrs. R. Courtney, joint secretary of the tower committee, and Wm. T. Hancock, vestry clerk, produced minutes and reports, which bore out Mr. Childs's statement regarding the condition of the tower and the action taken in connection with it.

Mr. Thos. Lang, contractor, Liskeard, who carried out the restoration of the church in 1878, said that the foundation of the tower consisted of loose rubble stone, without any masonry whatever. There were numerous cracks in the tower, many having developed during the past twenty years. But for the support of the roof and arches at the north-east corner the tower must have come down before this. It was really leaning against the church. To underpin the tower was an impossibility, but unless underpinned it must inevitably come down. Unquestionably it was impossible to restore it. The walls were in a state of utter disintegration, rapidly falling abroad.

Mr. Edmund Sedding, architect, Plymouth, reaffirmed the opinion expressed in his report. Personally he should rebuild the tower, using every old stone that was possible, and have an entirely new internal tower bonded to the old. He would also alter the form a little, and add another stage to the top. Only that morning he had seen the foundation for the first time. He had never before seen such a foundation. It consisted entirely of stones loosely set, without mortar or lime. The foundation was not capable of carrying the tower, which was bound to come down. On examining the tower that day he found two more cracks, which he had never seen before. In reply to the Chancellor, Mr. Sedding said the tower was worth retaining if that were possible, but it could only be retained permanently by being rebuilt. He advised rebuilding as far as possible on the lines of the tower as it existed at present.

Mr. Childs, in summing up, said if the faculty was not granted, a check would be given to church work in that part of the county, from which it would take a long time to recover.

The Chancellor asked if there was any possibility of a compromise. He did not want to prejudge the matter, but if on going through the evidence he should be satisfied that the tower could be restored and the foundations underpinned, would it be possible for them to erect the tower at the north-east or south-east corner, and restore the old tower?

Mr. Childs said the committee would not entertain it for one moment. Moreover, Miss Pedler's legacy was left expressly to rebuild the old tower, and would not be available for the erection of a new tower on another site. But while the committee would not entertain the idea of having two towers, they would willingly consider any modifications which might be suggested in the plans.

The Chancellor intimated that he would send a written judgment, and the inquiry closed.

The following is the letter referred to, which was sent (1) to the Chancellor of the Diocese of Truro, and (2) to the Vicar and Churchwardens of Liskeard parish church:—

"July 13, 1897.—Sir,—We are desired by the President and Council of the Royal Institute of British Architects to inform you that they, having had the proposed demolition of the tower of the parish church of Liskeard, in the county of Cornwall, brought to their notice recently, have given the matter their careful consideration. They have been supplied with much information and numerous photographs of the building by various gentlemen interested therein. The tower dates from about the end of the twelfth century, and is the only remaining portion of the earlier church, which was pulled down to make way for the present church about the end of the fifteenth or beginning of the sixteenth century. In the opinion of the

Council of the Royal Institute it is badly in need of repair, but there would be no difficulty in making it perfectly sound. The expense would probably not exceed 700*l.*, and might be much less. The Council are, therefore, strongly of opinion that to pull down so ancient a building, and thereby destroy a valuable and interesting chapter of history would be a deplorable mistake, and they protest against the threatened demolition in the most emphatic manner possible. It appears that a recently deceased lady has left in her will the sum of 1,000*l.* for the purpose of building a new tower, and to this, as the Council understands, the further sum of 2,000*l.* is proposed to be added by the parishioners. There can be little objection to the proposed new tower being erected in some other part of the churchyard; indeed, there is good evidence that up to the time of Henry VIII. the church had two towers. Examples of detached towers are fairly frequent, those at Chichester, Evesham and West Walton being, perhaps, the best-known examples. The new tower might properly contain the peal of bells which, owing to the defective manner in which they are hung, have very probably helped to cause the cracks which appear in the old tower. We are desired, therefore, by the President and Council of the Royal Institute of British Architects to say that to pull the old tower down would be not only a great mistake but an act of vandalism altogether without excuse.

"We have the honour to be, sir, your most obedient servants,

"WM. EMERSON, Hon. Secretary,
"W. J. LOCKE, Secretary."

The state of opinion in the district can be judged from the following letter:—

Sir,—I attended the meeting to-day in Liskeard Town Hall held by Chancellor Paul as to the advisability for granting a faculty for rebuilding the tower of Liskeard Church, and after the evidence and facts laid before the court I cannot see how the application can reasonably be refused, or how the authorities of the diocese of Truro can justify themselves for the annoyance, costs and obstruction they have already caused the parishioners of Liskeard. I have not yet seen or heard of any offer to provide the funds to defray the cost of renovating the old ramshackle tower by these antiquarians who evince so much concern for its retention. If I do not mistake them, the parishioners of Liskeard are steadfastly resolved, if they build at all, to build a tower in character with and suitable to the style of their fine old church, with very little, if any, deviation from the plan they have chosen and approved of.

Liskeard: September 23.

C. M. OLVER.

TONBRIDGE, KENT.*

IT has been my privilege to-day to accompany you to the quaint old town of Tonbridge, which is situated on the banks of the Medway and in the very heart of the "Garden of England." In our short ramble o'er hills and stiles, through copse and wood, we have had revealed to us just a little of that rural loveliness which has made the county of Kent so famous. The early history of the town is the history of the castle, for the two are inseparably connected. Regarding the meaning of the name Tonbridge there is still some doubt, for while some agree that it means the "town of bridges"—as centuries ago five bridges spanned the river and its tributaries—others believe the word to be of Saxon origin, from "ton" (a town) and "burg" (a fort). With the advent of William I. (1066) Tonbridge became a centre of great importance. When the Conqueror landed at Hastings he brought with him a horde of Norman nobility, ecclesiastics and others, who for the help rendered had bestowed upon them various manors and livings in England. Among these was one Richard Fitzgilbert, who had considerable possessions at Brionne. To him, it is said, was allotted the "lowy" of Tonbridge. A "lowy" is the district belonging to a castle, manor-house or religious house. In those days the town was little more than the suburbs of the castle, and the inhabitants, probably nearly all retainers of its lord, following their different callings virtually by his permission and existing to support him in his various warlike and sporting expeditions. Subsisting upon the roughest fare clothed in the rudest attire, we read that "within the deep glades of the dense forests surrounding the town the peasantry tended the vast herds of hogs, wearing as their clothing the untanned skins of animals with the hair inwards, whilst around either their neck or arms they wore rings of iron, betokening their servitude to their ruler at the castle." "Let us," says one writer, "try and picture the condition of Tonbridge and the surrounding districts in those far-off days. In imagination let us stand on Bloodshot Hill and view the landscape o'er. The town—such as it was—would be in the foreground, the walls of which, surrounding the houses of the townspeople, would be all clearly distinguished, whilst the many-channelled meanderings of the Medway would streak the landscape in various directions. In the background we should see the towers of Tonbridge

Castle, not then crumbling with decay and mantled with ivy, but erect, gaunt and forbidding; emblematic of the iron-handed rule of its dreaded lords. Away towards Maidstone and Paddock Wood vast marshes rendered thousands of acres useless and unhealthy, and in these vast quantities of wild fowl made their home, filling the air with their weird cries. The remainder of the landscape was comprised of dense forest land, indications of which exist to this day in the names of various spots, such as 'The Forest,' 'Forest Farm,' &c."

I will not attempt to give in detail the history of Tonbridge, but rather a separate account of each of the interesting landmarks which it has been our pleasure to visit, and from the whole we may perhaps be able to picture to ourselves a little of the past. With its castle, its church, its priory, its old timbered houses and last, but not least, its famous grammar school, certainly there are few towns of greater interest. And while we read and think of Tonbridge as in the old world, to-day we see it in the new, not decaying or destroyed, but growing in peace and prosperity; and although modern exigencies may necessitate many alterations and additions, let us venture to hope that this picturesque old town may long retain its valuable and interesting evidences of bygone days. For much of my information I am indebted to works by Hasted, Murray and Measom, and a most interesting and valuable guide to Tonbridge, by Messrs. Stanley Martin and Prescott Row, and "History of the Church," by J. F. Wardmore.

The Castle.

This building, which is supposed to have been erected by Richard, Earl of Clare, in the eleventh century, at one time enclosed six acres of ground and was surrounded by three moats, but little now remains of it except the keep, small portions of the walls and an interior gateway, said to be the finest extant specimen of Norman architecture in this country. The entrance is across a filled-up moat and through the noble gate tower, which is of great size and tolerably perfect. Here we note the excellence of the masonry, the durability of the very soft stone, the holes for the pivots of the drawbridge, much higher than usual, the extraordinary number of perforations in the vault, on the left a piscina marking the entrance to a chapel; above, the state-room and its large and handsome windows, and generally the various mouldings and enrichments, rare in castellated buildings, and showing this to be of the Early Decorative period, 1280-1300.

Beyond the gate-tower is the inner ward; on the left, beyond the modern house, is a wall with fragments of Norman and Early English work, and forming part of the enceinte of this ward is the so-called Norman Mound, on which stood the keep, covering an acre, 100 feet above the river and 70 feet above the court. On its top is a shell of wall which may be Norman. A walk leads from this mound along a thick curtain wall to the upper storey of the gate-tower. Under this curtain is an arch, which seems to have been a water-gate, by means of which boats could be brought from the Medway, along the moat, into the inner ward.

The keep mound was probably the work of Richard Fitzgilbert, who, it is said, acquired the estate in exchange with Archbishop Lanfranc, and established a jurisdiction over the "leuca" or "lowy" of Tonbridge. The later earls added the gate tower and dug the outer moats.

The castle is historically extremely interesting, as having been besieged by William Rufus in his contests with his brother of Normandy. It was captured by King John in his struggle with the barons; and in the reign of Henry III., when it was besieged by his son, Prince Edward (afterwards Edward I.), the town was burnt by the garrison to check the approach of the royal forces.

It devolved to the crown in the reign of Edward II. (1307-27), and subsequently became the property of the Earls of Stafford, afterwards Dukes of Buckingham, until the attainder of the last duke of that family in 1521, when it again reverted to the crown (Henry VIII.). Elizabeth gave it to her kinsman, Lord Hunsdon, from whom it passed to the Berkeleys, and from them to the Vanlores, the last of whom died, without male heirs, in the seventeenth century. It subsequently became the property of Jermingham, Lord Stafford, a representative of its ancient owners.

The lords of Tonbridge were hereditary chief butlers and stewards of the archbishops of Canterbury and attended their enthronisation feasts in great state. At their termination they claimed the right of remaining three days in one of the archbishop's manors—"ad sanguinem minuendam"—a process looked forward to as necessary after the streams of hippocras and malvoisie set flowing in the hall of Canterbury. The earls, however, may have had their own wine-vats nearer home, for Hasted asserts that a vineyard existed at the castle when he wrote, "from which quantities of exceeding good and well-flavoured wine was produced." This was planted by a Mr. Hooker about the middle of the last century, who, while thus appropriating the enclosure, built the present dwelling-house out of the ruins.

* A paper read by Mr. C. F. Partington on the occasion of the visit of members of the Upper Norwood Athenæum.

"We honoured the man for his taste," wrote Walpole, who ought rather to have condemned his vandalism; "not but that we wished the committee at Strawberry Hill were to sit upon it, and stick cypresses among the hollows. But, alas! he sometimes makes eighteen sour hogsheads, and is going to disrobe the ivy-mantled tower because it harbours birds." The present tenant is Mr. C. J. M. Wauton, who conducts a school there, and it is hardly possible to imagine a more healthy, lovely, peaceful spot in which to study.

The Church of SS. Peter and Paul.

Although there is no mention of the town, church and castle of Tonbridge in Domesday Book, which was completed in 1087, it is believed that a church existed previously, as Odo, Bishop of Rochester, held lands in Tonbridge, which were valued at the sum of 20*l.*, and Lanfranc, Archbishop of Canterbury, to the value of 15*l.* It is difficult to say why they escaped valuation in the survey, unless it be that when in the possession of the archbishop and bishop they were exempt from danegeld, and still continued to enjoy that privilege, and therefore, as in numerous other instances, they were not noticed by the Commissioners in their returns. On the disgrace of Odo, these lands were owned by Richard of Tonbridge, a powerful nobleman who came over with William the Conqueror. His grandson, Roger de Clare, Earl of Hertford, founded the priory of St. Mary Magdalen in Tonbridge, and in 1191 by charter gave to the Brethren of the Hospital of St. John of Jerusalem the church of Tonbridge, with the chapel and appurtenances belonging to it, to the use of the poor of that hospital, in pure and perpetual alms. And by another grant he gave and confirmed to them the advowson of this church and the right which he had to it. This was confirmed by Walter, Bishop of Rochester, and Pope Celestine. Pope Clement IV., A.D. 1267, granted license to the prior and brethren of the hospital to take possession of this church as an appropriation on the first vacancy of it, provided that a fit portion from the income of it was assigned to a perpetual vicar serving in it, for his maintenance and the support of the burthens of the church, and they were that year admitted to it. The first nomination of which there is any record was in 1267, when Brother Henry, Master of Sutton, of the Hospital of St. John of Jerusalem, was duly inducted by William de Quinton by the delivery of chalice and key of the said church.

In 1268 it was affirmed that the bishop received an annual pension of three marks from the parish church of Tonbridge towards the revenues of his table. In 1314 it was certified to the king's treasurer, in obedience to the king's writ, that the prior of the hospital possessed the appropriation of this church with the chapels of Schiburne and St. Thomas Martyr, of Capel, worth yearly 90 marks. In a report of Philip de Thame, prior of the Knights of St. John, to the Grand Master in 1338, the value of the church was 120 marks.

In 1508 it appears the bishop received from the vicarage of this church an annual pension of forty shillings. In 1527 the prior and brethren of the hospital demised to Richard Fane, gent., of Tudeley, their patronage of Tonbridge, with all its appurtenances, excepting the advowson and the woods and underwoods, at the yearly rent of 14*l.* In which state the church continued till 1541, when the order was suppressed, and all their lands and revenues were given to the king, and the fee of it continued to the crown, until Edward VI., in his first year, granted both the rectory and advowson to Sir Ralph Fane and Lady Elizabeth, his wife, to hold "in capita" by knight's service. After Sir Ralph's death, Lady Elizabeth Fane, in 1556, alienated the rectory, with its appurtenances, to Henry Stubberfield, yeoman, who sold it to Alexander Colepepper. He also passed it away by sale to William Denton in 1565, whose eldest son, Sir Anthony, died in 1615, possessed of it. He was one of the gentlemen of the band of pensioners of Queen Elizabeth and James I., and was buried in this church; there his monument still remains with the figures at large of himself and wife Elizabeth. After his death it descended to his four nephews, sons of Sir Alexander Denton, who sold this property; to some in districts or tithe wards, and to others as to their own lands only, which accounts for the several lands in this parish which have from that time been exempt from payment of rectorial tithes. But the advowson of the vicarage remained in the hands of the Fanes, who resided at Hadlow Place, till Viscount Vane (or Fane) dying in 1789 gave the advowson among parts of his estates to David Papillon, of Acrise. It is now held by Mr. John Deacon, of Mableton.

The church is an elegant stone structure with a square tower, but both the church and chancel have suffered so much from ecclesiastical changes and the hands of the destroyer that but little real interest remains. The oldest portion now existing is the chancel, which contains two small round-headed windows on the north side high in the wall, and another on the south, at present opening into the vestry; these are probably Early Norman. The church contains some interesting monuments,

especially one sculptured by Roubiliac to "Richard Children, died March 23, MDCCCLIII., aged 83 years."

In the chancel are two recumbent effigies of Sir Anthony Denton and wife.

In the churchyard there is an interesting memorial to Ann Elliot, the authoress. It is an urn-surmounted tomb surrounded by railings close to the wall near the Bordyke exit:—"Ann Elliot, daughter of Richard and Mary Elliot, born November 16, 1743, died May 30, 1769."

The Priory of St. Mary Magdalen.

The priory was founded in the middle of the twelfth century for black canons (Premonstratensian canons) by Roger de Clare, the first Earl of Hertford, and grandson of Richard Fitzgilbert, and was suppressed in 1526 among the smaller monasteries at the instigation of Cardinal Wolsey, to whom it was granted by Henry VIII., in order to enlarge the endowment of his college at Oxford. On July 11, 1337, it was destroyed by fire, but soon rebuilt, a special indulgence of forty days being granted to all who assisted in the rebuilding. The buildings from the foundations were extensive, for in 1337 they included consistory, chapter-house, dormitory, refectory, church, vestry, library and other offices. In April 1840 the last remains, consisting of the great hall and the chapel, were destroyed during the construction of the South-Eastern Railway. In the garden of the old Ivy House (house of the portreeve) there are some large "iron" stones, and among them I discovered two stone coffin lids with carved crosses in excellent preservation, which probably are part of the remains and the only relics of the black canons of Tonbridge.

Timbered Houses.

Old Ivy House, a picturesque old landmark, formerly the house of the portreeve, where in olden times owners of cattle coming into the town were taxed. The house is known to be 450 years old and its oaken beams seem as good as ever. The ceilings are rather low, but the rooms are large and comfortable and from the stoutness of the walls it is evident that the house was built to last.

Old Chequers Inn, High Street, is a quaint-looking old house which bears the strongest marks of antiquity; said to be some 500 years old and once the only inn in the town, now in the possession of the Colepepper family.

Elephant and Castle is a very quaint old building which formerly did duty as a portreeve house.

Tonbridge Grammar School.

The great glory of Tonbridge is its grammar school, which has for a great many years enjoyed a high reputation as a classical seminary. It was founded in 1553 by Sir Andrew Judde, alderman of London, and is under the government of the Skinners' Company, who annually come down to examine the scholars. Sir Andrew, who was a native of Tonbridge, obtained a charter from King Edward VI., and the foundation-stone which is inserted in the wall over the door of the head master's house bears this inscription:—

"This shole made bi Sir Andro Jude, knight,
And given to the compagne of Skinners, Ano. 1553."

During Sir Andrew's lifetime he was sole governor, but upon his death full powers were vested in the Skinners' Company. The endowment consisted of property in the City of London and some land in the then country village of St. Pancras. These sources now contribute a princely income to the school. Sir Andrew Judde's orders for the conducting of school contained in the original statutes are quaint and thorough.

As regards the master, it provided that he be elected by the Skinners' Company, and that he receive a quarterly salary of 5*l.*, rent free. It also stipulates, among other matters, that he be chosen "for his learning and dexterity in teaching, as also for his honest conversation and for right understanding of God's true religion now set forth by public authority, whereunto he shall stir up and move his scholars, and also shall prescribe to them such sentences of Holy Scripture as shall be most expedient to induce them to godliness."

It also provides against both the master and his usher, whom the former appoints, being "a common gamester or haunter of taverns." It prescribes that the hours of study be from 7 A.M. to 11 A.M., and from 1 P.M. to 5 or 6 P.M., according to the time of the year. The statutes are subscribed by Arch. Parker and Dean Nowell, the latter of whom suggested various alterations, one of which was no doubt much appreciated by the sixteenth-century boys. The original rules provided that no "remedy for playe" should be allowed "above flower tymes in the yere." To this Nowell, who had been a boy himself once, inserted in the margin the words that "Leave to play once a weeke may well be borne with."

An institution of the original school was the "Common Box," a receptacle made of iron with a heavy handle, and with the arms of the Skinners' Company on two of its sides. It was virtually a big money-box, into which a boy, upon his admission to the school, deposited sixpence for the use of books, and into

which fines of various descriptions were placed. Should a boy be absent without leave his delinquency was reduced to a monetary value, and the "Common Box" received his fine; another of its uses was when an extraordinary "remedy" was granted. A "remedy" was an extra holiday, and once a fortnight was the limit for these "remedies," but if some eminent visitor asked an extra "remedy" for the lads, provided it did not occur more than once in the same week, it was granted. But supposing such a request was tendered more than once in a week the "offender," that is the one who made the second application for a holiday, was mulcted in a fine, and the "Common Box" became the richer by the sum of three shillings and fourpence.

In the old days the boys attended service in the parish church, but in 1859, when Dr. Welldon was headmaster, a chapel to seat about 200 was built in front of the school. When the Rev. Joseph Wood became headmaster he extended the work of the school, and at his house and at the residences of some of the assistant masters boarders are received. The number of scholars so increased that it was found impossible to accommodate them in the chapel, so an iron one was erected, to which an extra aisle has since been added. The old chapel is now a museum. July 28 is known as "Prize Day" and "Skinners' Day." The prize compositions include English verse, Latin verse, Greek verse and English essay; and at the distribution of prizes the Master of the Skinners' Company, who is governor of the school, gives an address. The Rev. Joseph Wood is aided by thirty assistant masters, and in no school probably can more practical knowledge be gained. In 1833 the number of boys in the school was 100. Under the present headmaster the number of scholars has risen to the unexampled total of 400. Long may it continue to flourish.

Sir Andrew Judde died in September 1558, and was buried in St. Helen's, Bishopsgate, where a monument exists to his memory.

DESIGN IN LETTERING.*

THE subject of the course of Cantor Lectures I begin to-night is really the relation of lettering to design. "Art in the Alphabet," that should have been my title; it would have conveyed, I think, better than "Design in Lettering" the actual task I have set myself, which is to discuss the subject of lettering from the point of view of art, and only from that point, for it is the only one from which I have any right to speak.

I shall have, of course, to refer to the archæological and palæographical sides of the question; but I promise you it shall be in the briefest possible words, and I wish here, once for all, to make it clear that I lay no claim to the slightest authority on anything but the point of view of design—and even on that point I wish it to be understood that I am not presuming to lay down the law to artists, but only expressing my individual opinions. I do not wish even the younger members of my audience to attach more weight to my words than may be due to the interest I have always taken in this subject and the years I have given to its study. It suits my temper best to speak my mind frankly and unguardedly—and I don't want anyone to think that my most uncompromising assertion means more than that, that is precisely how the thing strikes me.

"Design in lettering!" We are bound to assume that, in the first instance, there was none. The alphabet was not designed, it grew. Precisely whence it came it would be rash to say—palæographers differ—but there is no doubt it came from the East as all culture did.

The Phœnicians, it used to be said, first invented alphabetic writing. They were, as everyone knows, the traders of antiquity (as we ourselves are the traders of to-day), and no doubt they spread the art of writing over Europe. But neither is there any doubt that the Egyptians were before them, to say nothing of the Chinese. The Chinese apparently arrived, quite independently of the Egyptians, at an alphabet of their own. Those, however, who should know best seem to agree in thinking that Egypt led the van. Certainly it showed Europe the way.

The letters of the alphabet are neither more nor less than symbols of sounds. Writing was in the first place figurative—that is to say, picture writing.

Drawing, in fact, preceded writing, or was the form writing first took. Primitive man knew no other way of conveying the notion of man, beast or thing than by making a rude sketch of whatever it might be. That, then, is the first stage of writing, the figurative—a simple but rather cumbrous way of recording speech, of transmitting it, that is, by glance of eye instead of word of mouth.

From that merely figurative writing to symbolic expression

is but a step. It requires no great stretch of the imagination to let, we will say, the sword stand for war, the pipe for peace, the lion for courage, the skunk for cowardice, and so on.

Not that I mean to imply that these particular symbols were used in this sense by the Egyptians; I refrain purposely (in my entire ignorance on the subject of Egyptology) from pretending to say the sense in which they used the familiar signs of vulture, beetle, serpent, and so on. It is enough for our purpose that, by the acceptance of images such as these as symbols, it first became possible to convey in writing abstract ideas.

The stock of ideas which could be so conveyed was, in the nature of things, limited; you could express a fortified town by a tower—but what town? Moreover, when once a thing stood for an idea, it became necessary to distinguish between the representation of it designed to express that idea, and the representation of it to express merely the thing itself. How was the reader to know whether by a serpent the writer meant eternity or simply a reptile? It is conceivable that a polite note asking for the loan of a hatchet might be taken as a declaration of war.

As the best symbolic writing could appeal only to people who had ideas in common—it would puzzle one to-day to invent a symbol which should convey to the Italian tradesman a notion of what we mean by "fixed prices"—the wider the dealings of a people, the more they would feel the need of some more elastic means of expression. How for example to express proper names, or things not readily distinguishable by the eye—say sugar from sand, glass from precious stones—and so with many a commodity in which a trade might be carried on. (There is an ominous sound about the word "trade"—but we must give it its due—and there is no doubt it is largely responsible for the spread of so much culture as may be implied in the use of written language.) Well, this need of more elastic expression—ever more and more pressing—was supplied by the use of signs to express, not merely things, no longer even ideas only, but sounds. There, with signs for sounds, begins a really scientific system of writing.

How man can possibly have conceived the idea of devising such a system is more than one can understand; the daring of it is tremendous, but of course its originators had not the faintest notion of the perfection to which in the course of ages it was to be carried. It began after the manner of things destined to take root modestly, and for a while the alphabet, though phonetic, was still pictorial.

The new departure consisted in making a sign stand for the sound of a word, and no longer for the word itself. It so happens that in the language of all primitive peoples words are usually monosyllabic—it was so in Egypt; a sign therefore stood for the sound of a syllable, and eventually for the first part of the sound, for the first letter of it, in short. It is as though they had started with the notion that "A was an archer," or rather that an Archer should be A, and so forth through the alphabet, no matter whether it took 16 letters or 52 or 500 to express the sounds employed in the language.

An archer answers very well for A—but the delineation of the archer makes demands upon powers of drawing with which not every one is gifted, and in any case it takes time. Why not, therefore, represent the archer by his bow: that is easily drawn, and not easily to be mistaken? Similarly, if the ox stood for O, or the stag for S, the beast might just as well be suggested by his horns only—and so on to the end of the alphabet.

Writing is always a sort of shorthand: inevitably the signs are reduced to their simplest expression, become mere signs, as unlike the thing which may have suggested them as a man's signature—which is yet honoured by his banker. Enough if it conveys that what we are meant to understand; the business of a letter is to convey a definite sound.

We arrive, then, by an obvious process of "degradation," as it is called, of natural forms, at an alphabet of practically quite arbitrary sounds, the alphabet as we know it and have known it for a couple of thousand years and more. (I don't quite know why we should call it degradation—"fit treatment," "natural selection," I should rather call it.)

You must bear with me for a few moments whilst I endeavour to trace back the characters we use to their origin.

We know them, in a sense, so well that we never think to ask ourselves what they mean or how they came to be. But it is of no use attempting to discuss the letters we employ without realising first of all how we came to employ them; rightly to understand their forms, we must understand how they came about. The story of their evolution should be interesting. At all events, it is an essential part of our subject.

We get our alphabet, as you know, from the Romans. We speak of it to this day as Roman, to distinguish it from Gothic or black letter. The Romans got it from the Greeks, or, if not precisely that, from the same sources whence they derived theirs.

What we know for very certain is that the Greek, Etruscan, and old Roman alphabets are all very much alike. They resembled one another, that is to say, in the number of letters they contained, in the sound-value of those letters, and in the

* Abstract of a course of Cantor Lectures, by Mr. Lewis Foreman Day, published in the *Journal of the Society of Arts*.

form they took. These letters were originally only sixteen in number; and that seems to have sufficed always for the Etruscans—the race died out before ever it had need of more. The Greeks, it appears, grafted on to the old Pelasgic or native alphabet (whencesoever that may have been derived) certain new letters necessary to express new words (involving new sounds) which they borrowed from the Phœnicians. Naturally they took those letters from the Phœnicians also. These same Phœnicians probably adopted from the Egyptians signs sufficing to express the sounds in their own language—without caring or knowing perhaps anything about the pictorial origin of such signs. They accepted them as so many arbitrary expressions of sound-values; and there was nothing in the world to prevent their modifying them, therefore, until they had reduced them to the very simplest and most convenient form of expression. That is what they did. And so it comes about that we to-day appear to be directly indebted to ancient Egypt for at least some part of our alphabet, far removed as it may be from the hieroglyphics of the Pharaohs. But that is by the way, as well a long way off. For our present purpose we need not go further back than to ancient Greece.

The Greeks had no longer (as the Egyptians had) any signs to represent syllables, that is to say, combinations of vowels and consonants; but they retained certain compound consonants, most of which they adopted from the Phœnicians. These the Romans dropped. At first they used, instead of them, the two consonants *ch*, *ps*, which expressed as nearly as possible the equivalent sound of the Greek *χ*, *ψ*, and so on.

And then, perhaps, they devised a single letter for a sound which until then had been expressed by two—*F*, for example, instead of *Ph*, *Q* instead of *Cu*.

The sixteen letters common to Greeks, Etruscans and Pelasgians were *Α Β Γ Δ Ε Ι Κ Λ Μ Ν Ο Π Ρ Σ Τ Υ*. The Phœnician letters next added were *Ζ Θ Φ Χ*. After that we get *H* for *ee*, *Ω* for *oo*, *Ψ* for *ps*, *Ξ* for *ks*.

The early Roman or Latin alphabet differed very little from the Greek. The latest comers in it were *G H K Q X Y Z*. Once printing was established, changes in the form of the type were necessarily very gradual. Possibly they have been, on the whole, in the direction of clearness and legibility. Certainly they have not been in the direction of beauty—which, however, I am bold to contend, is perfectly compatible with sternest usefulness. And we have arrived to-day at a period when everyone is so familiar with the printed page that, although he may be prejudiced against any modification of it, and resent it, there is no danger of his not being able to read it in any improved shape we might devise.

Modern type is based on manuscript forms. Those MSS. forms were modified by the scribes with a view always to ease in writing. Whatever was difficult or took long time to write fell naturally out of use. In printing, that concerns us no longer—one shape is as easy to print as another; and it might be worth while to restore some obsolete features, now that we have not to write the letter. At any rate, I think it is time we looked over the alphabet—took stock of it, as it were—with a view to perfecting it as printed type without too tender a regard to its descent. Letters, like the men who use them, must stand to-day on their own merits.

Our first business with the alphabet is to make it work smoother, to make reading easy. That will be done by developing whatever is characteristic in each letter, by curtailing, and if possible lopping off, whatever there may be in it which allows us to confound it with another. The needful thing is, in the case of each individual letter, to emphasise its individuality, to make it unmistakably itself. And at the same time there is no reason why reading should not be made pleasant as well as easy; beauty has also to be borne in mind. It goes without saying that that must on no account interfere with use, but there is not the least reason why it should. Beauty does not imply elaboration or ornament. On the contrary, the qualities of simplicity, dignity, character, which in the name of art we desire, are precisely the qualities which in name of practicality are equally demanded.

The preliminary, however, to any doctoring of the alphabet, any surgical operation, however necessary, any safe prescription even, is that doctors should understand the patient.

I propose, therefore, not precisely to dissect the alphabet (though it is dead enough), but to explain to you as far as I can the comparative anatomy of lettering, and I have prepared a series of diagrams which I think will enable you better to distinguish what is essential to the letter and what is not. They are not beautiful, but should be helpful.

You will notice the resemblance between the Coptic and the Greek letters. The Coptic alphabet is, in fact, only a variant upon the Greek. The Copts, you know, were the Christianised Egyptians, and when they accepted Christianity they adopted the Greek alphabet—just as the Turks took the Arabic character together with the Koran—and in the sixth century, when the new faith was firmly established at Alexandria, Coptic writing supplanted the old Egyptian. The Coptic alphabet is therefore Greek, except for seven extra signs, taken from the

ancient demotic alphabet to express Egyptian sounds for which the Greeks had no equivalent.

In its adaptation to Latin language Greek gamma or *G* becomes *C*. *G* is in fact almost equivalent to hard *C*. To the not too subtle ear the two sounds are like enough to pass one for the other—just as soft *C* may be made to do duty for *S*. When *G* came to be used as a separate letter, distinct from *C*, then *C* in its turn was used for *K*—though *K* did not go quite out of use.

There are points of resemblance again between our alphabet and the Runic. Runic is the name given to the writing of the priests of Northern Europe, and especially of Scandinavia. It is no doubt ancient. The legend is that it was the invention of Odin. If so, Odin must have derived it from some ancient Greek or Roman source, if we are to judge by internal evidence. Certainly it was in use from the time of the first intercourse between Scandinavians and Romans. Christianity forbade its use, and with the triumph of Christianity it passed out of currency. But it affected our Anglo-Saxon writing somewhat.

The Greek *H* stands for *EE*; but at the beginning of a word it answered the purpose of the aspirate. The Romans used it for the aspirate only, that is to say, practically just as we use it now, namely, for *H*.

The letter *J* did not exist either in the Greek or in the ancient Roman alphabet. It is equivalent, of course, to *ii*. Place one *i* over the other and you get a long *j*. Eventually the initial developed a tail and became *J*. Towards the fifteenth century the initial *I* was pretty generally written *J*.

The Greek *Υ* (upsilon) becomes the Roman *V*, whence the confusion until quite recent times of the letters *U* and *V*, which, you know, were used indiscriminately. They were interchangeable—you might use one or the other—both, if you liked, in the same sense, in the same word. It was not until the tenth century that the custom arose of reserving *V* for the beginning of a word and elsewhere using *U*.

Ω (omega) stands for *oo*. And in the minuscule form looks like it—shows its derivation; but in the end it is used for *uu*, or *W*. It appears that in some Greek dialects it is used for *ou*. It is quite certain that in the ninth century omega was written precisely like a *W*. And when you come to think of it the sounds are very nearly alike. Take any word beginning with *W* and change the *W* into double *o*, and then try and pronounce it—say, not *WHY*, but *OOHY*. Why, it's much the same thing.

(To be continued.)

THE BATTENBERG MEMORIALS.

A CORRESPONDENT of the *Standard* writes:—‘The committee responsible for the carrying out of the work of erecting suitable memorials in the Isle of Wight to the late Prince Henry of Battenberg, have received a communication from the Society for the Protection of Ancient Buildings which will in all probability retard the work which the committee have in hand. Shortly after the death of the late Prince Henry a committee of leading residents in the Isle of Wight, including the chairman of the County Council (General the Hon. Somerset J. G. Calthorpe) and the Deputy Governor of the Isle of Wight, was appointed to arrange for the carrying out of suitable memorials in or near the centre of the island, the town of Newport. The memorials decided upon were the conversion of the ancient gatehouse and portcullis chamber of Carisbrooke Castle into a museum for the reception of articles of interest connected with the castle and the Isle of Wight. The other memorial was an addition to Carisbrooke Church. Sir Charles Seely, formerly M.P. for West Nottingham, offered 1,000*l.* towards the second memorial, providing that at Carisbrooke Church a chancel should be built on the site of the one formerly said to have existed at the church. The memorial at Carisbrooke Castle is almost completed, and has given great satisfaction to those who are responsible for the work, including the Princess Beatrice, who is the Lady Governor of the Isle of Wight. With regard to the memorial at Carisbrooke Church, the committee of the Society for the Protection of Ancient Buildings has interposed, and the secretary, Mr. Thackeray Turner, has addressed a letter to the secretary of the Battenberg memorials committee on the subject. The committee express the hope that the rumour as to the destruction of the ancient chancel arch is unfounded, as, in their opinion, it would be an unjustifiable act of vandalism. Carisbrooke Church, they point out, is so well known, and was of so much interest to many people beyond the area of the Isle of Wight, that any interference with its ancient character and appearance could only be looked upon as a calamity, and, therefore, the committee earnestly begged that the memorials committee would not give its consent to the destruction of the chancel arch, which was necessarily a record, and an interesting feature of the church. The Society had no other object in view than as its title indicated, namely, the preservation of an ancient building. The memorial has not been so popular with

the island residents as that at Carisbrooke Castle. The action of the Society mentioned has caused considerable comment in the district, and it is quite probable that the committee will be prevailed upon to adopt some other scheme.

CARVED COMMUNION TABLES.

IN the Consistory Court of York on September 23 Lord Grimthorpe, as Chancellor of the Diocese of York, delivered judgment in the case of the Rev. T. J. Miller, vicar of South Cave, who applied for a faculty to erect in that church a carved oak communion table and reredos. The application came before the Court some time ago, when the lay rector and patron of the living, Mrs. Barnard, of Cave Castle, opposed the same. The Rev. T. J. Miller was presented by Mrs. Barnard to the living in August 1895, and, according to affidavits put in, the new vicar undertook not to adopt the eastward position nor yet to introduce a cross into the church. It was suggested that he had not kept his promise, and, with reference to the proposed faculty, Mrs. Barnard objected to the whole reredos, including a proposed cross, because it would, as alleged, partly obscure the east window, of fine old stained-glass which was brought from Holland at considerable cost by one of her predecessors. The substitution of a new communion table was also objected to as unnecessary, the present table being perfectly sound and in good condition and put in by Mr. Pearson as architect when the late lay rector restored the chancel. There was some contradiction as to the design of the proposed new communion table, and the Chancellor said the question was raised whether it was a *bona-fide* table at all. It was quite a mistake to imagine that the decisions against stone tables sanctioned a sham one made of wood. Mr. Prideaux, Q.C., in his "Churchwarden's Guide," doubted their legality. And the Court of Arches in *Bradford v. Fry*, which had never been overruled, disallowed steps round the north and south side of a communion table on the very ground that they made it look like an altar. He himself had always followed that judgment, and meant to do so until it was overruled, and not merely disregarded by some inferior court, or by architects and clergymen unlawfully. The Chancellor severely commented on the conduct of the vicar. He referred to an affidavit by a parishioner, Mr. Cousens, who stated that he had ceased attending the church because of Mr. Miller's practices, to which he and many others objected. He refused the faculty, and condemned the promoter, Mr. Miller, in the costs.

TESSERÆ.

Impressions of Medals.

IMPRESSIONS of medals having the same effect as casts may be made of isinglass glue by the following means:—Melt the isinglass, beaten, as when commonly used, in an earthen pipkin, with the addition of as much water as will cover it, stirring it gently till the whole be dissolved; then with a brush of camel's hair cover the medal, which should be previously well cleansed and warmed, and then laid horizontally on a board or table, greased in the part around the medal. Let them rest afterwards till the glue be properly hardened, and then, with a pin, raise the edge of it, and separate it carefully from the medal. The cast will be thus formed by the glue as hard as horn, and extremely light. In order to render the relief of the medal more apparent, a small quantity of carmine may be mixed with the melted isinglass; or the medal may be previously coated with leaf-gold by breathing on it, and then laying on the leaf, which will by that means adhere to it, but the use of leaf-gold is apt to impair a little the sharpness of the impression. Impressions of medals may likewise be taken in putty; but it should be the true kind, made of calx of tin and drying oil. These may be formed in the moulds, previously taken in plaster or sulphur; or moulds may be made in its own substance, in the manner directed for those of the plaster. These impressions will be very sharp and hard, but the greatest disadvantage that attends them is their drying very slowly, and being liable in the meantime to be damaged.

Burning Glasses.

The invention of mirrors or looking-glasses, constructed probably of polished brass, remounts to a very remote antiquity, as they are mentioned by Moses in the sacred writings. At what period they were employed in a concave form to concentrate the solar rays by reflection is not known, but it is very probable that mirrors of this kind were used to rekindle the vestal fires. Plutarch, in his life of Numa, 700 years before Christ, describes the *σκαφεῖα*, or dishes which were employed for this purpose, and which appear to have been concave segments of a sphere; and he states that the combustible matter was placed in the centre, meaning, no doubt, the focus or centre of

concentrated rays. In the time of Socrates, 430 years before Christ, the manufacture of glass had made considerable progress, and it appears from a passage in one of the plays of Aristophanes that the use of burning glasses was common. The author introduces Socrates as giving lessons in philosophy to Strepsiades, a citizen of Athens, and a man of low cunning. The subjects of these lessons are silly trifles, intended to make Socrates appear ridiculous. Strepsiades, after having asked him how he should avoid paying his debts, proposes the following expedient himself:—"Strepsiades: You have seen at the druggists that fine transparent stone with which they kindle fires? Socrates: You mean glass, do not you? Strepsiades: The very thing. Socrates: Well, what will you do with that? Strepsiades: When a summons is sent to me I will take this stone, and placing myself in the sun, I will melt all the writing of the summons at a distance." The writing, as we know, was traced on wax spread upon a more solid substance. This description must refer to a burning glass by refraction. Several other ancient observations on the same phenomenon exist. Pliny mentions globes of glass or of crystal, which, being exposed to the sun, would burn clothes or the flesh of a patient when cauterisation was requisite. Lactantius, who lived about the year 303, says, "A globe of glass filled with water and exposed to the sun will kindle a fire even in the coldest weather." But the most memorable account of burning glasses and of their effects in all antiquity, and what has excited no small degree of speculation in succeeding times, is the extraordinary achievement ascribed to Archimedes, of setting fire to the Roman fleet engaged in the siege of Syracuse.

Bronze Casting.

The art of the founder naturally underwent all the vicissitudes of the other arts; in the time of Nero the decadence had already commenced, it not being possible to cast the colossal statue of that emperor, modelled by Zenodorus, and which was to have been 110 feet high, although a century afterwards the beautiful equestrian statue of Marcus Aurelius was cast. Falconnet, in comparing these two facts, endeavours to make out a case for an attack on Pliny; but it seems to us that the circumstances may be reconciled by supposing that casting in bronze had been momentarily neglected before the time of Zenodorus, and that they had been more successfully cultivated in the time of Marcus Aurelius, for a similar circumstance happened in our own days. The brothers Keller, under Louis XIV., carried the art of casting in bronze to a high degree of perfection; but under Louis XV. the founders were not so good, and in the early part of the Empire great difficulties were met with in executing works of this kind, whilst now the art of casting in bronze has made greater progress than ever. Besides, it may be said that whenever a process is not carried on scientifically, while the reason of the different phenomena has not been discovered, and the artist consequently is reduced to take the bare results of experience for his guide, the neglect of the art for some time is enough to cause the facts to be forgotten, and the guides are consequently lost. This, however, cannot happen when the theory of an art is firmly based on scientific principles, and the reason of the phenomena is consequently understood; drawing our conclusions, from which we may say that the art of casting in bronze will henceforward never be lost, even should it be neglected for centuries, a few trials would be enough to bring it back to the point at which it had been left.

The Dominicans as Artists.

Of the various religious orders, the Dominican has probably furnished the largest number of artists. This was an order consisting chiefly of men sprung from the upper classes of society, and endowed with superior intelligence. From their ranks have proceeded painters, sculptors and architects, who lent their aid in the production of many most useful and permanent works, not merely in Italy, but in other countries; and the number of these artists is so considerable that the well-known work of Marchese is exclusively devoted to the record of their labours. With these art was a religious exercise. The intervals between the services of the chapel were occupied by the monk in pursuit of his art studies, the illumination of his service-book, the design for a basilica, baptistery, or bridge, or the composition of an antiphonal; and when he returned from singing the mass in the choir of his own church, it was but to resume his occupation on the picture or the illuminated service-book which was to assist in its enrichment. His faith stimulated him in its production, for it was the main object that impelled him to the exercise of his powers. His professional was subordinated to his religious enthusiasm, for he considered that the talents with which he was endowed were only given him in trust, and restricted in their application to one great end—the service of his religion. He came to the exercise of his diurnal labour with humility and fasting, and even bedewed with his tears the subject on which he was employed, invoking the Divine aid, that when completed it might be deemed an acceptable oblation, and

serve at the same time as a grateful acknowledgment of the superior talents with which he had been endowed. When men gave up all temporal preferment, when the regulations of their order supplied all their necessary wants and relieved them of worldly cares, and when their social position was thus rendered distinct from that of other classes of the human family, the same attention which the Church imperiously required from her votary was a condition essential to successful achievement in art; nor was the co-existence of the functions of ecclesiastic and artist deemed incompatible. The profession of fine art was in strict accordance with the spirit of his religious profession; he acknowledged its power to be most worthily applied when exercised in the service of the Church, when he could be the means of supplying symbolic personifications to arrest the attention of the devotee and guard his orisons from the intrusion of mundane circumstance, or when through its agency he could instruct the uninformed mind by means of the pictured realisation of Divine revelation of scripture history. Shut out from the artifices of the world and many of the adventitious circumstances in more recent times disadvantageously attendant on the painter's studio, his life was of that independent nature which is indispensable to the production of any excellence. His paramount responsibility as an artist was to his Church—the vital absorbing principle that controlled his efforts.

Sir T. Lawrence.

Sir Thomas Lawrence was perhaps hindered from rising to the highest rank as a colourist by his early and first practice of making portraits in colourless chalk only. His wish to please the sitter made him yield more than his English predecessors had done to the foolish desire of most people to be painted with a smile; though he was far from extending this indulgence to that extreme of a self-satisfied simper that the French painters of the age preceding his had introduced to portrait. Of indefatigable industry, Lawrence's habit of undertaking too many pictures at the same time was a serious drawback in many cases to their excellence. He began the portraits of children which he did not finish till they were grown up, and of gentlemen and ladies while their hair was of its first colour, but which remained incomplete in his rooms till the originals were grey.



The Accident to the Drury Lane Stage.

SIR,—At the suggestion of Mr. Arthur Collins, the managing director of the Drury Lane Theatre, I venture to encroach on your valuable space in order to emphatically refute the various exaggerated reports still current in regard to the extent of the damage done to the hydraulic machinery on the occasion of the recent accident in connection with the production of "White Heather." No such calamity as the bursting of pipes or flooding of the stage "cellar" occurred, and that the various apparatus employed in the realistic diving-scene had to be seriously brought into requisition can only be treated as an excellent joke. I would also take the opportunity of contradicting the various expressions of opinion which have been freely circulated as to the inadvisability and danger of adopting hydraulics for the working of stage mechanism. The more modern forms of stage appliances are distinctly safer than those of the stage of old, not only in their general working, but also as regards risk from fire.

Having been entrusted with the investigation of the accident which prevented the performance on Saturday week, I may perhaps be permitted to say to those professionally interested in modern methods and appliances that the hydraulic machinery at Drury Lane Theatre comprises two large lifts or "bridges," each measuring 40 feet by 7 feet 6 inches super, and worked by two pairs of rams in such a manner that they can either be raised horizontally or on the slope. The accident in question took the shape of a collapse of these lifts whilst in a sloping position, with the result that certain parts of the mechanism were strained or broken. There is not the slightest reason, however, to assume that the construction was defective, and, after careful research, I unfortunately found it necessary to say in my report to the directors on the occurrence that there was evidence which seemed to indicate that the accident had been brought about either by wilful negligence or malicious damage.

The appliances were introduced by the late Sir Augustus Harris, and were brought over from Vienna, little or nothing having been done in this direction of stage equipment by English engineers. The collapse, however, in no way lessens the discernment of the late manager as to the introduction of modern appliances from the Continent; in fact, the effect produced in the Lock scene in "White Heather" makes many wonder why improved methods and appliances have not long

ago been more generally used on the English stage. Now that a start has been made in the right direction it is to be hoped, however, that sufficient interest will be shown in stage construction to prevent the necessity of sending abroad for machinery of this description.

As to the repairs, which are being executed under my supervision, I am glad to say that, thanks to the indefatigable efforts of Messrs. A. Smith & Stevens, the hydraulic engineers, the first of the two "bridges" is already in working order, and the second will soon be ready, so that what has had to be temporarily done by manual labour can again be worked by water power. That the play could be presented with provisional aids as early as the Monday following the accident is mainly due to Mr. Taylor (the stage machinist) and his staff of carpenters; and in times of continual labour troubles it affords me particular pleasure to notice the brilliant manner in which the carpenters on the one hand, and the mechanics of Messrs. Smith & Stevens on the other, have vied to do their respective work thoroughly and quickly, regardless of the fatigue and inconvenience of successive days of very long hours.—I am, dear sir, yours very truly,

EDWIN O. SACHS.

11 Waterloo Place, Pall Mall, S.W.:
September 28, 1897.

The Acme Wood Flooring.

SIR,—As old patrons of your journal, we write to say in reference to the series of separate "Illustrations" appearing in the present and previous issues of your paper, that our patented system of immovable Acme wood-block flooring (as advertised in your pages) has been laid in several of the buildings included in your series. Thus, amongst others, in your issue of September 10, Messrs. Pawsons and Leafs, Limited, and of September 17 and 24, Her Majesty's Theatre, Haymarket, and the Imperial Institute.—Yours truly, WILLIAM DUFFY.

(The Acme Wood Flooring Co., Ltd.)

GENERAL.

A Protestant Temple is about to be opened in the Boulevard Barbes, Paris. The works have cost about 5,000*l.*, towards which the city has granted 1,200*l.*

The Memorial Statue of the late Dr. Dale will be unveiled in the art gallery on October 15 during the meeting in Birmingham of the Congregational Union. The statue, which has been executed by Mr. Onslow Ford, R.A., will be presented to the city on behalf of the subscribers by Alderman Kenrick, M.P.

A New Hotel is to be erected at Crowborough Beacon, Sussex, at a cost of about 15,000*l.* Mr. Samuel Denman, of Brighton, is the architect.

A Chancel is to be added to Christ Church, Brussels, as a memorial of the Victorian Jubilee. An inscription recording the great event of the Jubilee will be placed in the new chancel as the most appropriate memento of its elevation.

The French Architects who possess diplomas or other claim to be considered "patentées" number 3,241, while the civil engineers holding a similar privilege number only 283. Painters, sculptors and men of letters are among the unprivileged classes.

The Abbé Louis Tosti, Inspector General of Religious Monuments in Italy, has died at Monte Cassino in his eighty-sixth year. Among his works was a history of that famous monastery.

Messrs. Metchim & Son, printers, lithographers, &c., have removed from Parliament Street (where they have been established for half a century) to Abbey Buildings, 8 Prince's Street, Great George Street, Westminster.

An Excursion Meeting of the Northern Architectural Association will be held to-morrow, Saturday, October 2, when the following buildings will be inspected:—Jesmond Parochial Hall, St. Jude's Church (Portland Road), and Shieldfield Board School (Portland Road).

Mr. Alderman Hind was on Wednesday sworn in as Master of the Plumbers' Company, and subsequently Mr. Frederick Machin as Warden, and Mr. Charles Hudson as Renter Warden.

"A London Merchant" has offered 1,000*l.* towards the erection of a residence house for the clergy attached to St. Saviour's Church, Southwark.

On the Summit of a hill, known as How Tallon, Yorkshire, nearly 1,500 feet above sea-level, a barrow, supposed to have been constructed by the ancient Britons, has been opened, and an interesting discovery made. The barrow is 60 yards in circumference and 6 feet high. A quantity of human bones, a stone cist, four flint arrow-heads and a flint scraper were found in the portion dug into. One of the arrow-heads was barbed, the others leaf-shaped, and the edges are serrated and most delicately fashioned. A small pottery urn, with a worked pattern upon it, was found interred with the remains of one human body.

The Architect.

THE WEEK.

THE death of Sir JOHN GILBERT on Tuesday is not a surprise to his friends, but it is none the less to be regretted. At one time his name and, it might be added, his works, attained a popularity which no other artist could rival. Woodcuts from his drawings were to be found everywhere, for not only editors and publishers believed in him, but even the proprietors of quack medicines and other productions found it an advantage to have his aid. There was no essential difference between his drawings on wood and his pictures, except that the latter were coloured. It was, indeed, sometimes difficult to decide whether the woodcut did not precede the painting. He was born eighty-one years ago at Blackheath, and he was faithful in residing there throughout his life. GILBERT was mainly self-taught, but he was only a lad when he began to make drawings for illustrations. In those days he was an imitator of the French draughtsmen. GILBERT did not confine himself to one class of work. He was able to gain admission for an oil-painting in the Academy exhibition in 1836 and for a water-colour drawing in the Suffolk Street galleries. The effect of his experiments in painting was advantageous for his drawings. He appeared in both as an admirer of RUBENS, and in representations of modern commonplace incidents his draperies sometimes recalled the Flemish masters. Mr. INGRAM'S experiment of a weekly illustrated journal gave an unexpected opportunity for JOHN GILBERT'S facile pencil. Without his aid so much success could hardly be attained, for among the men who were then available there was not one who approached GILBERT in expedition and power. His services were not restricted to the *Illustrated London News*. Imitations were set up on which he was engaged, but they were unable to endure. For penny periodicals he also made an amazing number of drawings. There was rarely much difference in the quality of his work, for an illustration of a sensational romance generally possessed as much dramatic effect as one which was prepared for an edition of SHAKESPEARE. There seemed to be no limit to his productiveness, and however hurried he always contrived to express his subject with vigour and point. His paintings were at once recognised, and their dashing qualities were always admired by artists, although the conventionality could not be ignored. His pictorial work fairly entitled him to admission into the Academy and the Water-Colour Society. He exhibited constantly, and it could not be said that his powers were diminished by age. Sir JOHN GILBERT served his generation, and as a faithful servant his death should be regretted.

MR. Chancellor R. M. PAUL has declined to grant a faculty for the rebuilding of the tower of Liskeard parish church. In the judgment which he prepared he says:—"According to Mr. PRYNNE'S report, the existing tower, which is of considerable architectural and archaeological interest, appears to be of Norman character and design, although various conspicuous additions have been made at later periods, and, with its Norman details and carvings, is the most interesting part of Liskeard Church. I am also advised by Mr. PONTING (the assessor) that the three lower stages of the tower were erected during the last quarter of the twelfth century, and the top stage added at the end of the thirteenth or beginning of the fourteenth century; that beyond the rebuilding of the parapet and the work in 1627, when the west door was inserted and the exterior partly refaced with granite, little alteration has been made in the structure, which is an interesting relic of Norman Liskeard; that the settlements began at an early stage, probably during the progress of the Norman building; and that the tower can be underpinned and repaired without the addition of buttresses, and put in sounder condition than when first built. Structures in a similar, and, in some instances, more dangerous condition, owing mainly to defective foundations (namely, the towers of St. Peter's Church, Broad Hinton; St. Mary's Church, Bishop's Canning; Down Ampney Church; St. Mary's

Church, Tormarton; and All Saints Church, Martin), have been secured under Mr. PONTING'S supervision, and he is now engaged upon similar work at St. Mary's Church, Devizes. As a proof of his confidence in the feasibility of restoring the tower of Liskeard, he has expressed his willingness to gratuitously give to the petitioners written directions as to the methods to be adopted, and should they require it he would send a builder, who has done similar works under him, to carry out the work for them. The circumstance that no parishioner appears to oppose the faculty no doubt sufficiently justifies the anxiety of the petitioners to be allowed to replace the existing tower with a new one of larger proportions and of a totally different style and design. The Court, however, cannot disregard the fact that the builders of the present Perpendicular nave were content (probably from the value they set upon such ancient work) to leave the Norman tower standing, and is also bound to consider future as well as present parishioners. It is, moreover, the duty of the Court to discourage, so far as possible, the demolition of all such ancient and interesting ecclesiastical buildings as are within the limits of its jurisdiction, and in a diocese where Norman work is comparatively rare, no effort should be spared to preserve every link that connects the present age with the far distant past. I must, therefore, reject the prayer of the petition so far as it involves the demolition of the existing tower and the erection of the proposed new tower in its place; but (provided the tower is restored) a faculty may go for the erection of a vestry-room, in accordance with Mr. SANSOM'S plan, and for the opening of a doorway through the south wall of the restored tower. If, however, it will meet the wishes of the petitioners and parishioners, I should be prepared to sanction the necessary work recommended by Mr. PONTING for the preservation of the existing tower, and the erection of the proposed new tower (with such modifications as the altered circumstances render necessary) at the north-east or south-east corner of the church." How far the Chancellor's proposal will agree with the conditions of Miss PEDLER'S bequest will, of course, be a question for lawyers.

THE lectures at the Royal Academy will commence on Monday next at 4 P.M., with the course on chemistry, by Professor CHURCH. The subjects will be as follows:—Grounds for painting, classification and trials of pigments, selected palettes, vehicles and varnishes, methods of painting, conservation of pictures. On November 1 Professor ANDERSON begins his course on anatomy, which will be followed by the usual demonstrations. Sir W. B. RICHMOND will give the first of six lectures on January 10, 1898; his subjects are:—"In Memoriam" two great artists, Greek influence upon Italian art, GIOTTO in the Arena Chapel, Padua (two lectures), "Form," and "Colour." Renaissance architecture will be treated by Professor AITCHISON, the first lecture will be delivered on January 31, next year. The arrangements for the lectures on sculpture are not yet concluded. In the session there will be no evening lectures.

SOON after the visit of the Roman Catholic prelates to Canterbury Cathedral it was announced that the tomb of Cardinal POLE was to be restored as a memorial of the celebration of the landing of St. AUGUSTINE, as well as of the courtesy shown to the visitors by Dean FARRAR and Dr. MASON. The project startled archaeologists, for there was a risk that the tomb might lose its character. The Dean and Chapter propose to do no more than to restore the escutcheon supported by two angels bearing the arms of the late prelate. This was originally proposed by the late Canon JENKINS, as they are of great interest from an historical and heraldic point of view. There are sixteen quarterings, some of families now extinct, and, as the cathedral is such a storehouse of heraldry, the repainting of Cardinal POLE'S arms possesses distinct interest. The quarterings suggest the number of families to whom REGINALD POLE was related. His father, Lord MONTACUTE, was a cousin to HENRY VII., and his mother was daughter of the Duke of CLARENCE, brother to EDWARD IV. He was therefore a sort of cousin to Queen MARY, but there was no trace of the cruelty of the Tudors in his disposition.

A SEVENTEENTH-CENTURY AMATEUR.

IT is generally acknowledged that among the private gentlemen who lived in England during the troubled seventeenth century there was not one who was better entitled to be called a worthy than JOHN EVELYN, of Wotton, in Kent. He did not possess the military spirit which seemed to be needed by all men at the time. Nature had adapted him for occupations of a more quiet sort, and he was living in harmony with his disposition when he was studying works of art, writing books, etching, taking part in philosophical experiments or devising improvements in gardens. But he was out of place in the Civil War, and acted wisely when he left England in order to see the world. EVELYN tells us that he beheld on Tower Hill "the fatal stroke which severed the wisest head in England from the shoulders of the Earl of STRAFFORD," and as he was apprehensive that he could not steer his way through the calamities he anticipated, he departed for Holland soon afterwards. He was about twenty-one at the time. EVELYN spent much of his time in studying works of art and archaeological remains, but he utilised the numerous opportunities afforded him to obtain an initiation into politics and public administration. He had married the daughter of the king's ambassador in Paris, and was therefore in a favourable position to acquire the art of governing.

It is, however, of JOHN EVELYN, the amateur, we have to treat. The English university system was favourable to the creation of men of that class. The Grand Tour appeared to be a course of object lessons that supplemented the reading of the classics. The majority of fine gentlemen made the journey from city to city without calculating the extent of their mental improvement, or allowed the learned companions who accompanied them to monopolise all the intellectual advantages while their pupils amused themselves. But occasionally travellers were met who studied buildings, pictures and statues with as much care as if they were expected to stand an examination in those subjects on their return. They knew that men who were able to gain a reputation for a knowledge of ancient remains, or the works of Renaissance masters, were sure to obtain influence in England. We need only refer to one case as an illustration of the spirit of the time. ADDISON was among the shrewdest men who were to be found at the end of the seventeenth century. He was aware of his own worth, and was justified in anticipating a prosperous career. But his ambition soared above office in his university or in the Church. How was so poor a man to take the great world by storm? It may now seem incredible, but ADDISON considered there was no more certain route to success than by appearing as an amateur, that is, by demonstrating he was possessed of acquaintance with antique remains. If he had followed the bent of his genius, he would have described the life he saw around him in France and Italy, and enriched the world by a delightful book. Instead of anticipating the *Spectator*, he laboured as a topographer, and wrote tedious disquisitions on ancient medals.*

From time to time in the *Spectator* he returned to the subject, and it is evident from one of his papers he was well acquainted with JOHN EVELYN's translation of FREART'S "Parallel of the Ancient Architecture with the Modern."

It may now seem strange that amateurism should be so appreciated, especially in the case of buildings which represented a large outlay in money and where errors entailed discomfort. There were builders in England who were able to design as well as to construct in the seventeenth century, but few men claimed to be architects. The word was associated with extraordinary talent, with experience derived from a long course of travel, with an early study of the classics. In other words, architecture was identified with amateurism. This is suggested by the men who were selected by ALLAN CUNNINGHAM, the Scottish mason, as "the most eminent British architects." Between WILLIAM OF WYKEHAM and INIGO JONES there is a blank. INIGO'S versatility was so extraordinary, he was treated by BEN JONSON as an amateur. To some of his contemporaries he was "Mr. JONES, a great traveller." According to his own account he was a painter who had taken up architecture, for he says, "Being naturally inclined in my younger years

to study the arts of design (*i.e.* painting), I passed into foreign parts to converse with the great masters thereof in Italy, where I applied myself to search out the ruins of those ancient buildings which, in despite of time itself and violence of barbarians, are yet remaining. Having satisfied myself in these, and returning to my native country, I applied my mind more particularly to the study of architecture." WREN, who comes next, was a mathematician and student of physical science, and it is no exaggeration to say that if JOHN EVELYN were ambitious he might have succeeded Sir JOHN DENHAM, the poet, as Surveyor and Intendant of Buildings instead of WREN. Sir JOHN VANBRUGH, another of the most eminent architects, was a playwright. WILLIAM KENT painted petticoats and drew vignettes to prepare himself for the duties of a "restorer of architectural science." The Earl of BURLINGTON, in spite of all the praises lavished on him by his contemporaries, was no more than an amateur. Of the eight representative architects described by CUNNINGHAM, two alone—*viz.* GIBBS and CHAMBERS—would now be considered as practical members of the profession.

The value of such amateurs as we have mentioned is generally judged from a few buildings. But if we take the entries in JOHN EVELYN'S "Diary" as indications of what they were called upon to perform, it becomes evident that they were more often consulted than is commonly supposed, and hence they were influential. EVELYN had spent about ten years as a sort of travelling student, and he returned to England in the beginning of 1652. The first ceremony he witnessed was the funeral of IRETON, who was CROMWELL'S son-in-law.

EVELYN was not many weeks in England before he was called on to advise his brother about garden improvements at Wotton, which comprised, he tells us, the removal of a mountain overgrown with huge trees and thicket. In the course of his life he was engaged on many enterprises of the kind for the benefit of his friends and of himself. But during the Protectorate it was only in private that EVELYN could exercise his talents. It was known he was one of the trusted agents of the exiled CHARLES II., and his ability was not utilised for the public benefit. About the time of CROMWELL'S death he was twice summoned to form part of the commission on new buildings and on sewers, but, as he says, "because there was an oath to be taken of fidelity to the Government as now constituted without a king, I got to be excused and returned home."

CHARLES II. declared EVELYN to be an old friend, and if he were eager to share in the rewards which were then showered on courtiers whose services were less valuable, he could have gained power and dignity. Apparently he was only anxious for the welfare of the State. Thus on one occasion when he was on the king's yacht the conversation between the king and himself related solely to a scheme of EVELYN'S for abating the smoke nuisance in London, and his plans for the improvement of gardens and buildings. Soon afterwards we find him in consultation with Sir JOHN DENHAM about the proposed palace for the king at Greenwich. Sir JOHN wished to have it erected on piles at the brink of the river. EVELYN advocated a site between the river and queen's house, with a bay in front; but the discussion was fruitless. EVELYN "came away, knowing Sir JOHN to be a better poet than architect, though he had Mr. WEBB (INIGO JONES'S man) to assist him." CHARLES was glad to draw out EVELYN on other subjects besides building. We hear of conversations on bees, painting, engraving; but EVELYN did not enjoy the dissipation of Court. The gambling which the king introduced as a nightly entertainment also appeared to him to be discreditable to a palace which should be an example of virtue to the rest of the kingdom.

In 1662 EVELYN was appointed one of the commissioners for reforming the buildings, ways, streets and "incumbrances," and for regulating hackney coaches. He began his duties with consideration of how St. Martin's Lane might be made more passable into the Strand, and other improvements carried out in the neighbourhood. As a consequence, he relates how "we ordered the paving of the way from St. James's North, which was a quagmire, and also of the Haymarket about Piquillo." Soon afterwards we learn that EVELYN was called to consider the model of a new sort of ship at Lambeth, "the intention being to

* See *The Architect*, vol. xxxiii., pp. 312, 325.

reduce that art to as certain a method as any other part of architecture." Improvements in the Mint were as necessary as in ships, and the useful EVELYN became one of the commissioners.

EVELYN was not envious of other amateurs. In his first notice of Sir CHRISTOPHER WREN he speaks of him as "that incomparable genius." WREN showed him a model of the Sheldonian Theatre in Oxford, and did not disdain his advice in some particulars. Then we find EVELYN designing a chapel for the Earl of DENBIGH; another amateur, HUGH MAY, designed the stables. The latter was the architect for Lord BERKELEY's house, the site of which included a large part of Mayfair. EVELYN says "the porticoes are in imitation of a house described by PALLADIO, but it happens to be the worst in his book." MAY also designed the new house or plain fabric erected by the Earl of ESSEX at Cassiobury, and the villa at Chiswick for Lady Fox. "Swing-Swang" HOOKE was the architect of Montague House, which was the original of the British Museum, and PRAT designed Lord CLARENDON's famous mansion that was one of the short-lived wonders of London. Other cases could be added.

It is curious to find CHARLES II. was also desirous of demonstrating that he possessed some skill in architecture. On one occasion after he had thanked EVELYN for his books on architecture and gardening before several noblemen in the privy gallery at Whitehall, the king called him apart. "He then caused me to follow him alone to one of the windows," continues EVELYN, "and asked me if I had any paper about me unwritten and a crayon; I presented him with both, and then, laying it on the window stool, he with his own hands designed to me the plot for the future building of Whitehall, together with the rooms of state and other particulars. After this he talked with me of several matters, on which I find His Majesty had an extraordinary talent, becoming a magnificent prince." But CHARLES soon found other objects on which to expend the public money which were more interesting to him than any building.

Lack of money also prevented the realisation of a project of EVELYN's. He was appointed commissioner to take care of the sick and wounded as well as the prisoners of war, for England was then contesting against the Dutch. He went about this oppressive work with a conscientiousness and patience that seemed remarkable in a man who was more at ease in a picture gallery or cabinet of gems than in an hospital. His attention and kindness won him the applause of the king and of MONK, but EVELYN was more likely to prize the gratitude expressed by the sufferers, who were not accustomed to such treatment. The time was unfavourable for the recovery of the victims, as the plague was raging. EVELYN wished to erect a special infirmary. The king and Commissioners of the Navy approved of the plans, but, says EVELYN, "I saw no money, though a very moderate expense would have saved thousands to His Majesty, and be much more commodious for the cure and quartering our sick and wounded than the dispersing them into private houses, where many more surgeons and attendants were necessary and the people tempted to debauchery." When it is remembered that EVELYN was to look after the unfortunates who were food for powder, there seems to be irony in making him one of the commissioners for regulating the farming and making of saltpetre throughout the kingdom; but in the Court there was a notion that he was acquainted with all varieties of knowledge, and the more he was engaged the more leisure he could command.

His next office was more gratifying, and was a sort of compensation. He was selected as one of the three surveyors for Old St. Paul's, which was then in a dangerous condition. The description he gives of his first examination of the building on August 27, 1666, is interesting:—

I went to St. Paul's Church, where with Dr. Wren, Mr. Prat, Mr. May, Mr. Thomas Chichley, Mr. Slingsby, the Bishop of London, the Dean of St. Paul's and several expert workmen we went about to survey the general decays of that ancient and venerable church, and to set down in writing the particulars of what was fit to be done, with the charge thereof, giving our opinion from article to article. Finding the main building to recede outwards, it was the opinion of Mr. Chichley and Mr. Prat that it had been so built *ab origine* for an effect in perspective, in regard of the height; but I was, with Dr. Wren, quite of another judgment, and so we entered it. We plumbed

the uprights in several places. When we came to the steeple it was deliberated whether it were not well enough to repair it only on its old foundation, with reservation to the four pillars; this Mr. Chichley and Mr. Prat were also for, but we totally rejected it, and persisted that it required a new foundation, not only in regard of the necessity, but for that the shape of what stood was very mean. We had a mind to build it with a noble cupola, a form of church building not as yet known in England, but of wonderful grace. For this purpose we offered to bring in a plan and estimate, which, after much contest, was at last assented to, and that we should nominate a committee of able workmen to examine the present foundation. This concluded we drew all up in writing, and so went with my Lord Bishop to the Dean's.

With INIGO JONES's Corinthian porch, which was considered to enhance the interest of the old Gothic cathedral, it was no doubt considered that a Classic cupola would be a crowning grace; but that feature was to be reserved to a later time and for a different sort of cathedral. In less than a week after the examination of St. Paul's the fire began which left "that goodly church a sad ruin." The portico was rent in pieces, "nothing remaining entire but the inscription in the architrave, showing by whom it was built, which had not one letter of it defaced."

Within a couple of days EVELYN had prepared a survey of the ruins and a plan of a new city. He submitted it to the king. CHARLES and his wife "examined each particular and discoursed on them for nearly an hour." They appeared to be pleased with the project. But prompt as was EVELYN he was anticipated by WREN. Both plans coincided frequently, which excited the surprise of the king. One of EVELYN's proposals was to use the rubbish to fill up the shore of the Thames and in that way to have less variation in the depth of the waterway—in other words, to form a Thames Embankment.

We cannot expect to see human nature always philosophic, and although equable in mind on most occasions, EVELYN appears to have resented the preference shown for WREN's plan. Apparently he never visited St. Paul's Cathedral during the progress of the works. On the completion of the choir he went there and remarks that "some exceptions might perhaps be taken as to the placing of columns on pilasters at the east tribunal, but as to the rest it is a piece of architecture without reproach." With WREN he was afterwards associated in the arrangements for building Greenwich Hospital and Chelsea Hospital, but there was no sign of any warmth in their friendship. EVELYN, however, acted as godfather at the baptism of one of WREN's sons in 1679.

It would take a volume to describe the public and private services of JOHN EVELYN. He undoubtedly held more public offices than any of his contemporaries, and not one of them was a sinecure. Whatever was undertaken by him was faithfully carried out. But somehow he never received the rewards he merited. He was loaded with duties which were onerous, but CHARLES II. generally lost his memory and was indifferent to the claims of his loyal servitor whenever one of those desirable appointments which are liberally endowed became vacant. EVELYN was too modest to urge his rights, for he held reversions, or at least the royal promise of reversions. The only favour he obtained was the extension of a lease of Sayes Court, which was inherited by him. He seemed to be as much engrossed with private affairs as with those of the king. His judgment was supposed to be infallible, and it was often tested. Did a gentleman resolve to build a large house in London or in the provinces, EVELYN was invited to inspect the site and arrange about the planning. His advice was also sought about the selling of property, reparations or enlargements, and such family affairs as marriages, the education of children, trusteeships and so forth. If a man bought a picture he wished to have EVELYN's testimony about its merit, and VERRIO appears to have considered that EVELYN was the critic who should first be invited to give an opinion on every new wall-painting. It suggests EVELYN's shrewdness, when we find him observing that the danger awaiting mural work was to be found in the salts of the plaster and the moisture of the climate.

He rendered two important services which deserve to be remembered. He was the discoverer of GRINLING GIBBONS, who is described by him as "without controversy the greatest master both for invention and rareness of work

that the world ever had in any age." He found the carver in a small house at Deptford translating a copy of TINTORET'S *Crucifixion* into a relief. EVELYN introduced him to CHARLES II., to WREN and to other patrons, and the artist found commissions in abundance. Another service was the securing of the Arundel Marbles for the University of Oxford, and the Arundel Library for the Royal Society. The property was collected by the Earl of ARUNDEL, who was the friend of RUBENS, but his grandson left the marbles exposed to the air in the garden of Arundel House in the Strand, and he cared so little for books that anyone having access to the house could carry some off, and, says EVELYN, "abundance of rare things are irrecoverably gone."

JOHN EVELYN attained his eighty-fifth year in October, 1705. The death of his oldest acquaintance, Dr. BATHURST, the president of Trinity College, Oxford, in his eighty-sixth year, "stark blind, deaf and memory lost, after having been a person of admirable parts and learning," alarmed him, but he was spared a few months without any loss of intellect. His useful life came to an end on February 27, 1706.

RENAISSANCE ARCHITECTURE.*

THE lecture which I am to deliver this evening forms the opening of the courses for the study of architecture and construction in this college in the session 1897-98.

The details of this course are, I hope, fully and clearly stated in the printed programmes; but I desire to draw attention to the fact that both in construction and in architecture as a fine art the course is extended. Mr. Elsey Smith will give two series of preliminary lectures which in art will treat of the orders and Greek architecture, and in construction of the materials. This will give time for me to carry both my courses of lectures further than in previous years it has been possible to go, and the full course in each subject will be forty lectures instead of thirty.

The evening classes established by the Carpenters' Company for the practice of architectural and constructional drawing will be continued on three evenings in the week, and those for quantity surveying on one evening. The fees for these classes are very moderate, and the advantages are very good.

I wish to announce that I am unavoidably prevented from beginning my own Tuesday evening lectures before Tuesday week, the 19th; but Mr. Elsey Smith will begin his on Tuesday, October 12, and both his lectures and mine on construction will begin on Wednesday, the 13th.

I have now to turn to the subject announced for this evening's lecture, namely, "Renaissance Architecture"; and before beginning I desire to introduce to your notice the excellent volume on "The Architecture of the Renaissance in Italy," by Mr. W. J. Anderson, of Glasgow.

I do not see how I can better open the subject of Renaissance architecture than by asking you to accompany me in an imaginary visit to Westminster Abbey. We will go together to Henry VII.'s Chapel, the elaborate structure added on to the extreme east end of the Abbey. There we find enclosed by gilded railings the tomb of the founder.

As we look round you can hardly fail to be struck quite as much with the harmony as with the richness of the whole. Every part is perfectly in keeping. Even an untrained eye must perceive this to some extent, and the more artistic culture you have the more you are able to appreciate the universal prevalence here of one architectural character. But when you look through the railings surrounding the founder's monument, and examine as well as the closeness of their many bars and ornaments permits the tomb itself, you are conscious of a something not quite harmonious with the rest. All is rich and beautiful, but both its richness and its beauty are somehow different from the sort of richness and sort of beauty that pervade the entire building, down even to the ornamental grille which guards the tomb.

If you inquire you will very likely be told this tomb is Renaissance and that the chapel is Gothic, also that the tomb is Italian, all which is true.

You ask further, and you find that Henry VII. caused this chapel to be built as his mausoleum during his own lifetime, that it was practically completed at the time of his death in A.D. 1509, and that the Renaissance tomb was set up in it within ten years—that is to say, not later than the year 1518.

You go a little further before you leave the chapel, and you see in its side aisles the tombs of Queen Elizabeth, completed

in 1606, and of Mary Queen of Scots, erected about 1611, both by James I. These are most distinctly and definitely different from the architecture of the Abbey, and if you are a critical observer you may soon convince yourself that they in many respects differ in character as well as in shape from Henry VII.'s tomb. They, in fact, are English Renaissance, not Italian. We leave the Abbey, and I point out to you as we go the busy and florid exterior of the chapel in which we just now stood, and you note the rich and complicated sky-line, with its pinnacles and flying buttresses and high-pitched roof, and the windows full of mullions and transoms and cusplings, and the surface of the wall elaborately panelled in continuation of the decoration of the windows.

A few steps up Whitehall and we see the building erected in 1619 by Inigo Jones for Charles I., and known as the Banqueting Hall; and here we can hardly point to any one feature that is not glaringly in contrast with the corresponding part of the chapel we have just left. The character is stately and solid, but neither busy nor florid. The windows are bold square openings devoid of all stone filling-in like mullions. Instead of the busy roofs and pinnacles we have a straight unbroken sky-line, and for the fretted and panelled wall we have plain masonry with, in the lower part, the joints strongly marked, and above large round pillars carrying boldly a projecting cornice.

It is hardly possible to display the position of the Renaissance in England more exactly. It comes from Italy, where Henry VII.'s tomb came from. It was brought in by Henry VIII., who set up that tomb; and the first quarter of the sixteenth century is the date of its first appearance here.

By the time that Queen Elizabeth was dead Renaissance architecture (tinged very largely by English peculiarities) had taken hold on the country, and the tombs erected by James to the memory of Queens Mary and Elizabeth, to which I have already directed your attention, are good examples of what is termed Jacobean art, that is to say, early English Renaissance as practised in the reign of James I., and by the time that Charles I.'s reign had begun in 1625, matured Renaissance as practised in Italy had been introduced and adopted here, and the Whitehall Banqueting House is the work of the first distinguished English architect who built in that manner, Inigo Jones.

And now it seems necessary to anticipate two or three questions which must suggest themselves to you. What, you will ask, is actually meant by Renaissance? If it began in Italy, what was the manner of its beginning? If Henry VIII. introduced it, where did he get it from and how did he introduce it here?

What then, you ask first of all, is actually meant by Renaissance? The exact sense of the word is "new birth." The thing signified, when the term is used in its widest sense, is that awakening of the intellect and taste of Europe which took place in the fifteenth and sixteenth centuries, out of which sprang modern Europe, as contrasted with Mediæval. Employed in a more limited sense of the art of architecture, it signifies a great change, so great as to deserve to be termed a new birth, and which manifested itself in an abandonment of Gothic details and methods of design and the adoption of details and methods which had been employed by the Romans, with, however, such modifications as are called for by modern requirements. When we talk of Renaissance architecture we usually mean revived Roman modernised. Renaissance architecture as employed by some writers means less than others include. French writers usually restrict the term to the early period of the change; most other writers, including, I think, most English ones, make it with less accuracy include what followed the change, and so make the name cover the architecture of the seventeenth, and even eighteenth and nineteenth centuries.

In this lecture the most extensive meaning given to the word will be adopted, partly because there is no other English term generally accepted as applicable to what would be shut out if we limit Renaissance to its narrower signification.

Anything like an adequate answer to the second question, How did the Renaissance come about in Italy, the land where it began? would require far more time than we have at our disposal to-night, but a very slight outline it is possible to give.

The Renaissance did not begin in architecture. It began in a new temper of mind, which showed itself first in the fifteenth century and more strongly in the sixteenth, in literature, as well as in the arts and in sculpture and painting, before it reached architecture. The outcome of this new temper of mind was somewhat different according as it applied itself to letters or to politics or to art, but there was always one feature in all that the Italians did at this time, namely, a return to the Greeks and the Romans—the Romans whose language was the basis of the tongue they spoke, and whose blood ran in their veins; the Greeks, to whom the Romans stood indebted for all that was finest in their literature. It may be as well to add that Gothic architecture, though it had been practised in Italy, had always been a little foreign to the genius and sympathies of the people, and that as soon as something more congenial to those

* Opening lecture of the Architectural Classes, delivered by Professor T. Roger Smith at University College, London, on Thursday, October 7, 1897.

sympathies was presented to them it was eagerly adopted, and Gothic was at once and totally abandoned.

Florence is the city of Italy where Renaissance architecture began, and it made its appearance there early in the fifteenth century. The man who first practised it—in fact, the man who very largely created it—was Filippo Brunelleschi, a person of great genius, who was born in 1379 and died in 1446. In Italy at that time it was very usual for the same artist to be a sculptor, a painter, an architect and a worker in gold, and perhaps a poet and a musician also, or at any rate to unite the practice of two of these arts, and accordingly we first hear of Brunelleschi as a sculptor, but it was as an architect that he won his fame.

He went to Rome about the year 1403, and spent four years there studying the remains of Classic architecture and sculpture, and after his return to Florence he accomplished the feat of thinking out and carrying into execution a new manner of building. In the church built by him known as the Pazzi Chapel, and subsequently in the Church of the Holy Spirit, we have complete and consistent and excellent buildings without a shred of Gothic detail, adhering, it is true, to the received plan of a church, but clothing it in forms drawn direct from examples of old Roman work.

Without attempting to analyse here what I hope at a later period to go through with my class very carefully, I may say generally that in the early stage of Italian Renaissance everything is delicate rather than vigorous. The orders are sparingly introduced, and usually where they occur the shafts are flat pilasters, not columns. Panelling and sculpture, in low relief, furnish the most usual enrichment of the surfaces. The openings are usually small, and more often semicircular-headed than square-headed. In some few cases something like very simple tracery occupies the window heads. A characteristic ornament used as the filling in of a semicircular head over a square lintel now makes its appearance in the shell ornament, a beautiful and very appropriate imitation of a shell with radiating ribs like a pilgrim's shell.

There is a group of solid and dignified palaces at Florence, several of them due to the design of Brunelleschi, in which these characteristics are tinged with a severity of character inherited from older fortified houses.

Very good examples of early Italian Renaissance architecture exist in Venice. Among them I may perhaps select the Palazzo Vendramini as a specimen. This, like other Venetian palaces, is a compact square block with an unbroken straight front, rendered, however, extremely varied and interesting by the grouping of the openings. There are three storeys, and on each the main openings are at the centre. If the façade of a Gothic Venetian palace be compared, it will be seen that the same principle of grouping prevails. In the example under consideration the windows are round-headed, but there is a sort of simple round-arched tracery. Classic pilasters are introduced, but not obtrusively, and something of an entablature divides the top storey from the middle and main one, while a line of balconies divides that again from the solid-looking basement storey. An exaggerated entablature and a cornice fitted to the proportions of the whole building crown the façade and complete the composition. The style of these and other buildings in Florence, Venice, Rome, Milan, &c., is that which we know as early Italian Renaissance.

Later on there came mature Renaissance and later still the decline. Nor is it in Italy alone that these three phases present themselves. Everywhere Renaissance architecture may be said to have run a similar course, and to have had an early, a mature and a declining stage, although in many ways these differed in different countries, and the style assumed so many forms and was so tinged by the various influences which it underwent in different countries, and even in different cities, that anything like a classification is very difficult. As far as Italy is concerned it may be safe to say that the early style prevailed in the last seventy-five years of the fifteenth century, *i.e.* from 1425 to 1500. The mature style prevailed in the first seventy-five years of the sixteenth century, say from 1500 to 1575, and the decline then set in and lasted as long as the erection of important buildings continued. In every other country of Europe the dates would be later.

A few characteristics of Renaissance when fully developed—mature Renaissance—show it in strong contrast with Gothic.

First, the window has ceased to be a prominent and a rich feature, and on the other hand the wall has become so.

Secondly, the sky-line, which in most Gothic buildings is of great importance, is in the majority of Italian Renaissance buildings very uninteresting, though not in all.

Thirdly, the Classic orders reappear as decorative features almost without exception.

Fourthly, all the forms, mouldings and ornaments are imitated from or suggested by ancient Roman buildings, and supersede those in use in Gothic buildings. Thus the semicircular arch replaces the pointed arch, and the lintel once more is straight instead of being cambered or of arched construction.

Fifth, the Roman forms of vault supersede the Mediæval, and the dome especially is frequently employed and made a main feature.

A building of the matured Italian Renaissance may not show all the above characteristics, but it will show most of them. Perhaps as good an example as can be selected is the library at Venice, the work of Sansovino, architect and sculptor, erected about 1540, and it is the more useful to select this because its architecture has been copied (with some variations) by Smirke, in the Carlton Club, Pall Mall, where it can be seen by all of you.

The building is of two storeys—a Doric order below and an Ionic above, the orders in each storey being combined with semicircular arches open below, closed by windows above. The entablature of the upper order is very much higher than the usual Classic proportions would prescribe, in order to give a cornice sufficiently large to crown the whole building. Above the cornice is a high balustrade giving a level sky-line, broken only by a statue over each column.

The keystones of the arches are carved, the spandrels above them are occupied by sculpture, and the frieze of the upper entablature is enriched with heavy swags of carving and boys, and has small oblong openings. Regularity, dignity, richness, repose, and above all the most satisfactory proportions throughout, are among the qualities of this noble building.

I have already mentioned Smirke's copy at the Carlton Club, Pall Mall. He has omitted the statues—a definite and very regrettable loss—and he has carried out the shafts of his main order in granite, instead of the same stone as the rest of the front. This is a more unfortunate alteration than the other, for it makes the shafts unduly prominent and diminishes the sense of breadth which one gets from the original; still, as a full-size copy of a portion of one of the best buildings of the best period of Italian Renaissance, this club-house is worth looking at carefully.

In a Renaissance church the straight sky-line disappears, for there is usually a dome and often a pediment at the end of each limb.

In church-building the Renaissance architects revived the ancient Roman methods of vaulting, and indeed they used such vaults as the Romans had previously employed wherever in secular or domestic buildings a vault was required.

The greatest feat of the Revival was, however, the return to the dome, which had not been modified, as the vault was, by the Gothic architects, but had been avoided entirely. The great dome of the cathedral of Florence was the work of Brunelleschi, the father of the Italian Renaissance; and afterwards in a series of churches this feature was employed and was modernised till in St. Peter's, at Rome, it became the central and dominant feature of the foremost building of the time.

St. Peter's is the greatest building of the Renaissance. It had the fate to drag on through a century or more, and each architect who was employed on it recast the design. The first was Bramante, and his plan was for a building nearly square in outline and with a large central dome. The dome was begun, and in the plan of every succeeding architect was the main feature. At length the last recast of the design was made by Michel Angelo, who fortunately was able to carry his work so far that no great interference with his scheme itself seemed to be possible. But, though his building could not be much altered, it was possible to add to it, and accordingly after his time the nave was elongated and a vestibule was built. These additions really detract from the effect of the exterior of the cathedral instead of adding to it.

The dome of this vast cathedral is a most dignified and vigorous structure, and is, as it ought to be, the finest work of the mature Renaissance, and the finest dome, inside and out, in Europe. Perhaps the dome of St. Paul's rivals it in external effect; but even the most prejudiced Englishman, if he has seen both, will hesitate to claim that the interior of the dome of St. Paul's equals, or even approaches, its Italian rival in beauty. In point of structure also St. Peter's is the nobler. It is outside as well as in of masonry, whereas the exterior dome of St. Paul's is only a domical roof, and is liable to be destroyed by a chance spark or an untoward flash of lightning.

I have already described a typical secular building of the mature Renaissance—the Library at Venice—and have referred to the greatest church building—St. Peter's. In these and in many other instances it will be found that the openings have grown large; often they are arches rather than windows. The orders have become conspicuous, and the pilaster has nearly always given way to the column. The decorative sculpture has become rich and in high relief, the rustication is very strongly marked, and the windows very frequently have each of them pilasters at the jambs and a little pediment. In short, there is a great air of vigour and richness; there is also a singularly fine sense of proportion, which lends to the best productions of the Italian Renaissance a great and a very subtle charm.

The buildings of the decline exaggerate the vigour of the mature style. Their features are bold enough to be program, their carving and sculpture extravagant and heavy. Refine-

ment is in some cases quite lost; in others greatly spoilt and overdone ornament takes its place. There are, however, a hundred ways of going wrong, and in the seventeenth century Italian architects went wrong in various directions. One of the best of the later Italian Renaissance buildings is Sta Maria della Salute at Venice.

At the outset of this lecture I suggested three questions, and I have now tried to answer the first two, namely (1) What is Renaissance architecture? (2) How did it arise in Italy? There remains the third question, How did it come to England? Where did Henry VIII. get it from, and how did he introduce it here? The short answer is that Henry VIII. got it from France and the Low Countries rather than direct from Italy, but that he induced artists from every European country where they were to be found to visit England and settle here and work. Probably the best known name among those of artists imported in this way is that of Hans Holbein, the painter, but though he is believed, after the custom of the time, to have been skilled in various arts and to have done some architecture, it is chiefly as a painter that we know him. There were, however, others.

The Renaissance architecture that Henry's artists brought with them early in the sixteenth century was of course of the early phase, whether they came from Italy or France or Flanders. This had more affinity with Gothic than the matured style displays, and, however introduced, it had in England and in France to contend against or else combine with Gothic architecture, strongly rooted in the building instincts of the people, as it had never been in Italy.

It will not be possible to include within reasonable limits of time any description of Renaissance in Germany or in Spain, but it seems almost necessary to say something about its early phase (the Transition) in France. That phase began by the adoption, early in the fifteenth century, of Italian painting, sculpture and gardening, but it was not till the close of that century that architecture in France came under Italian influence, and then, and far on into the sixteenth century, it is rather a new phase of Gothic than a modified form of Renaissance which we find in French buildings. Léon Palustre, in "*L'Architecture de la Renaissance*," points out that what occurred was the deliberate and consistent adaptation of the forms of Classical art to a disposition of buildings which had been adopted during the Mediæval period. Early in the sixteenth century we meet with French Early Renaissance work which has, it is true, discarded the pointed arch, but in almost every other respect remains Gothic in essence and quality, though not so in ornament. The style of Francis I. is the culminating point of this period, and that monarch and Henry VIII. met on the famous Field of the Cloth of Gold—a sufficient proof that there were ample opportunities for French fashions in art to pass over the Channel.

Perhaps the sixteenth-century wing of the château of Blois and the contemporary châteaux of Chambord and Chenonceaux will sufficiently show something of the quality of the architecture of Francis I.'s time, and it would be well worth while to compare these buildings with the great Gothic château of Pierrefonds in order to see how Gothic the early Renaissance was in France.

In none of the many phases which this art passed through in the different stages of its growth and at various centres of civilisation was Renaissance ever quite so charming, so graceful, so full of provoking little turns and unexpected oddities, yet so uniformly in perfect taste, as in France during the earlier years of the sixteenth century. The sky-line of the châteaux built at this time is as full of play, as much diversified by high-pitched roofs of large mass, by dormer windows, and by pointed terminals to turrets and towers, as in the best domestic Gothic. The plans were similarly broken and varied, the bay windows on corbels were as picturesque, the general feeling was as free as in the previous style, only there was a quite different and exquisitely restrained yet profuse ornament, there were some echoes in the shape of pilasters and cornices of the Classic order, and there was, perhaps, a shade more regularity and symmetry in the disposition of the masses.

This charming style has not been made use of by modern architects to the extent to which it might have been expected, and has seldom been well managed when it has been attempted. The best English example is the Holloway College, by Mr. Crossland. The elegant building lately completed by Mr. Aston Webb, in a style approaching early French, on the Embankment, and next to the School Board House, shows that in his hands, at least, this graceful phase of art could be reproduced to perfection.

In England the fusion of Gothic and Classic was difficult, and took long. The Transitional style which was eventually evolved did not make its appearance so early here as in France. It was to a great extent suggested by the French, but was not so elegant or so rich, yet has its own excellences. We generally know it as Elizabethan, and in its later phases as Jacobean, and we are, I think, as a nation, very proud of the best examples of Elizabethan. Most of these are noble mansions,

and their existence remains as a kind of monument of Henry's violent methods of Church reform, and of the tranquillity and security which this country enjoyed under the sagacious and prosperous rule of Elizabeth. At the dissolution of the monasteries Henry VIII. seized vast estates which had belonged to the monks, and most of these, with the disused buildings, were granted to favourite noblemen and gentlemen. It was, however, not till the succeeding reign that enough wealth was amassed and enough tranquillity secured to justify the nobles and squires in erecting costly houses; but under Elizabeth, in every part of England they began to rise, almost all of them showing a mixed architectural character. Many of them continue to this day to serve as delightful residences, at once dignified and cheerful.

There are also Elizabethan buildings of a more public character, no churches that I am aware of, but halls, libraries and almshouses. As a general rule each Elizabethan building has some Gothic features and some Classic ones, but both the one and the other have been more or less modified in the process of fusion. Most often the general form and disposition is Gothic, the clothing more or less derived from Italian; but the architects seem to have felt that in order to blend the two the Italian ornament should be itself modified, and to do this they have very much debased the detail. Elizabethan and Jacobean work is more often clumsy than refined, more often coarse than elegant. The workmanship is often not a little rough, and the ornaments are usually more or less rude, if rich and bold; but still the best examples of Elizabethan buildings reach a high degree of excellence, mainly on account of their fine masses and their frank adaptation to the purposes which they were built to serve. There are not many specimens remaining in London. By far the finest is the Middle Temple Hall, which has a sober exterior, but one of the most noble of interiors. The roof is a hammer-beam roof—I believe the last great roof executed on this principle—and its general lines are of Gothic origin; but all its ornaments and details come from Italian architecture, and in the fine oak screen, richly carved, and the panelling round the walls very few traces of their Mediæval origin are left.

At the South Kensington Museum you can examine a good specimen of Jacobean street architecture—the front of Sir Paul Pindar's house, standing till within a year in Bishopsgate Without; its mullioned windows and general air possess a definite character not of the highest class, but very distinctive.

At length there rose an English architect who had been educated in Italy—Inigo Jones. It is said that he desired to become a painter; but, like many of the Italian masters among whom he studied art, he prepared himself for the practice of architecture as well as painting, and it was his architectural work which made his reputation. Curiously enough, no inconsiderable part of that reputation rests upon an unexecuted design, the one which he made for King Charles I.'s palace at Whitehall, of which one little corner only was built—the Banqueting House. I referred to this building as a typical one in the opening remarks of this lecture, and no better or more complete example of the mature Renaissance as practised by Inigo Jones and his followers exists.

I will pass at once to the greatest genius and most successful architect belonging to the Renaissance in England—Christopher Wren. He had the rare fortune to enjoy an almost unparalleled opportunity, created by the Fire of London, and to prove equal to the call upon his energy and his genius.

Wren's most famous building you all know—the cathedral of St. Paul. He had desired—as Bramante desired when he made the first plan for St. Peter's, and as Michel Angelo, when he made what he thought was the last—to build a church approximately square, with a central dome; but he had to change his plan, and his church has, like St. Peter's, a long nave, and also has a long choir. Fortunately the change was made at St. Paul's before building was begun, and so the design could be, and was, radically modified and made to fit the programme, which required a long nave, instead of the feature being added after the church was built, as was the case at St. Peter's.

As a result, St. Paul's, if different from what Wren had first wished, is still consistent throughout, which is more than can be said for St. Peter's; though, on the other hand, the exquisite beauty as well as vastness of the interior of the Roman cathedral are not approached by the much smaller London one.

You may, however, visit St. Paul's with the certainty that you there see, with one exception only, the best thing that Renaissance architecture has done, and probably the best that it can do to rival the splendid cathedrals of the Middle Ages. How far this rivalry has been successful is a question which persons of cultivated taste have answered very differently at different times, and for a very good reason—their cultivation has not always been of the same sort; and I believe it will always remain a question the answer to which will be very much influenced by early associations, by training, even by prejudice, and possibly by natural temper of mind. I am not myself disposed to venture any answer of my own.

Wren designed and carried out a considerable amount of secular work; next to St. Paul's his greatest successes were not such buildings as Chelsea Hospital and the completion of Greenwich Hospital, but the London parish churches, of which he designed and built a large number. Most of these are small; they are unequal in their degree of excellence, but the best are extremely good. The most famous of his towers with spires is Bow Church. The tower is visible from the base upwards. Down below the architect provides a dignified entrance, and then he rightly carries up the tower perfectly plain till it is clear of adjoining roofs and buildings, when comes the belfry stage with the suitable large openings. Above this rises the spire, a rich composition built up in the most skilful way, and one of the greatest ornaments of London. Simpler but hardly less beautiful is the arcaded spire of St. Bride's Church, and there are many more. In this idea of a Classic spire Wren was an original inventor, and few attempts have been made to follow his example.

The most common defect of Renaissance buildings is tame-ness—an uninteresting correctness, a respectable solid monotony. This defect at least can never be complained of in Wren's work. It is full of variety—contrasts of light and shadow, of opening and solid. It is also pervaded by a fine and subtle feeling for proportion. If you examine any of Wren's designs, compasses in-hand, especially if they are his own original drawings, you become impressed with the faith that he had in the value of simple geometrical relations between the different parts. Nowhere can this be better seen than in the plan and sections of St. Paul's, or in those of St. Stephen's, Walbrook.

When one has to try to present some view of a very extensive subject in a very short time, almost the only chance of success is to limit one's self to a few salient points, and having reached the most conspicuous figure in the history of English Renaissance, the path of wisdom will be to leave off at Wren's architecture.

Let me then in closing remind you that some phase of Renaissance—unfortunately only too often the copy of a copy—is the architecture of the day to a great extent in every country on the Continent of Europe, and to a very large and apparently an increasing extent in our own country. To all appearance the reasonable probability is that those who are beginning to study architecture now with a view to practise it as a profession, will find that if they are to follow the current of public opinion in their day it will be some form of Renaissance art that they will pursue. If this is so, and it is what I firmly believe, then it is quite right for our attention to be directed to Renaissance from the first, and let me add that it is of importance also to go to the fountain-head and study the Classic originals themselves, to which Renaissance architecture is so deeply indebted.

THE BRUSSELS EXHIBITION.

THE superior jury have confirmed the awards made to the following British artists:—Médaille d'honneur—L. Alma-Tadema, R.A. First-class medals (painting)—Frank Dicksee, R.A., E. J. Gregory, A.R.A., Seymour Lucas, A.R.A., H. Herkomer, R.A., Sir J. D. Linton, P.R.I., J. W. Waterhouse, R.A., J. C. Hook, R.A., J. S. Sargent, R.A., E. Onslow Ford, R.A. (sculpture). Second-class medals (painting)—W. Q. Orchardson, R.A., S. J. Solomon, A.R.A., J. Aumonier, R.I., G. Clausen, A.R.A., Charles Green, R.I., D. Murray, A.R.A., Mrs. Allingham, R.W.S., R. Macaulay Stevenson, J. Lavery, J. W. North, A.R.A., W. W. Ouless, R.A., J. L. Pearson, R.A. (architecture), G. Frampton, A.R.A. (sculpture), A. Drury (sculpture), D. Y. Cameron (engraving). The exhibition authorities have purchased the picture "Apple-blossom and Tulips" (No. 118) by Alfred Parsons, A.R.A., for the grand lottery.

THE BARGE OF TIBERIUS.

THE recent recovery of some remains of the famous triremes of the Emperor Tiberius, which lie at the bottom of Lake Nemi, is of great interest both to artists and antiquaries. The lake of Nemi, which is situate about seventeen miles south-east of Rome, is formed by the crater of an extinct volcano. Upon its broad bosom once floated the magnificent pleasure-house of the luxurious and licentious emperor, Tiberius Claudius Nero, who, leaving his duties at Rome in the year A.D. 26, retired the year following to the island of Capræ, where he indulged in the greatest sensuality. His love of luxury and display was exhibited in the two famous pleasure triremes which bear his name, and the remains of which now lie buried in the lake of Nemi. The discovery referred to consists of the finding of several massive metal mooring-rings and tops of stakes by which the vessel could be moored to the quay. The rings are fixed in the mouths of bronze heads of lions, wolves and Medusæ, by the teeth of which they are retained in their proper places.

These bronze heads are marvellously modelled, and the faces are characterised by a life-like similarity to the animals represented. Despite their long immersion in the mud of Lake Nemi, they are all perfectly preserved, and the massiveness of their build and the beauty of their outline enable the spectator to judge of the magnificence of the structure of which they once formed but a secondary and almost insignificant part. It is said that the trireme to which these ornamental mooring-rings belonged was that dedicated to the worship of the goddess Diana, but about this and other points connected with these submerged vessels there has been recently a good deal of discussion. What is certain, however, is the fact that last week the Court at Rome ordered the castle and lake of Nemi to be offered by public auction for debt. The present owner of the Nemi estate is Don Filippo Orsini, Prince Assistant at the Pontifical Throne, which is the highest lay position at the Papal Court. The sale of the Nemi estate will doubtless include the remains of the famous Tiberian vessels which now lie at the bottom of the lake.

LIVERPOOL ARCHITECTURAL SOCIETY.

THE first ordinary meeting of the fifteenth session of this Society was held on Monday evening, at the Law Library, Union Court. The opening address by the president (Mr. W. E. Willink) and the nomination of members formed the main portion of the business. A letter from Mr. Cowell, librarian of the Free Library, William Brown Street, was read, in which the writer mentioned that an interesting collection of drawings of bits of Old Liverpool, by Herdman and others, were to be found in the library, and requesting that any member of the Architectural Society who possessed or acquired duplicates or photographs or drawings of any kind bearing upon the same subject should kindly allow them to be added to the collection, either by presenting them or by enabling the library committee to purchase them. The President's address was a learned disquisition on the art of architecture, in which he traced in some measure the effect of literature upon that art. Independence of mind, individuality of design, and a disregard of *ensemble* had produced in groups of buildings very inartistic and inharmonious effects. He would advocate censorship of design. The present was a time of efflux, he said, and he warned students of the dangers that beset them. Study was most important, and he advised young members of the profession to examine and criticise their own work just as if it had been that of another. Students of architecture had in Liverpool opportunities for learning their profession which no community outside London possessed. In this school students had the means of gaining knowledge and of practising and perfecting themselves in the various departments of their craft which were unsurpassed elsewhere. In conclusion, he appealed for co-operation in the work of the Society, and urged its members to emulate the true public spirit of their predecessors of fifty years ago.

KING'S COLLEGE.

THE distribution of prizes to the students of the architecture and building construction and woodcarving classes was held at King's College. The Rev. Dr. Robertson, principal of the College, occupied the chair, and was supported by, amongst others, Sir Henry Harben, and the master, clerk and warden of the Carpenters' Company. Professor Banister Fletcher reported that the competition for the two free scholarships given by the Carpenters' Company took place at the College on September 27. There were twelve candidates, of whom ten sat for the examination, the successful candidates being Mr. A. C. Remnant (126 marks) and Mr. C. J. T. Dadd (123 marks). In conclusion he announced that since the opening of last session the whole of the original diagrams and drawings prepared by the late Sir Gilbert Scott, R.A., and his pupils, numbering some 400 drawings, had been presented by his son, Mr. John Oldrid Scott, F.S.A., to the architectural school of the College. Sir Henry Harben presented the prizes to the successful students, and afterwards delivered a short address to the students present. The Rev. Dr. Robertson proposed a vote of thanks to Sir Henry Harben, saying that a great deal of the success which the classes had achieved was due to the munificent and thoughtful support received from the Carpenters' Company. Mr. Joseph Henry Gibbins, master of the Carpenters' Company, seconded the vote, which was carried unanimously. A vote of thanks to the chairman concluded the proceedings. A conversazione was held afterwards, various exhibits in connection with the architectural classes being thrown open to the guests.

Black Granite in large blocks, rough as well as polished, is largely exported from the port of Åhus, in Sweden, to Germany.

NOTES AND COMMENTS.

THE authorities of the great museums are disposed to look askance on casts. We have some in the British Museum, but their introduction is to be attributed to special considerations. The casts from the *Ægina* statues in Munich are reminders of what can be lost by a want of interest on the part of the Government, and the same can be said of other examples. The treatment which the collection of casts received in the South Kensington Museum reveals the animus which exists. Casts are always inferior if compared with original works, and their presence sometimes has the effect of making ignorant people imagine that examples which have cost large sums are only a sort of reproduction. In the Louvre all considerations of that kind have to be set aside in order to please the multitude. A museum of casts of antique sculpture is about to be opened. The arrangements are in the hands of M. RAVAISSON-MOLLIEN. The Louvre contains many chambers which are not used, and for the casts the riding-school of the late Prince IMPERIAL has been assigned. It lies between the Pavillon Denon and the Porte Jean Goujon. The roof is supported by columns which were designed by M. FRÉMIET the sculptor. There are already many reproductions in bronze of antique sculpture, but students of the history of the art will be glad to have the fine collection of works in marble supplemented by casts which can enable them to clear doubts more readily than is possible with illustrated books.

ARCHITECTURAL competitions do not appear to be fully acclimatised in the United States. The collapse of one for the erection of a new capitol for the State of Pennsylvania at Harrisburg suggests the difficulty of securing fair play. The sum assigned for the building was 110,000/, and appears ridiculously small if compared with the requirements and with the cost of various other capitols. Six architects only were invited to send in plans, and a sum of 200/ was promised to each of them, but other architects could also take part in the contest, and it was announced that the designs would be impartially considered. The programme was carefully drawn up by Professor LAIRD, of the University of Pennsylvania; he and two New York architects formed the jury. It is not easy to keep affairs secret in America, and the selection of the designs leaked out. Some of the competitors felt aggrieved, and the local press took up their cause. The commissioners being afraid of the *vox populi*, decided to reject all the plans and to call for a new competition. Professor LAIRD has protested. He upbraided the commissioners, saying to them:—"You have, in my opinion, violated the terms of your contract with the competitors, and have entered upon a course of action in which I cannot accompany you without loss of self-respect and professional honour. I stand ready to perform my full duty as your adviser, and I ask respectfully that I be given opportunity to complete my service under the terms of the programme. Should you be unwilling, however, to grant this request, I am left no alternative but that of presenting my resignation as your adviser. I respectfully ask that immediate action be taken on my request, and that if it cannot be granted my resignation in that case, hereby offered, be accepted, to take effect immediately." There seems to be little use in protesting. The competition has failed, and a body of men holding the highest positions in the State, who had guaranteed the honesty of the conditions, has caused several unfortunate architects to waste their time and ability in a fiasco.

THE Hugh Reid Bequest, which is in charge of the Edinburgh Town Council, amounts to about 3,000/. The money is available for the purchase of sculpture for the adornment of the city. It is proposed to expend a part of it on statues of King ROBERT BRUCE and Sir WILLIAM WALLACE, which are to be set up on two of the pedestals of the new North Bridge. It is suggested that the third pedestal should be used for a statue of JOHN KNOX which is at present placed in the quadrangle of the new college, while the fourth would be reserved for one of ROBERT

BURNS. In that way three of the makers of Scottish history would have their memorials, as well as the most popular of all the Scottish poets.

M. JOLIET, who is one of the most useful members of the Comédie Française, was originally an engraver. In 1870 he obtained a medal from the Salon, in 1873 another was awarded to him at the Vienna Exhibition, and in 1875 his ability was recognised by his election as member of the jury of the Salon. He was a long time engaged on the *Monde Illustré* and *L'Illustration*, and his work was appreciated by publishers. A great many of the designs of GUSTAVE DORÉ were reproduced by M. JOLIET. Although he no longer practises engraving M. JOLIET has not renounced the pictorial arts, for he now practises in pastel. There are other members of the Comédie who are skilful in drawing and colouring, and we believe that every theatre in Paris contains more than one actor who can claim to be amateurs in painting.

IN the imperial Russian theatres a new prompter's-box has been introduced which offers a problem in acoustics, which has a wider application. In many cases the occupants of the boxes nearest to the stage can hear the prompting almost as well as the actors. The new Russian invention consists of a box that resembles a shell, and which is enclosed within a short cylinder. The timber employed is perfectly dry; it is then thickly varnished and covered with alternate layers of felt and compressed paper. The prompter is at a depth which makes him invisible to the audience, and not one of his words can be heard in the auditorium. But from the form and method of construction of the box a whisper can be heard distinctly on the stage.

THE "Antiquary's Library" (ELLIOT STOCK) is to be a cheap series of volumes which relate to the past rather than the present. Some of them have appeared at a higher price. The second volume is Mr. PHILIP NORMAN'S "London Signs and Inscriptions." It contains a record of the survivors of the sculptured house and street signs, and many quaint stories about them are told by the author. The following signs are treated, viz.:—Human signs, such as the popular boy in Panyer Alley, which is the first object sought out by some visitors to the City; astronomical signs; animals and birds, real and imaginary; crests and coats of arms, &c. Modern building regulations are unfavourable to projecting signs, and in consequence London streets are deprived of features that would add to their picturesqueness. Much of the effect which is so much admired in Belgian towns is owing to signs and other images. Mr. NORMAN'S book is interesting from beginning to end.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: CRYPT CHAPEL OF OUR LADY OF THE UNDERCROFT.—CHAPTER-HOUSE.

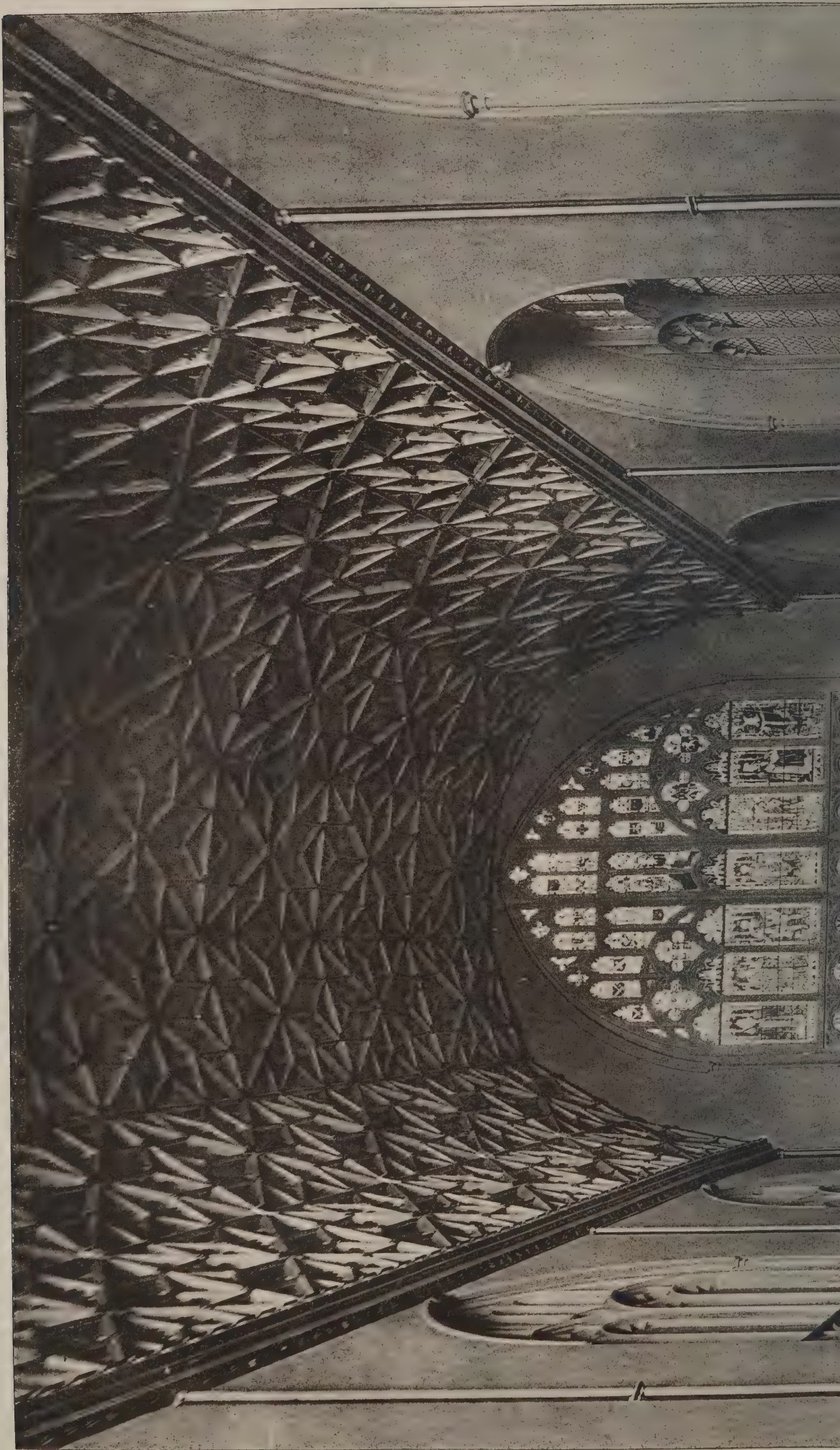
HER MAJESTY'S THEATRE, HAYMARKET.—ROYAL RETIRING-ROOM.

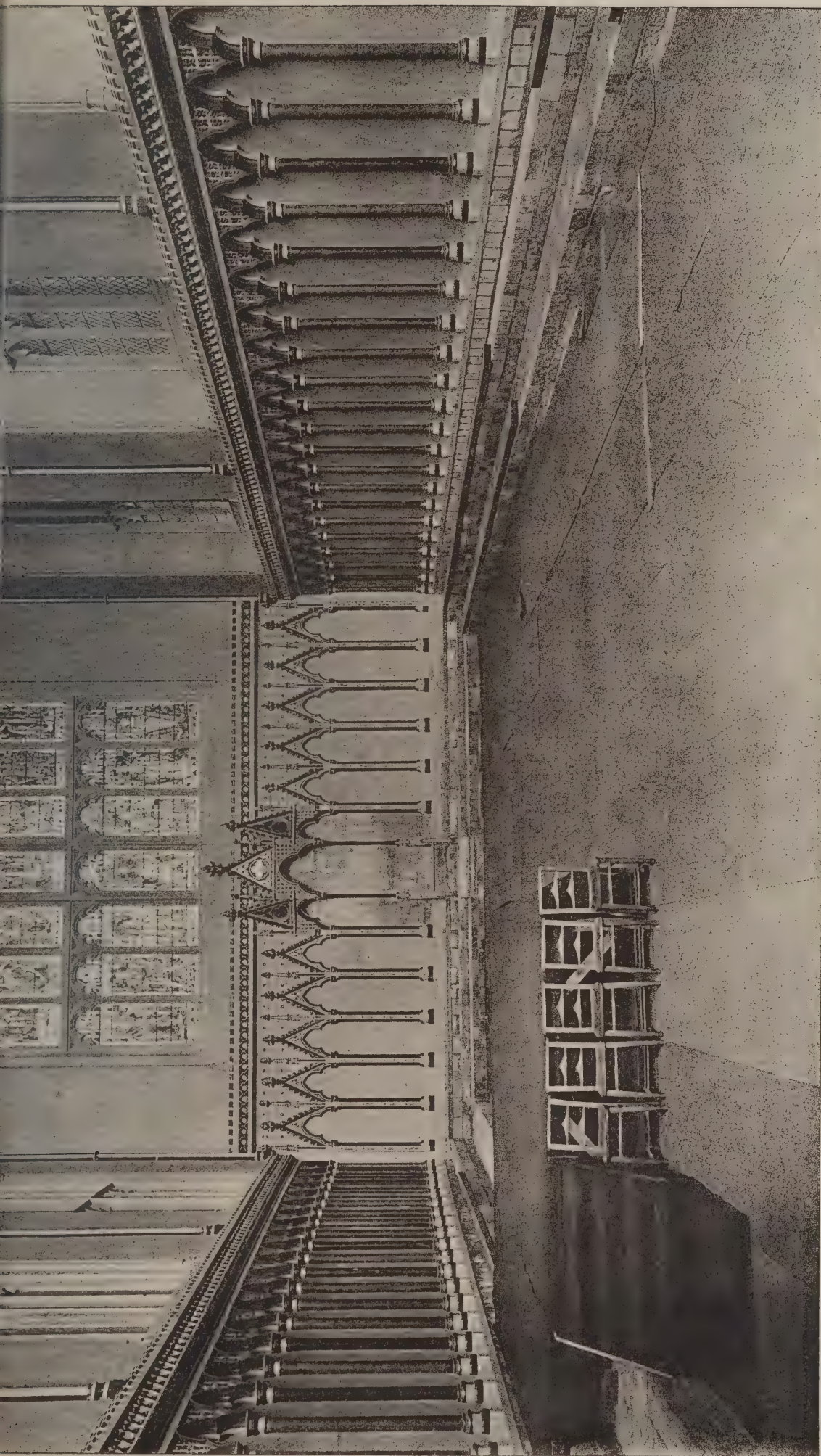
COTTESMORE SCHOOL, HOVE.

THIS building, recently erected in its grounds of eight acres, overlooking Hove, is designed for the accommodation of a private preparatory school. Broseley tiles, red-facing bricks and dressings of Monk's Park stone have been used. The building is electrically lighted throughout, and the hot-air system has been successfully adopted for the warming of the larger rooms and corridors.

The builders were Messrs. GOUGH & Co., of Hendon, and the architects Messrs. BROWN & BARROW, F.S.I., A.R.I.B.A., of 12 Norfolk Street, W.C.

The Architect, Oct. : 8th 1897.





PHOTOGRAPHED BY E. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

INK-PHOTO, SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 80.—CANTERBURY: CHAPTER HOUSE.



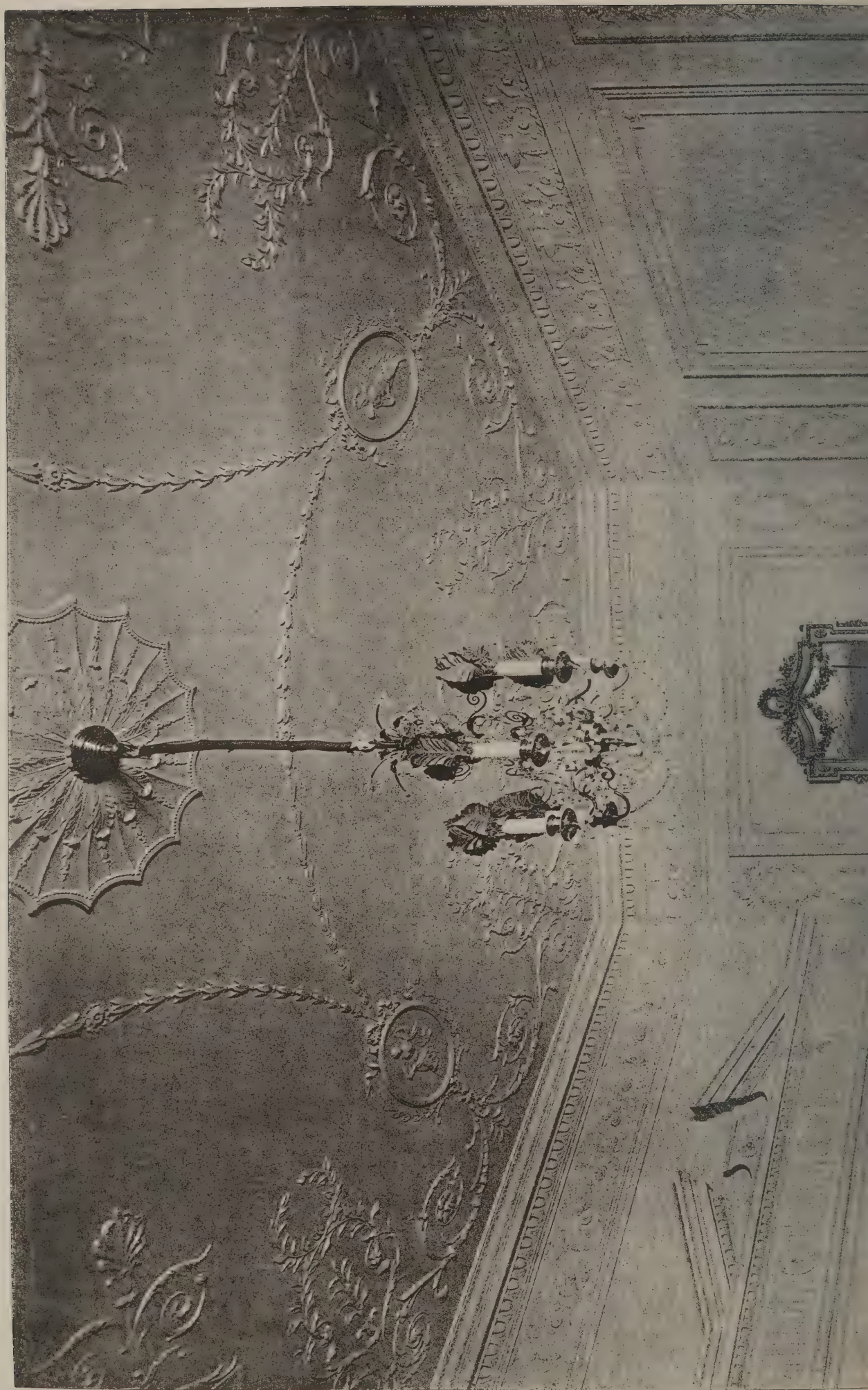
PHOTOGRAPHED BY S. B. BOLAS & CO. II, LUDGATE HILL, E.C.

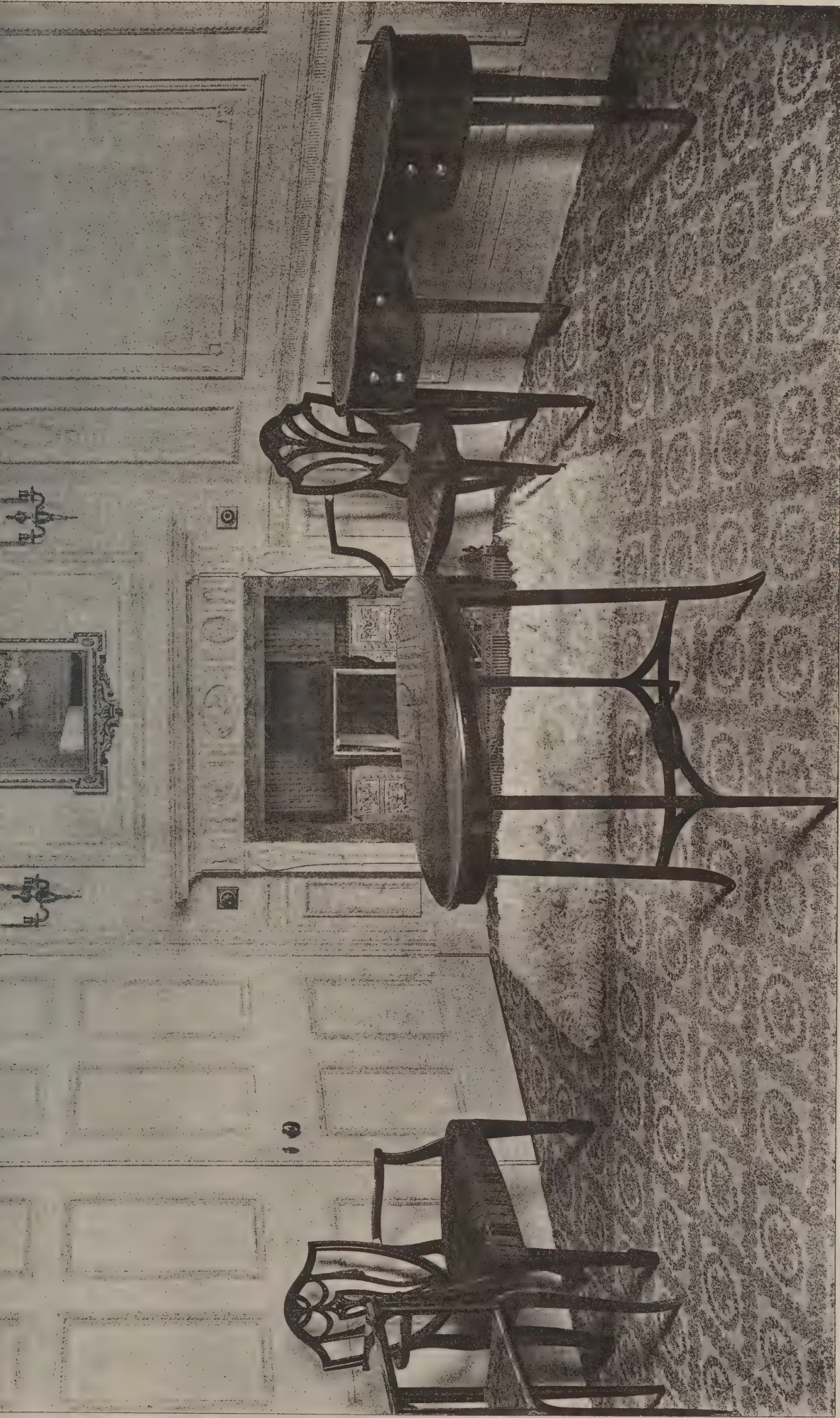
Oct: 8th 1897



INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CHAPEL OF OUR LADY OF THE UNDERCROFT.





FROM A PHOTOGRAPH BY J. BULBECK & CO., 168 STRAND, W.C.

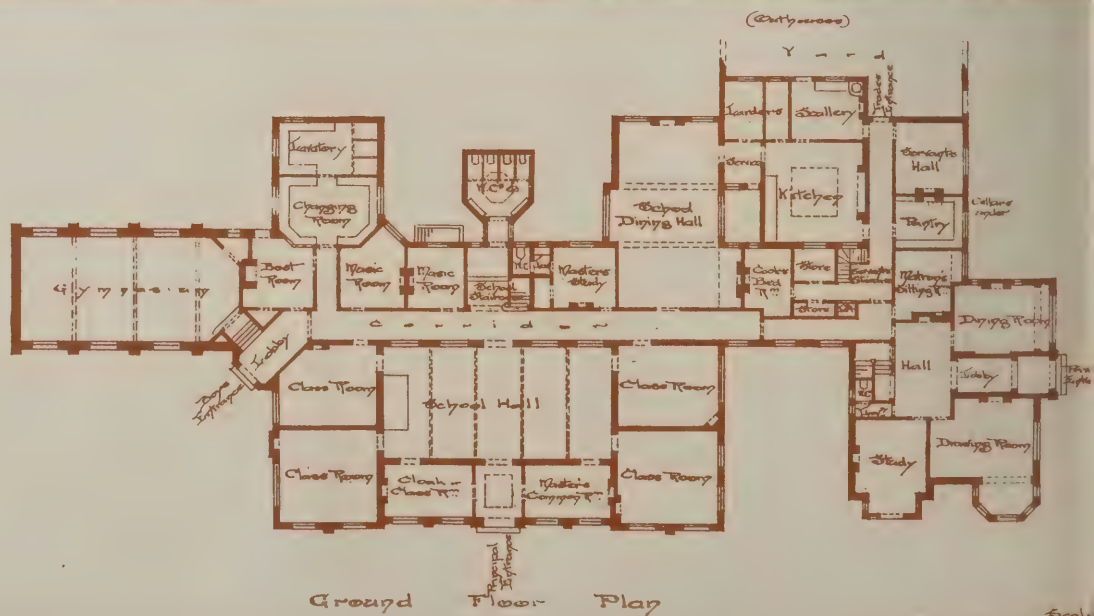
ROYAL RETIRING ROOM: HER MAJESTY'S THEATRE, HAYMARKET.

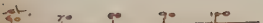
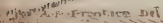
The Late CHARLES J. PHIPPS, F.S.A., Architect.

INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

COTTESMORE SCHOOL · BRIGHTON ·

A. BURNETT · BROWN · F.S.I.
ERNEST · R. BARROW · A.R.B.A. } ARCHITECTS





Bredford Barrow. Amphitheat.
Amberley House
Yorkshire. London. W.C.

ECCLESIOLOGIA GERMANICA.

By T. FRANCIS BUMPUS.

IN pursuance of a promise made in a former issue, I proceed to lay before my readers some notes illustrative of the impressions conveyed to me by German architecture, during a short tour lately made among the old cities and towns of Westphalian Prussia and Thuringian Saxony, notably Osnabrück, Minden, Herford, Hildesheim, Halberstadt, Naumburg and Erfurt.

While perfectly aware that the ecclesiastical architecture of this part of Europe is vastly inferior to that of France, where nobility of conception, skill in the disposition of ground plans and beauty and vigour of sculpture are leading characteristics, it would be idle to deny that there is something exceedingly fascinating, and at the same time perplexing, in the study of German ecclesiology. Take, for instance, that imposing line of Rhenish-Romanesque churches, Neuss, Cologne, Bonn, Limburg and Gelnhausen, all of which were in building during the middle of the thirteenth century—one indeed, Gelnhausen, belonging even to the fourteenth. Now, were we to see these churches in England or France we should assign them to the last three decades of the twelfth century, whereas they are, generally speaking, fifty years later, so tenaciously did the people of the Rhenish provinces cling to that style which they had brought to such a pitch of perfection in the examples just enumerated.

Thus it is that, those beautiful gradations from Romanesque to Late Pointed, that natural growth which forms so delightful a feature in our own country's architecture being absent from that of Germany, makes its study, as I hinted just now, one requiring great absorption, and one that is not devoid of fascination and perplexity.

Leaving Osnabrück, where some interesting specimens of *ouvrage du fer forgé* and *orfèverie*, in the shape of a fifteen-branched herse-light for the office of Tenebræ, and sundry altar and processional crosses, preserved in the sacristies of the solemn Transitional cathedral and Pointed church of St. John elicited my admiration, I journeyed through a pretty pastoral bit of Westphalia, where white-washed and red-tiled homesteads embosomed in trees were lit up by a glorious sun, to Minden. The Catholic Domkirche

of this picturesque city is not a vast edifice, and this makes the presence of three enormous windows on either side of its "hall" nave not a little to be wondered at. More curious than beautiful, these windows, in whose tracery the fancy of the designer seems fairly to have run riot, failed to give me so much pleasure as the piers supporting the arches of the arcade, composed as they are of a cylinder round which four thick and four slender shafts cluster, all with delicately chiselled capitals. Perhaps to a severe criticism these piers at Minden may seem deficient in that elegance characteristic of similar work in the retro-choir at Ely; but they must, together with the arches, I think, rank very high among contemporary German work of the kind.

A short railway ride in a fourth-class compartment—far more agreeable than books or common report had led me to expect—brought me late in the golden afternoon sunlight to Herford, whose thirteenth-century minster—an interesting

example of the tenacity with which the Germans clung to their round-arched style—and the shrine-like St. Maria-auf-dem-Berge, a perfect gem of fourteenth-century Gothic, kept notebook and pencil in constant employment. Between Herford and Hildesheim is Hameln, where, however, a wait of twenty minutes was insufficient to go into the town and see the minster church of St. Boniface, which, together with the chain bridge spanning the Weser, assisted in composing a very agreeable picture—one that would have been doubly agreeable had the weather been fine—as the train steamed into the station.

By midday, shortly after which the glass "went up" a bit, Hildesheim was reached, and I set out on foot in quest of the inn—Der Goldener Engel—which was, after some difficulty and détour, found. As however the latter introduced me to sundry thoroughfares which might otherwise have remained unexplored, I did not regret it.

The admirer of Mediæval Domestic architecture will have his tastes gratified, not to say gluttied, by a visit to Hildesheim, the streets in the old quarter of the city being composed of low-browed steep-gabled houses, exhibiting in many instances

quaint paintings, and in almost every one a profusion of rich carved ornament. Such a house was Der Goldener Engel, where I had elected to take up my quarters in this old episcopal city, portraits of his Holiness Leo XIII. and the present occupant of the see of Hildesheim embellishing the walls of my chamber with great appropriateness. The afternoon Offices were being monotoned, as I entered, in the high choir behind the celebrated Renaissance rood-screen, so that for a time I was obliged to confine my observations to the western portions of the building.

Originally, the cathedral of Hildesheim was an eleventh-century basilica with short transepts and choir. The stalls for the officiants here, as in nearly all the churches of the same period in this part of Europe, are carried across the transept, being enclosed beneath the western arch of the crossing by the fine rood just now alluded to, and beneath which are the steps to the crypt, which, German fashion, is by no means so subterranean as those of France and England.

Unfortunately, the original character of what must have been a simple solemn church, like Gernrode and Hechlingen, was entirely obliterated during the middle of the last century, when the interior was encrusted with that meretricious

trumpet characteristic of the Louis XV. period. The same epoch had added side chapels to the nave—an almost unique example of these appendages in a German church. That the ensemble of the interior of Hildesheim Cathedral is woefully disappointing goes without saying, and we can only hope that judicious restoration will tear off this hideous Pompadour mask, and allow the building to stand forth in all the simple, solemn Romanesque grandeur that forms so noble a feature of the city's two other basilicas, St. Michael's and St. Godehard's. There are, however, numerous items of interest in the Dom at Hildesheim. Besides the voluptuous rood-screen above mentioned there are the great bronze western doors; a brass font, elaborately chased; a huge corona lucis pendent from the nave ceiling, and representing the Heavenly Jerusalem—a corona of which a copy can be seen at South Kensington; a pillar in the transept modelled on that of Trajan at Rome, having twenty-eight scriptural groups com-



A STREET CORNER IN HILDESHEIM.

mencing at the base and ascending spirally to the summit; and numerous costly service-books, altar and processional crucifixes, chalices, pyxes, thuribles, &c., for use in the service of the sanctuary. The majority of these instrumenta (not however confined to the cathedral, but found scattered about in the museum and other church sacristies of the city), owe their existence mainly to the great bishop, Bernward, who presided over the see from 993 to 1022, and who, amid the active discharge of his spiritual functions, found time to superintend the various ateliers of artisans he kept employed for the purpose of enriching his churches with such works of art as I have alluded to above.

It is to St. Michael's or St. Godehard's that you must go to see what Hildesheim Cathedral was like before it was Italianised. Here we find the narrow round arches dividing the nave from the aisles, carried on columns, of which two cylindrical ones alternate with a square pier. Above these arches a considerable space of wall is left for fresco or mosaic-work, and surmounting the whole is a clerestory of continuous round-headed windows. As is the case with the generality of basilicas in this part of Europe, the roof is of wood and flat, enriched, however, in the case of St. Michael's with that renowned painting which served as *motif* to Mr. L'Estrange when about to undertake his great work in the nave of Ely.

The journey from Hildesheim to Halberstadt was broken for a short time at Goslar, whose beauties—so picturesquely does it nestle beneath the Harz mountains—were sadly marred by the pitiless rain. I contrived, however, to see the churches, each of which is distinguished by that curious quadrangular form of western façade which, flanked by pinnacled turrets, rises considerably above the apex of the roof of the church it screens.

This is a type of western front very common in the Harz district, extending likewise to Halberstadt and Brunswick, and penetrating even to the Low Countries, where it may be looked for in St. Servatius and Notre Dame at Maas-tricht.

If Hildesheim was delightful, Halberstadt was doubly so, for here I found myself among some of the best German Decorated work, as evidenced in the Dom and the two long, unclerestoried churches built by the Dominicans and Franciscans.

There was also some interesting but rather rude Romanesque in the Liebfrauen Kirche and the now secularised Paulus Kirche, both of which show the lofty turret-flanked western screen-façade just alluded to.

The Dom is now Lutheran, but the choir retains all its old furniture of stalls, bishop's throne (situated facing the altar, with its back to the rood-screen), tapestry, triple-branched candlesticks, stained-glass, &c. But next to the sacristy, where are preserved perhaps the most magnificent collection of eucharistic vestments, copes, mitres, altar and processional crucifixes, tapestry, pyxes, reliquaries, &c., in Northern Europe, the glory of the Dom at Halberstadt is its rood-screen, or Lettner, having, according to German custom, the entrances to the choir on either side a central altar—called, where the cathedral is Catholic, the people's altar. The whole workmanship is typical fifteenth-century German, and the rood which soars above is so verily a Tree of Beauty that to no other in

Europe does that verse of Venantius Fortunatus's "Vexilla Regis" seem more applicable:—

Arbor decora et fulgida,
Ornata Regis purpura,
Electa digno stipite
Tam sancta membra tangere!

Railway arrangements gave more time than I wanted at Halle—a place against which I warn those in search of fine architecture, none at Merseburg or Schulpforta—and hurried me at Naumburg, where treble the hours allotted to me there would not have sufficed for thoroughly mastering the beauties of what I consider one of the most valuable and interesting churches in Saxony. For this there was no help; circumstances obliging me to be at Erfurt by Saturday night. Journeying from Halle to Naumburg in the brilliant summer noontide, I again essayed the fourth class, whose occupants, this being market day, afforded scope for

endless speculation and amusement. There was music, too, not of a high order, to be sure; still, it was lively and joyous, and to its strains the villages and towns seemed to dance as the train approached or left them. Arrived at Naumburg, I hurried up to the cathedral, anxious to spend every available minute of the time in and about it. It being Protestant, the key had to be sought. This having been obtained, I made a leisurely tour of the interior with its female custodian, who was neither officious nor obtrusive, but very intelligent and anxious to give all the information that lay in her power. During our inspection some other visitors arrived on the scene of enchantment—a German lady and her son, residents in the town, the former of whom spoke English very tolerably.

Not being sufficiently *au fait* at German to indulge in what Miss La Creevy revolved as she walked along on that memorable morning of her interview with Miss Knag at Madame Mantalini's, *i.e.* "genteel turns of expression," I begged the aforesaid lady to communicate to me—what shall I call her?—vergeress my thanks for her politeness and attention, and apologies for my long detention of her—two hours, I think—in the church. This she did, and in consequence the ardent ecclesiologist was quite overwhelmed with courtesies and civilities, whether at the liberality of the donation or not

history is silent, on taking his departure.

Naumburg is a double-choired church—a distinction it shares with Laach, Mayence, Worms, Oppenheim, Gernrode, Hildesheim (St. Michael), and Bamberg, to which last-named cathedral that of Naumburg bears in many respects a great resemblance. Early in the thirteenth century a nave, exhibiting that mingling of Romanesque and Pointed observable in such contemporary works as Münster and Osnabrück, was inserted between too much older apses or choirs. These Romanesque choirs gave place during the latter part of the thirteenth and the middle of the fourteenth centuries to lightsome erections in First and Second Pointed respectively. Of the western choir at Naumburg it is not too much to say that for elegance and refinement of detail, as well as for purity of design, it is unequalled by anything else of the period in Germany, being as it is in that rare style, First Pointed, ...



INTERIOR OF CHURCH OF ST. GODEHARD, HILDESHEIM.

A rood-screen or Lettner, with the crucified Saviour and attendant figures abnormally placed between, and on either side, the central doorway, separates this western choir from the nave. It is coeval with the choir, and is quite the loveliest thing of its age and class. The altar in the apse of this choir was vested in a magnificent old crimson frontal with saints in the orphreys, and upon it stood a crucifix between two candles. Separating the nave from the eastern choir is another and much older Lettner (Romanesque in fact), having its doors placed eccentrically with an altar between them. The choir is not, however, entered by these doors, but from the transept, and by a steep flight of steps as at Paderborn; a mode of approach rendered necessary by the crypt, which is a rich specimen of Romanesque work. Some idea of the non-subterranean situation of this crypt at Naumburg may be gained from the fact that the floor of the eastern choir is on a level with the top of the Lettner. This eastern choir is delicate Middle Pointed, its apse terminating triangularly. The three-light windows

the conditions under which I first saw them having an air truly stupendous. There is but little Romanesque work in the Dom, and indeed throughout Erfurt, fourteenth-century Middle Pointed having the ascendancy.

The nave of the cathedral is a "hall" one of the fifteenth century, and not a very good specimen of its class; but entering it, as I did, in the early morning light through that celebrated saint-guarded triangular northern portal, so familiar to us by the drawings of Norman Shaw, the ensemble presented by its clusters of reedlike shafts, tinged with colour from the tall painted windows, was exceedingly striking and awe-inspiring.

But the glory of the Dom at Erfurt is its choir, beyond question the grandest and most harmonious of those lantern-like, aisleless structures that the fourteenth-century German architects were so fond of rearing. Its walls being set back considerably beyond the line of that transeptless portion of the church between it and the nave, the choir of Erfurt Cathedral cannot be adequately seen from a distance, appearing much



INTERIOR OF THE DOM, HALBERSTADT.

retain much old painted glass, and the general aspect of this part of the church, with its stalls and bishop's throne placed, as at Halberstadt, in the centre of the choir at the west end, is remarkably picturesque.

The church has four steeples, but as I shall have occasion to refer to them later on when remarking on German towers generally, I shall not now allude to them nor to the *entourages* of this most interesting building, from which it was only with great reluctance I could tear myself away and once more take the train.

By the time Erfurt was reached darkness and rain were falling; so, jumping on to the footboard of an electric car, I was whisked through streets of brilliantly-lighted shops crowded with Saturday night purchasers to the Friedrich Wilhelm's Platz. Here I alighted, to gain that comfortable hostel, the Thuringia Hof, situated just below the great Dom and its adjacent St. Severus, both buildings from their elevation and

foreshortened, so that it is only when the visitor has advanced to the screen—a veritable *cancelli*, of which more anon—that the full magnificence of this imposing erection, with its noble stallwork and tall Middle Pointed windows, mostly retaining their original glazing, bursts upon him.

Curiously contiguous to the Dom stands St. Severus—so close in fact that, viewed from certain points, the western façades of the two buildings seem to touch each other. St. Severus, however, inclines considerably to the north, so that there is plenty of room between the structures at their eastern portions. St. Severus is not a particularly remarkable Middle Pointed church, its most striking features being the inclusion of its five aisles beneath one enormous steep roof, and its steeple, an oblong piece of masonry from which sprout up a triplet of small towers surmounted by extremely tall slate spires, which, taken in conjunction with those of the cathedral—similar in point of construction and "restorations" of the present cen-

tury*—forms a group as curious as it is unexpected. Both these churches are Catholic.

In the lower part of the town are the three noble churches—now in the hands of the Protestants—of the Augustinians, Dominicans and Franciscans. The leading features of these three Middle Pointed structures, upon which I anticipate dwelling more fully later on, are their unbroken line of tiled roofs, their noble western elevations, their clerestories, their tall, somewhat narrow aisles, their luminous choirs ending in polygonal apses, and their charming little octagonal bell-turrets, which, placed against the clerestories, do duty for steeples. Besides these churches, there are others of minor importance, small in scale but good specimens of Saxon Decorated work.

From Erfurt a rather tedious journey through Eisenach, Coburg and Warburg—taken perforce in a single day—brought me back to Paderborn, whence, after another visit to what I call my favourite German cathedral, I caught a midday train to Soëst, and spent a loto-eating afternoon wandering about its quaint streets, and renewing my acquaintance with its ecclesiology. I quite envied the vulgar children who were playing and screaming beneath the shadow of the old steeples—Sir Peter Lely did the same most probably—but alas! as is the case too often in this world,

What's most posset 's enjoyed the least.

With this reflection I comforted myself as the train steamed out of the station on its way to Aix-la-Chapelle, whence, with brief stoppages at Louvain and Bruges, I returned to England after having made the tour of which I have endeavoured in the foregoing notes to delineate a faint outline.

(To be continued.)

DESIGN IN LETTERING.†

(Continued from last week.)

I PROPOSE now, in the first place, to show you just a few pages, or parts of pages, of lettering showing the more decided steps in the progress of the alphabet.

Our printed type takes, as you know, two forms—a larger and a smaller, major and minor, or as printers put it, capitals and “lower case”—because the small letters, being those most continually in request, are kept for convenience nearest at hand—in the lower part, that is, of the case from which the compositor, so to speak, feeds himself.

Our written character takes the form of a “running” hand—and is known by that name.

Now the printer's “lower case” or “minuscule,” as it is also called, is practically the book-form of running-hand, except that the letters are quite separate and not conjoined, as they are in what pretends to be only the hand of the ready writer, and does not claim to be beautiful at all.

The earlier form, whether of Greek or Roman lettering, was the capital—those more or less square letters, with relatively few curved shapes, which were most convenient to cut in stone or engrave on metal. It is, in fact, the monumental style—adapted to, and, what is more, inspired by, the chisel or the graver.

Even in the sixteenth-century version of it on the screen (in which the rounded D and other details show Gothic influence) you see at a glance how eminently fit it is for its purpose; you realise at once that that is inscription. Manuscript writers adopted for book writing a different character, or rather they adapted the square capital letter to more ready execution with the pen, and so evolved a rounder kind of letter, which is known by the name of uncial. The word “uncial” is supposed to be a corruption of “initial,” but the use of uncial letters does not support that derivation. I show you an instance of exceptionally beautiful small or round-hand Greek writing, “cursive” as it is called, in order that you may compare it with the more stately uncial writing. This form of letter was commonly used in Greek MSS. of the tenth century.

The uncial form of writing is intermediate, you will see, between the monumental writing and the “current” hand of the ready writer. It is, if not the step between the two, a compromise between them—no matter which. What it concerns us to know is that calligraphy took that form—which goes to explain many a later form of letter widely differing from the original square type.

It does not so much affect the modern printer; but it is the form of letter from which the artist who prefers his own handiwork to that of the printing press has probably most to learn.

Even when the Romans used, as they sometimes did, the square capital form in MSS. they did not confine themselves to

the severely simple shapes which came natural to the lapidaries.

The unequal strength of the lines, the thickening of the strokes at the ends and the spurred or forked shapes they take all speak of the pen—not the steel pen of course, nor yet the more supple quill, but the reed pen—rather blunter than a quill, but pliant enough and less given to spluttering—and it did not tempt the writer to indulge in unduly thin upstrokes.

The smaller uncials you will see are own brothers to the Greek letters just shown.

A further example illustrates another form of square capitals employed by the Romans in MSS. of the fifth and two following centuries. They are known by the name of “rustic” capitals—not that there was anything rustic about them in our sense of the word; but the Latin word was used in the sense of free and easy, *sans gêne*. The character of the writing, that is to say, is not so formal as would befit the town, it is a kind of country cousin; it stands, let us say, for the Roman capital in a loose coat and a soft hat. The rustic writing shown is of the fifth century. The characteristic points about it are that the vertical strokes are all very thin, and the cross strokes broad. These cross strokes take the form of a kind of tick, tapering at the ends; and similar ticks are used to emphasise the finishing of the thin strokes. The A has no cross stroke, but is like an inverted V. F and L rise above the line. The I wants knowing—then you can read it. The T and L are none too easily recognised. That all of this is pen-work is, I think, self-evident. But, as before said, the more usual form of penmanship is the uncial letter.

Roughly speaking, capitals represent the first accepted form of letter engraver's or carver's work, whether Greek or Roman.

Uncials stand for MSS. writing, scribe's work, growing rounder by degrees; whilst the smaller minuscule letter, our “lower case,” was evolved out of the running hand of the business, as distinguished from the literary scribe. This last was not used by the ancient Romans, and it was not till towards the eighth century that it was thus, as it may be said, reduced to order.

Running hand hardly concerns us. “Cursive” it is called; it might be called discursive, it is so apt to run wild. It tells us less of the artistic progress of lettering than of the caprice or carelessness of the individual writer.

There were various ceremonial versions of the running hand employed by the writers of Papal Bulls and Royal Charters—“diplomatic” hands they are called, because diplomas were written in them; and some of these, and the so-called “Chancery” hands, are highly elaborate if not ornamental; but they are so illegible, so unlike familiar forms of writing, that it would be hopeless to try and discuss them briefly, and it would serve no useful end.

With the decline of the Roman empire came naturally the demoralisation of the Roman character—capital or uncial—and just in proportion as Rome ceased to be the one centre of the world, and the Frankish and other nations rose into importance, so their writing began to show signs of nationality. At the loss of some refinement we now get variety of character. By the beginning of the eighth century we get distinctly national styles of lettering.

To subdivide these styles so minutely as some learned antiquaries do is simply to bewilder the poor student by their multitude. The important European races were the Latins, the Franks, the Teutons and Anglo-Saxons and the Visigoths; and so we get the Lombard, the Frankish, the Teutonic and Anglo-Saxon, and the Visigothic types of writing—all of which eventually merge themselves in what we call Gothic, though we may still distinguish between Italian, French, German, English and Spanish Gothic.

I will show you specimens of some of the earliest national styles. First the Lombardic—that is the term commonly used to describe the form of lettering which prevailed in Italy from the eighth to the eleventh century. It might be taken to imply that the style of it was in some sense the invention of the Lombards. That was not so at all. They were just long-bearded conquerors, and invented nothing. The style was not even confined to northern Italy; but it happened first to be developed there, and so all later Latin writing (after the empire) was called “Lombardic.”

Uncial writing, I told you, was transitional between square “caps” and rounder pen-forms. The Lombardic shows a further stage of transition. The penman has not quite made up his mind between straight lines and curved; he hesitates between the square-lined M and N and the rounded forms. Eventually he decided for the rounded form, which in its later development we distinguish by the name of Lombardic capitals.

In another form of Lombard writing, “Lombard brisée,” as the French call it, is foreshadowed the “black letter” or Gothic form. Its name is justified by the broken back of the letter, in which, as I said, you see the beginning of that later Gothic “lower case” which we call black letter.

* Puttrich's book on the architecture of Saxony shows the central steeple of Erfurt Cathedral wanting in its triplet of pinnacle-like spires.

† Abstract of a course of Cantor Lectures, by Mr. Lewis Foreman Day, published in the *Journal of the Society of Arts*.

Our own "lower case" we get more or less directly from Charlemagne, who was crowned you know in the year 800. He found—perhaps his friend the Pope told him—that writing by that time had degenerated to a state unworthy of a mighty emperor, and accordingly he ordained its reformation. He went so far as to compel bishops and other important personages who could not write decently, to employ scribes who could. In this way he revived the small Roman character which we eventually adopted for our printed type.

The scribes of Charlemagne (and for some time after him) did not yet manage to get very satisfactory capitals. They still mixed up letters all of one thickness with others in which thick and thin strokes, or diminishing strokes, were used in a most illogical and awkward way—indicative, of course, of a period of change. But they did arrive at a satisfactory and very characteristic rendering of minuscule lettering. A conspicuous feature in it was the elongation of the longer limb of the *l p q f d*. Tails, that is to say, came into fashion, and long ones, as much as four or five times the length of the body of the letter. We get now also the long *s—f*, though the *t* does not rise much above the line, sometimes not at all.

That elongation of the up and down strokes is characteristic of Frankish and Visigothic lettering generally. It occurs even in the case of capitals, as in the headlines of the tenth-century MS. on the screen. There you see the *I*, the *H* and the *L* rise high above the heads of their fellows, whilst, on the other hand, the *V*-shaped *U* in the word *Opvsculum* is reduced to more than modest proportions.

Visigothic lettering, of which that is a good example, shows, it seems to me, usually a trace of Moorish influence, betraying itself, to begin with, in the liberties taken with the proportion of the characters; the Moors, remember, had by that time overrun the whole of Spain.

You will see in the alphabets on the screen the rather freaky character of Anglo-Saxon lettering—sometimes mechanically square in form, sometimes exceptionally flowing and even frisky. Anglo-Saxon lettering, I should say, was affected by lingering traces of an obsolete alphabet derived perhaps at some remote period from the Gauls, which, to judge by internal evidence, must have been something like the Greek—but I need not go into that, letters so unlike ours do not much concern us.

A couple of pages of a seventh-century copy of Gospels show the character of the Saxon minuscule lettering. There is a curious twist in the long stroke of the *b* and *l* which here does not rise above the line at all.

By the thirteenth century the Gothic style had formed itself. In the next hundred years or more it perfected itself. At the end of the fifteenth century it was still flourishing—flourishing was the word literally, and in the sixteenth it was sometimes all flourish. I show you some late German letters. It takes an expert to read them. Some of them happen to be upside down. It is no easy matter to say which.

But I am getting on a little too fast. I have two or three examples of "Lombardic capitals," as they are called, to show you. These were used as initials. In their simplest form they were just in red; often they were filled up with linework in blue, or more elaborately illuminated with gold and many colours; but it is the form of the letters themselves to which I wish to call your attention now. The swelling and bulging of the lines is as characteristic as the spring of their tails and other extremities. To this period belong also the "closed" letters characteristic of thirteenth and fourteenth-century Gothic writing.

Lombardic capitals were not used only for initials; inscriptions were written in them entirely; in fact, it was not till the fifteenth century that inscriptions were commonly written in minuscule letters. Observe that this is not pen writing. It is done with a brush, and there results a very distinctive character; the letters are fatter than pen letters.

Contrast the Lombardic capitals with a rubbing from a Flemish brass, also of the early fifteenth century, in which you see there are no capitals at all. The even perpendicularity of the straight strokes gives at a glance the character distinguished as "black letter;" there is, of course, relatively much more black about it than there would be in an inscription in Roman character.

Another Flemish Gothic brass shows the association of similar lettering with capitals. The simplicity of these Gothic capitals argues that it belongs to not too late a Gothic period. Further inscriptions in Lombardic capitals are shown in the stained-glass from the Sainte-Chapelle at Paris, undoubtedly of the thirteenth century.

You will see that the letters are sometimes joined together. We have abandoned that kind of thing, except in the conjunction of *Æ* and *Œ* diphthong, and writing is all the easier for it; but there are ornamental possibilities in the linking of letters not to be overlooked.

The next diagram on the screen is by way of reminder that the Gothic scribes used two forms of smaller letter—rather that their manner varied so that it presents forms very different in appearance. According as the writer considered

ease of writing he approached the rounder of those types, the more cursive. If regularity was his first thought he adopted the latter, the more straight-backed. The latter form went rather out of fashion for awhile, but it was revived by the printer, who saw in it what he could best imitate.

The page of late German Gothic lettering shown has quite a national twang about it; it is a noble bit of black letter, strong and manly as one could wish. But there is something rude in its strength when you compare it with the Italian MSS. which follows. That is strong in a simpler way, more refined, more perfect, not so Gothic perhaps. There is an elegance about Italian Gothic lettering—see the capitals, for example—which is not characteristically Gothic. The difference of nationality is very plainly marked in two contrasting specimens.

By way of prelude to some examples of printed type, I will show you just two or three specimens of the fifteenth-century penmanship. The first are from German missals of towards the end of the fifteenth century; both of them are excellent and not too florid. The capital letters in the upper one you will see are rather frisky, but being distinguished from the rest of the type by their colour, those tails would not cause confusion in the ranks. Even the crosses introduced at erratic intervals, certainly in a very decorative way, would not so much interfere with the wording in red as they do in the photograph. In the lower instance you may note how decorative is the use of the four heading lines of the page in letters three or four times as big as the rest. Compare with these the Italian MSS. next shown, rather earlier in date—1450—but Roman in character, you see.

I need not explain to an audience such as this how in the sixteenth century (and much earlier in Italy) the Classic manner of design generally was revived, and with it of course the style of lettering. Enough to note that at the time of the introduction of printing the two styles were in use for MSS., and so two styles of printed type arose.

The type we use nowadays has come about in a more or less accidental way. In the first place it was a copy of MSS. forms. That was inevitable. Possibly printers were anxious to palm off their printed books as MSS. But apart from any such intent on their part, their text was bound to follow the written page, or no one would have been able to read it.

The printed psalter, of which a page is shown, bears obvious resemblance to the two MSS. specimens shown three slides back. This was printed by Schæffer in 1457. It is the first book with date and the earliest specimen of printing in colours; the big initial *B* is in red and blue.

The black letter and the Roman types, as the printer first conceived them, are both shown on the screen together for comparison. The topmost of the two is from Schæffer's Bible, 1461. My friend Mr. Emery Walker considers it perhaps the best of the black letter founts.

The lower, by Jensen, 1470, is one of the best Roman. There again we have the heading lines of large type. You see when you compare the two that the black letter is blacker.

A supplementary slide shows you on a rather larger scale specimens of the same two founts with another between them of intermediate character—not so angular as the one, not so round as the other. That is by Sweynheim and Pannarts, who were the first to print in Italy. All these are obviously very much in the likeness of MSS. writing.

The Gothic lettering next shown is French and not so aggressively Gothic as some writing and printing of the period. It is of the year 1486.

A more rigidly Gothic type is the specimen by Wynkin de Worde of Westminster, 1486. That is English, you see, and is typically "black letter."

A further example of English work is from Caxton's "Dictes of the Philosophers," the first book printed in England.

That will be enough of type printing. I have shown examples enough to illustrate the variety in it.

When I was a boy, I remember, I thought there were so or so many alphabets; I had no notion as to how many, but I had no doubt about there being a fixed number; and I have a very distinct recollection of hesitating to buy a book of alphabets (which I coveted) hoping to find one which would include them all. It did not occur to my youthful mind that in the year 1300 or 1400 the recognised forms of lettering had never yet been stereotyped and that each individual scribe was at liberty to play variations on the well-known alphabetical tune. That is just the difference between lettering ancient and modern, that we are not allowed to play variations; and that is why our types are so monotonous.

In the case of type-printing that must be more or less so. But I think it might be less; we need not go on copying copies of copies of copies of copies, from which all the virtue of vitality and freshness has died out. That is how we arrive at the Victorian newspaper type. Compare it with the early founts and ask yourselves if that is any credit to this year of Jubilee. I don't feel very jubilant about it. Let us found ourselves at least upon the best types and let us go straight to them for inspiration. We have got to go on.

Pedants want everything to be fixed, but nothing is fixed until it is dead. Then let it be decently buried. Life is in movement. We have long since given up the idea of perpetual motion, but that is the secret of it—life. And that is the evidence and sign of life—motion. The question is, Are we alive?

I have alluded to the influence of the way writing was done upon its shape and character, more especially in reference to the implement employed in writing. I must illustrate that a little more plainly, for it is of infinite importance in design.

The earliest writing was most probably scratched with a point upon whatever was handiest—skins, palm-leaves, the bark of trees, and especially upon clay—a material which, when it was baked, was more lasting than stone. We have to-day at the British Museum any number of clay tablets or Babylonian "bricks," covered with minute and most voluminous inscriptions.

To the left of the screen is what purports to be the most ancient inscription extant (B.C. 4500). That is a very rude drawing taken from the *Daily Chronicle*, but you can see that the signs are all scratched—there is no doubt about that. The smaller inscription at the top of the screen, to the right, is seven or eight hundred years later. In that you see the wedge shapes from which the cuneiform writing of the Assyrians takes its name. That is described, you see, as a "brick stamp," but the drawing is too rude to show how it was done—whether stamped, scratched, or cut. If, in scratching on firm clay with a sharp instrument you begin with a dig, and, as it were, drag the tool along, you get a more or less wedge-shaped scratch, and that may very well be the way the cuneiform lettering came about; but the British Museum "bricks" (as they are called) are so precisely and sharply defined that they must almost certainly have been cut.

You will see in the various cuneiform inscriptions lower down, on the same side of the screen, divers wedge-shaped or arrow-headed characters, taken from what are said to be facsimiles of sculptured writing. But the more common Ninevite form, as found in the famous sculptures which we have at the British Museum, is neither forked nor rounded (as these reproductions have a tendency to be), but consists, as in the diagram I give you, of, for the most part, merely three-sided digs into the stone. In fact, it is "chip carving" of the simplest kind, born and bred of the chisel.

From that to the simple Greek or Roman capital, as square as well could be, is not far. Early Greek inscriptions on granite are sometimes not much more than scratched in the stone.

The small Greek character on the famed Rosetta stone is mere scratching. Larger and deeper-cut lettering is still typically chisel-work though no longer simply chip carving.

The writing with a stylus on tablets of wax was naturally blunt. Penwork at first was also much blunter than modern writing, owing partly to the pen used (a reed) and partly, it seems, to the texture of the material on which it was written. At all events, the early writings on papyrus (Egyptian, Greek, Latin) are bluntish—the lines rather equal in thickness, the points not sharply turned, but rather rounded.

The Arabs wrote with a reed pen held more or less horizontally so as to hold the ink. The paper or papyrus was held at an angle. It was in writing the Roman letters with a reed pen that the Mediæval scribes gave it its Gothic character. When quills (which hold the ink better) came into use it enabled the Italians to develop their minuscule.

In the diverse specimens of early Egyptian hieratic writing shown you will see there is considerable variety of character. The lettering in the darker scrap of papyrus is unmistakably the outcome of the brush, and, curiously enough, it is written in vertical columns, just as Chinese and Japanese writing is—which also is brushwork. By the way, the Chinese had also an almost perfectly rectangular form of writing, which was their monumental manner. The inscription to the left, below the last mentioned, proclaims itself penmanship. Two inscriptions look as if they might have been dug out of clay with a round-pointed instrument. More likely they are cut in stone which has been weather-worn.

I have amused myself by designing an alphabet, near enough I think to ordinary Roman lettering to be unmistakably readable, based on the idea that it can be cut in the simplest and most direct way on fairly hard stone. The letters are shaped, that is to say, with deliberate view to their direct and easy expression with the chisel. I take the Assyrian cuneiform character, and its invariable use for inscriptions to be cut, as proof of that being a convenient form of letter for cutting. It is noteworthy that Assyrian inscriptions painted on bone are not cuneiform, whilst those cut in bronze are.

The suitability of the straight-backed Gothic letter to engraving on brass is plainly shown in the engraved brasses of the fifteenth century, and you get a precision in the detail which is characteristic of the graver.

In some of these it is the background of the letters which is cut away, whilst a well-proportioned band of bright brass holds them together. The taller letters cut into this. The letters themselves are in some cases slightly engraved, so as to suggest that they consist of straps which turn over. That is a

tune upon which the writers of the fifteenth and sixteenth centuries played many variations.

Gothic still, but very different, is the French black letter shown. Clean as the work is, there is not that metallic precision about it, though the incised letters are very squarely formed. The fact is that they are cut in slate; and you can see it in the comparatively soft lines of the curling tops and tails of the taller letters.

A yet more beautiful inscription, also French, is yet more suitably treated. There is no reason why in soft stone the letters should not be rigidly square; and these are not. There is here more the freedom that you get in penwork, of which you yet trace the influence. Still it is not penlike, but obviously and beautifully what it is, viz. cut in.

The painted inscription in Lombardic capitals is very different, but you never suspect this of being cut either in stone or brass.

You can see again the influence of material upon design in the big D on the screen. That is a simple block for printing or stamping on to linen an initial (afterwards to be embroidered?). It is made for French peasants and sold in market-places for two or three sous—the workman himself a peasant. It consists of strips of thin flat wire driven into a chunk of deal, roughly sawn across the grain, so that the metal-tape easily finds hold. But see how simply the design follows the process employed, the easy curves which lend themselves to it. The type of the letter is commonplace, but it is the commonplace type best suited to that way of working. So with the added decoration. The workman (and those to whom he appealed) would probably have liked the sprig of foliage more natural, but the wire would have it so; he followed its promptings, and was something of an artist, almost in spite of himself.

I have attempted to design an alphabet especially suitable to wood. The suitability of strapwork to wood-carving is shown in instances innumerable of Elizabethan, Jacobean and especially Henri II. wood-work. The slightest modelling on the surface of the slightly raised pattern is for many purposes quite enough. There, at all events, is lettering adapted to the simplest expression in wood-carving, and that simple expression dictated its design.

The Arab penmen took great pride in their penmanship, and their writing shows the wonderful elasticity of the pen. They seem to get out of a reed pretty much all that a brush will give. One is reminded of brushwork by the characters on the screen, but they are yet more like broad penwork—though here woven in silk; and very beautiful decoration this *neskhi* character makes. The Arabs had also a squarer *cufic* form, which I take to have been originally the monumental or sculptural form.

The letters on the old English sampler of the seventeenth century are clearly adapted to needlework; their angularity, as well as the peculiar form of that angularity, is begotten of the canvas on which the work is done, and characteristic of a simple class of needlework. Very different is the other needlework example. The needleworker has the choice of two very opposite kinds of lettering, the one rigidly square in outline following the meshes of the canvas, the other carefully avoiding anything like a right line which it is difficult to get right except in the way last shown. This flowing letter is well adapted to working on a material of which the mesh is not apparent. There is good reason for here avoiding the square line, and even flourishes are excusable.

The alphabet in gesso is suggestive of the way it is done. It is easy with a long-haired brush and a thick creamy composition of glue and plaster to trace fairly even, fat, bluntish lines. Of such lines I have devised an alphabet, naturally of rather a curly character. To have tried for sharpness would have been foolish. Just such an alphabet as this (it might be much more elaborate) would lend itself to execution in raised cord (single or double) sewn down or "couched" upon a textile ground.

Two more examples and I have done. The first a sixteenth century version of the Greek alphabet, just that you may see its simple, square and clean-cut lines. Comparing that with the lettering on the coins next shown it might seem to you that the die sinker had, say in the coin at the bottom of the screen nearest to me, set himself to elaborate a much more ornamental form of letter rounded at the points in a curious way. But he had no such ambition. That simply happened so. The fact is the artist worked with a drill and a wheel, and in cutting the very short strokes of which the letters are made up, he would be likely with the wheel to overshoot the mark. It was a safe plan to drill holes at the points and then to engrave a line from hole to hole. From that comes a character which he did not think it worth while to efface.

It is time now I came to an end. I shall have an opportunity in my last lecture of referring again to the influence of the tool upon the alphabet. Enough for the present if I have impressed upon you how inevitable that influence is, and the character it gives to design.

(To be continued.)

NEW CHURCH AT BASSETT.

A NEW church is in course of erection on the east side of London Road, Bassett, situated between Red Lodge and the turning to North Stoneham Park, of which Mr. E. P. Warren, of Westminster, is the architect, and Messrs. Holloway Bros., of Battersea, the contractors. The new building, the foundation-stone of which was laid on the 29th ult., is dedicated to St. Michael and All Angels, and has been designed with a view to making the most of the congregational area. It is to be roofed with a groined vault, and the deep buttresses built to resist the thrust of this vault are placed internally and pierced with arches to form continuous narrow passage-aisles, the outer walls of which are mere screens or "curtain walls" connecting the buttresses, and roofed over with a low-pitched roof immediately below the tall nave windows. The nave is thus divided into a succession of deep arched bays. The chancel, which is a direct continuation of the nave, is formed by omitting the passage-aisles and making the side walls almost flush with the inner faces of the buttresses, at the same time raising the floor and providing steps for approach. The nature of the structure has, in view of the exigencies of the case, been ruled by the strictest considerations of economy, and there has been no desire or attempt to follow an historic style. The materials are local bricks, red for external facing, and Monk's Park stone for all dressed work of doorways, windows, &c. The roof will be covered externally with green slates. It is only at present possible to build a portion of the church, the south transept and the two westernmost bays of the nave being omitted. The edifice when completed will be 99 feet long and the nave will be 25 feet wide, and with the aisles added the total dimensions across will be 37 feet. There is no tower in contemplation, but it is finally intended to have at the west end a stone bellcote on the gable.

THE GOVERNMENT LABORATORY.

A BLOCK of buildings has been erected on a site adjoining King's College Hospital, which contains laboratories for testing excisable and dutiable articles. It occupies a site of about 7,900 square feet, and its various rooms, thirty-eight in number, and capable of accommodating about 100 workers, are distributed over three floors and a basement. The building externally is befittingly simple in character, and with the exception of the entrance, which faces Clement's Inn, is altogether devoid of any attempt at ornamental treatment. On the ground floor are situated the office of the principal chemist, the deputy principal, a small reference library, the research laboratory, the Crown contracts laboratories and the laboratory for the examination of food and drugs sent by magistrates under the Adulteration Act of 1875. Samples of imported butter taken by Customs officers at the port of entry at the instance of the Board of Agriculture are also examined in this laboratory, as are samples of fertilisers and feeding stuffs referred in accordance with the Act of 1893.

The first floor is wholly reserved for the examination of alcoholic products and manufactured tobacco. The alcohol laboratory, arranged for thirty-two workers, is a lofty, well-lighted room, with conveniently-disposed work-tables fitted with various contrivances for the rapid and accurate examination and analysis of brewing materials, worts, beers, wines, tinctures, medicated wines, compounds, &c. In the same laboratory is conducted the examination of the wood naphtha required for the methylation of alcohol. Round the room are placed the balances needed for the estimation of density, &c. and under each window is a table for the clerical work of the analysts, special arrangements being made for the keeping and preservation of the official registers. Immediately adjoining are the polariscope room and an artificially cooled chamber, capable of holding some thousands of samples pending examination. Close to the entrance of the main laboratory are the offices of the superintending analysts, each fitted with a working bench and with presses for the custody of microscopes and special apparatus. Next to these are the tobacco rooms. In one of these the incineration work, required for the determination of sand and inorganic matter, is conducted in muffle-furnaces fired by gas. The estimations of moisture in manufactured tobacco, instituted in 1887, are also conducted in this room, the samples being heated in a series of jacketed steam ovens, arranged to work continuously night and day. The main tobacco laboratory is fitted with appliances for the examination of manufactured and the so-called "offal" tobacco for determination of drawback and for the detection of fraudulent or improper admixtures.

On the second floor are placed a number of special rooms, a museum of specimens of adulterated foods and other products, a small class-room for the instruction of supervisors, a type-writing office and a room for the preparation of micro and other photographs.

In the basement are situated rooms for the standardisation

of the instruments employed in the Revenue Service and laboratories for the chemical and bacteriological examination of waters sent by the Prisons Department of the Home Office, the Board of Trade, Office of Works and other public departments. There is also here provision for operations requiring a high temperature, as in furnaces, oil and air baths, &c.; a small mechanical laboratory, rooms for the storage of chemicals, apparatus and stationery, and of samples required to be preserved either for purposes of reference or pending prosecutions. Lastly, there is a small boiler-house and engine-room, ventilating fan, refrigerating apparatus and ice-making machine, and a lift placed near the receiving-room and delivering on each floor of the building.

Particular attention has been paid by the architect, Sir John Taylor, to the arrangement and fitting of the new laboratory, and there is provision for the introduction of all the machinery and apparatus required for modern analytical operations. It is amply furnished with draught places, evaporation closets, filter-pumps and the other paraphernalia required in a well-appointed chemical laboratory of the present day. The heating, lighting and ventilating arrangements have been carefully planned, as well as the systems of supply of water, gas, steam, and electricity and of drainage, and the operating tables are fitted with various contrivances, some of them of original design, in order to expedite the work or to increase its accuracy.

The whole building is interesting as being the first State laboratory in this or any other country which has been specially constructed for the purposes it has to serve, and the mode in which it has been equipped and finished reflects great credit on the Office of Works.

TESSERÆ.

Taste and Architecture.

IT has been deemed a fruitless task to reconcile to a principle the varying opinions current upon the same object in arts each of which is termed the opinion of taste, because of the different degrees of sensibility and imagination found in different minds, and because it has been observed that the same object which is viewed carelessly by one man fills another man with exquisite delight. Strange as differences may appear, they are all to be traced to one source. The taste of a man, which is a progressing principle, receives its perfect development only from time. Taste which in infancy is mere sense becomes improved as imagination and reason blend to assist it. Taste resulting not from a simple idea, but from the union of reason and imagination, varies then not according to that chance inseparable from a simple notion, but according to the effort of the imagination and the exercise of the judgment, the latter quality of the mind being a determinable thing, whose degree of ability is proportioned to the attention and care bestowed. Imagination, too, though a power extremely elastic, resembles when engaged with architecture either more or less that faculty we denominate "taste," for its essential power then lies in tracing resemblances, and it is either perfect or advancing towards perfection, according to the degree of judgment in simultaneous exercise. Thus taste is subject to degree, and according to this degree of taste in different individuals, we find the degree of refined pleasure which a work of art produces. Taste which is a habit is therefore imperfect taste, because inimical to progression. Hence habit, which is the origin of our views in a great measure, may explain the source of our architectural taste. Independently of this definition of taste, and the grounds of its support, there is a further difficulty attendant upon its application to architecture, from the circumstance of there being little or no direct appeal to the sympathies which the painter, the poet and the sculptor so powerfully affect, and which the rudest mind intuitively feels without previous study to acquaint him with the source of his emotion. This is one reason why public opinion varies so much; men untaught, with their judgments unassisted, feeling that emotion is the object of the art, are precipitated into hasty conclusions just because their sympathies cannot be awakened. A correct taste in architecture is more difficult than in any other art, because the ideal resemblances affecting the mind are more remote, and this is the reason why taste is pleased by figures, pictures, statues or striking ornaments, to the prejudice very often of a taste strictly architectural, the mind being conducted towards familiar objects. The essential difference between architecture and the other poetic arts consists, then, in this suggestive character, whilst the poetry it exhibits appears in expression, attitude or relative position. It has, however, all the attributes of the other arts at command, and which it makes subsidiary; and thus its claims to criticism are as strong and as important as the noble art of the painter or the sculptor.

Michel Angelo and Oil Painting

When Michel Angelo pronounced oil painting to be "Arte da donne e da huomini agiati e infingardi" (an art fitted only for women and lazy men), a maxim to which the fierce Venetian manner has given an air of paradox, he spoke relatively to fresco. It was a lash on the short-sighted insolence of Sebastian del Piombo, who wanted to persuade Paul III. to have the *Last Judgment* painted in oil. That he had a sense for the beauties of oil-colour, its glow, its juice, its richness, its pulp, the praises which he lavished on Titian, whom he called the only painter, and his patronage of Fra Sebastiano himself, evidently prove. When young, Michel Angelo attempted oil-painting with success; the picture painted for Angelo Doni is an instance, and probably the only entire work of the kind that remains. The Lazarus, in the picture destined for the cathedral at Narbonne, rejects the claim of every other hand. The Leda, the cartoon of which, formerly in the palace of the Vecchiotti at Florence, was painted in distemper (a tempera); all small or large oil pictures shown as his are copies from his designs or cartoons, by Marcello Venusti, Giacompo da Pontormo, Battista Franco and Sebastian of Venice.

J. P. De Louthembourg, R.A.

There was a period, when Louthembourg was apparently bewitched from himself, when the phantasies of an unsettled mind drove him upon the trial of experiments equally futile and unprofitable; when the *auri sacra fames* made him immure himself from the world to seek the philosopher's stone, he pondered, he floundered, and was approaching fast to the threshold of common pity, cadaverous, but not rich, when the good sense of a relative saved him from local perdition; she burst upon him during his nocturnal studies when he was keenly watching the deceiving process of transmutation in company with a charlatan from the Lower Rhine; the reddening fair caught them in the raging of the enchantment, when they were calcining Venus with the butter of the daughter of Luna, and fixing Luna herself into Sol. She broke his crucible to shivers, enfranchised the simmering metal, extinguished his fires, and seizing the forceps took his adult associate by the nose and led him from the laboratory into the street, where the enraged lady broke his head with a pipkin and then dismissed him with a timely malediction. From this eccentricity he shortly wandered to another, originating from a wild benevolence of spirit; this inventive gentleman dreamed that he was blessed with a knowledge of the Panacea Catholicon, or remedy for all diseases; he professed to be an adept in the art of healing and was believed; his gates were crowded with the diseased of all degrees, and he imagined he could eradicate their complicated maladies by the secret springs of sympathy; he ardently thought himself "eyes to the blind and feet to the lame"; he enforced his spells, but the end was not answerable to his hopes, the cripple was unrelieved and the internally afflicted were not grateful for his attention. The miserable inmates of the vicinity rushed liked a common torrent from Putney, Brentford, Kew and No-Man's land; the blind followed the whoopings of the lame until they congregated on the terrace at Hammersmith; here they manifested their wrath by a yell that would have staggered Cerberus; the Alsatian Celsus heard the curse with dread; he seized his telescope and scudded to the garret to reconnoitre, the liberal chemist leered upon the disappointed mob from the parapet of his mansion and saw his most valued medicaments cast into a fetid ditch; his *agua beoartica*, his *catharticum argentum*, his *calomelanus* and his dear *pilula panchymagoga* were hurled amid the swine of the district, while he, like another Jeremiah, stunned even Heaven with his lamentations as his big manly tears ran down the gutter to the silver Thames.

GENERAL HOSPITAL, BIRMINGHAM.

OUR attention having been called to an error in our description of the work at the General Hospital, Birmingham, we sent down a member of our staff to make inquiries, and we learn that the whole of the faience and tilework, which has given great satisfaction, has been carried out by the Leeds Art Pottery Company, with the exception of the waiting-hall, which has been lined with Staffordshire faience, supplied by Mr. Whitehead. The work supplied by the Leeds Art Pottery Company is as follows:—The staircases, five in number, eighteen arches, in front of the general offices and main corridors, the tower, lobbies, thirty-six bathrooms, the extensive range of departments which comprise the kitchens and the skirtings, which measure $3\frac{3}{4}$ miles, also the skirting and bathrooms in the nurses' home.

In an early issue we shall illustrate one of the tower lobbies showing also part of the staircase, which will give our readers some idea of the extent and artistic treatment of the work executed by the Leeds Art Pottery and Tile Company.



Lift Accident at the General Post Office.

SIR,—As it is well known that we have supplied a number of lifts to the General Post Office, we think it only fair to ourselves to state that the lift which was the cause of the recent lamentable accident was not one of our manufacture.—We are, sir, your obedient servants,

EASTON, ANDERSON & GOOLDEN, LIMITED.

GENERAL.

Sir Isaac Newton's house in St. Martin's Street, Leicester Square, is to be taken down shortly.

The New Hotel which is to be erected at Sheringham, and for which a provisional license is granted, is to cost 30,000*l*. There will be 100 bedrooms.

The London County Council adopted the following resolution on Tuesday last:—"That the Parliamentary committee be instructed to take the necessary steps to insert a clause in one of the Council's Bills empowering the Council to purchase or contribute towards the cost of purchasing or otherwise incur expenditure in connection with the preservation of buildings and places of historic or architectural interest." Mr. Benn seconded the resolution, which was adopted.

M. Roty, the engraver of medals and of coins, is about to present the French Mint with a collection of his designs which were prepared during several years.

A Return prepared by the Chamber of Commerce in Leipsic shows that during the past year 1,337 volumes on the fine arts were published in Germany. The volumes on engineering sciences number 595. The total production of new books was 23,339 volumes.

Hornchurch Marsh, near Barking, containing about 130 acres, is recommended for purchase by the streets committee of the Corporation as a depôt for dust and refuse of the City. The value is 25,447*l*.

The Town Hall of Helsingborg has been completed at a cost of about 40,000*l*.

The Priory Church of St. Bartholomew the Great, West Smithfield, may now be said to be restored, but further portions of the original building are still being found. During the last fortnight some 20 feet of the exterior wall of the north side of the lady chapel have been uncovered. This wall will now be left permanently exposed. The building, and especially the lady chapel, which was opened last May, continues to attract large numbers of visitors, and during October the whole church, including the crypt, will be thrown open, free of any charge, on two Saturday afternoons, viz. October 9 and 16, and the points of interest will be explained by one of the hon. secretaries of the Restoration Fund at half-past two precisely. A collection will be made after the lecture towards defraying the debt still owing on the recent works.

At a General Assembly of the Royal Society of British Artists the following gentlemen were elected members:—Messrs. A. D. McCormick, Harry G. Shields, R. Goodman, Percy Craft, James Greig, R. Ponsonby Staples, Ivystan Heatherington and W. G. Knight.

The Duke of Westminster has, it is said, purchased three pictures in the collection of Jonkheer Six of Amsterdam—a Rembrandt, a Cuyp, and another old Dutch masterpiece—for nearly a million florins, in order to present them to the Queen.

Mr. John Cash is the architect for the new premises erected for Macmillan & Co., publishers, in St. Martin's Street, W.C.

Mr. A. Sanderson has presented to the Chiswick Urban District Council a valuable property known as No. 1 Duke's Avenue, for the purpose of a free public library.

The Opening of the West Riding County Council's new offices in Wakefield, which were expected to be ready by December 1, has, on account of the incomplete state of the building, been postponed till February 23 next.

The New Public Halls just erected at Uddingston were opened last week. The building is situated near the Caledonian Station and comprises large hall to seat 1,000 and lesser hall to accommodate about 250. Besides, there are two large cloak-rooms for ladies and gentlemen and two committee-rooms. Under the stage there are dressing-rooms and kitchen and on the stage level a green-room. The total cost has been 3,500*l*.

The Architect.

THE WEEK.

A NEW street in the City hardly seems a possibility, but the London County Council on Tuesday approved of an application from Messrs. DAVIS & EMMANUEL to form one leading out of Noble Street. It is to be only 13 feet wide, and is intended for foot traffic. It is to be called Fitchett's Court. The conditions imposed by the Council are as follows:—(a) That the name of the street as approved by the Council be affixed on posts at the end of such street until the houses are built, when the name must be affixed according to law; and (b) that if the said application, plan, or particulars be hereafter found to be inaccurate in any respect, the said order shall be null and void. That notice of such order be given to the applicants with an intimation that the Council's reasons for the imposition of such conditions are:—(a) That it is expedient in the public interest that immediately the formation of any street is commenced its name should be affixed as required by the order; and (b) that there should be no deviation from the scheme sanctioned by the Council. At the same meeting the plans of the proposed theatres at Peckham, Walham Green, Brixton and Charing Cross Road were approved, while the plans for the alterations at Olympia were considered unsatisfactory.

ON Tuesday the question of who is to design the new lunatic asylum at Rubery came before the Birmingham City Council. The committee had agreed to appoint Messrs. MARTIN & CHAMBERLAIN. One of the reasons for the selection was that several competitions in Birmingham and the vicinity could not be considered satisfactory, as economy and efficiency were not secured. Then it was said that the majority of the local architects were without experience in the erection of asylums, and to arrange an open or unrestricted competition might result in the success of a stranger, which would not be satisfactory. In such a case Messrs. MARTIN & CHAMBERLAIN, who had been engaged on asylums, would be excluded, for they declined to compete for any building unless they were paid for their trouble. To pay fees to all competitors would lead to an expenditure of about 2,000*l*. The building required was to be plain, and the committee could not perceive any advantage which would arise from making it the subject of a competition. The majority of the Council disagreed with the asylums committee. The voting will be approved by architects in Birmingham and elsewhere. If there is only one firm of architects who are acquainted with the arrangements of asylums it would be wise to have the number increased, for the demand for asylums is becoming more urgent. If the buildings are as simple as the committee describe them, an architect who has had experience in other work could without difficulty become acquainted with all the necessary details. There are, unfortunately, buildings enough in England where he could study. We have not a word to say against the firm who were nominated, but it deserves to be remembered that for several years they enjoyed a monopoly of municipal work. When the standing order was made which was supposed to make competition henceforth obligatory, the intention was to put an end to favouritism that was considered to have many disadvantages.

IN the address which Mr. R. W. FOWLER delivered as president of the Sheffield Society of Architects and Surveyors on Tuesday, he referred to the action of the Corporation in restricting a competition for a fire-brigade station to the members of the Society. He pointed out the advantage accruing to the Corporation from the arrangement, instead of employing an architectural staff of their own, whose services could not always be in requisition, and who yet must necessarily be a permanent expense. They thus obtained the talents of practically the whole architectural profession in the neighbourhood, with very beneficial results not only to themselves, but to the ratepayers at large. The tendency of corporations nowadays was, he said, to concentrate the work of a town in the hands of their

own body, and employ their own workmen to carry it out. That was not economical, they all knew, and whether it resulted in greater efficiency was a matter of controversy. The evil growing out of it, which hardly seemed to obtain the attention it deserved, was the difficulty of dispensing with the services of an army of men, or a portion of them, with the necessary increased staff of permanent officials, when not required, and the consequent obligation that arises to find employment for them at the unnecessary expense of the ratepayers. When the trade of a town was prosperous the burden of increasing rates was not heavily felt; but when the tide turned, and economy became necessary, a social difficulty would be likely to arise which he was afraid was not duly considered by the advocates of this system. No large employer of labour would dream of carrying on his work on the principles that are urged as so necessary for some corporations. A railway company, he remarked, when making new lines invariably employed contractors, and on the high efficiency of that work depended the safety of hundred and thousands of lives in the future, and why a municipality should be unable to supervise piece work with the same satisfactory result as private individuals and other corporate bodies was a matter difficult of comprehension. The remarks of Mr. FOWLER should receive consideration from municipal councils that possess architectural departments.

AN action between a district surveyor and the London School Board on a question of fees will have some piquancy for ratepayers, especially as the London County Council will, no doubt, support their officer, and consequently whoever wins the costs will fall on the Metropolis. In April last Mr. BERNARD DICKSEE applied to Mr. GOAD, one of the School Board contractors, for 9*l*. 7*s*. 6*d*. fees. The Board put the case in the hands of their solicitor. It was said that although the work done was on the site of an old school in Rockingham Street, Newington, the district surveyor had based his fees on the scale of the new Building Act of 1894, which are in excess of those allowed under the Act of 1855. As the school was erected in 1855, the works committee are of opinion that the Act of 1855 applies, and that the Board could successfully resist the claim for the larger amount. A summons has been served upon Mr. GOAD for the amount of the fees, which the solicitor to the Board has been instructed to defend.

THE Dominicans may no longer have famous painters enrolled in their ranks, but they have not ceased to take an interest in art. The remarkable figure of CHRIST which M. JAMES TISSOT has completed in their chapel in the Faubourg Saint-Honoré, Paris, and which was unveiled on Sunday last, is evidence of the importance they still attach to wall-painting. This figure is colossal, for it occupies the whole of the space behind the altar. CHRIST is represented with the arms outstretched. The space from hand to hand is fifteen metres. Above the wall is a cupola, in which it was necessary to introduce the head, in order that the figure might be as large as possible; but the combination of plane and curved surfaces was regarded with doubt. M. TISSOT has contrived to obviate the difficulty presented by the concave surface by packing it with layers of canvas in such a way that the addition is not noticeable. The head, which measures two metres, and is surrounded by a nimbus of golden rays, accordingly stands out from the azure ground most effectually. CHRIST is clad in white robes. The figure is seen above a balustrade, and in the bays floral symbols of the Virtues are introduced.

M. GODEBSKI is a Polish sculptor who has been brought up in Paris. He was taught his art in the Atelier Joffroy, and among the works he produced is the monument of THÉOPHILE GAUTIER in the Montmartre Cemetery. The Franco-Russian alliance has served M. GODEBSKI. The CZAR has given permission for the erection of a memorial of the national poet MICKIEWICZ in one of the public places of Warsaw. The Poles at once subscribed 700,000 francs for its execution, and M. GODEBSKI is the fortunate artist to whom the commission for so important a work is entrusted. The poet died in 1855, and the liberty to place his portrait before the eyes of his countrymen is accepted as a most generous concession.

RENAISSANCE ARCHITECTURE IN ENGLAND.*

IN his opening lecture at University College, Professor ROGER SMITH pointed out to his students that "to all appearance the reasonable probability is that those who are beginning to study architecture now with a view to practise it as a profession, will find that if they are to follow the current of public opinion in their day, it will be some form of Renaissance art that they will pursue," and accordingly it was wise for them to direct attention to Renaissance from the first. It needs no gift of prophecy to arrive at that conclusion. Whether owing to the desire for change which is implanted in men, or the inconveniences which the occupants of Gothic buildings have to endure, or some other cause, the whirligig of time has again brought direct or indirect imitations of Italian buildings into fashion. It would perhaps be safer to say that the style is preferred for secular buildings, inasmuch as Gothic churches continue to have their admirers. There is no reason why the two styles should not be favoured, especially as each has advantages. Gothic may be under a cloud, but it has more numerous associations with English life than its rival.

The time is therefore opportune for the appearance of so excellent a history as Mr. REGINALD BLOMFIELD has prepared. A comparison of its merits with others of its class is impossible. Incredible as it may appear, there was no satisfactory work on the subject available for the use of students of architecture or laymen. There were books on some of the architects who made the history, and on the buildings which exemplify the style, and there are few subjects in the two volumes which were not already treated in papers read before societies or in technical journals. But in all such attempts proportion is apt to be overlooked. The relation of parts to the whole period is not considered. The nearest approach in a history was in Mr. GOTCH's work, but it could only be partial in its aims, for they were mainly determined by the buildings selected for illustration. As far as we know, Mr. BLOMFIELD is the first who has endeavoured to present a continuous history of English Renaissance, one which explains the forces which were in operation and affected the design of the buildings, and one which enables the reader to appreciate the relative importance of the examples which were produced between A.D. 1500 and 1800.

That the books which Mr. BLOMFIELD has utilised are numerous will be evident from the list prefixed to his first volume. He has also referred to the invaluable abstracts of State Papers and has had recourse to college and other collections of documents. But he has found, like older explorers, that chroniclers in general bestowed little attention on the arts in England, and the writers in the early newspapers and periodicals found subjects more attractive in the gossip of the time. STEELE, with characteristic generosity, stood up in defence of WREN, but there was no scribe who cared to note the progress of WREN's masterpiece.

MACAULAY's "History of England" was described as a huge pamphlet in support of Whiggism, and every history, unless it is of the "old almanack" species, must have an ism of some kind to uphold or cast down. What is the ism of Mr. BLOMFIELD's history? It would probably be best suggested by "patriotism," if that word was not of late degraded. Unless we are mistaken, his proposition is that English Renaissance was as much of a reality as any of our English institutions, for the foreign elements in it were subdued or transformed by the national spirit. This is suggested by the opening paragraph of the first chapter:—

For the purposes of this history the Renaissance in England will be taken to mean that fresh departure in architecture which began with the tentative efforts of imported workmen in the reign of Henry VIII., which reached its highest development in the hands of Inigo Jones and Wren, and eventually ran itself out in the uncertainties induced by the literary eclecticism of the end of the eighteenth century. The remarkable expansion of the English people in the sixteenth and seventeenth centuries, and the strong conservative instinct of the race, constitute the two contending influences which struggled for the mastery in this new movement, and finally united to give it a distinctly national character. The two factors to be considered are, on the one hand, the constant

importation of foreign ideas, and on the other, the tenacious tradition of a people with a great historic past in architecture. From first to last the process of fusion and adjustment between these two elements occupied over 100 years, and it was the work of the greatest architect this country has possessed, perhaps our one architect of quite commanding genius, to gather up the broken threads and weave them together into one splendid and harmonious architecture.

It is always an advantage in a book when forces can be represented in opposition, and it is a peculiarity of the Renaissance in England to be able to show a continual struggle for survival. In no other country in Europe did so many foreign artists gain a footing. Italians found their way to Germany and France and a few Frenchmen and Germans were received in return; Flemings settled in France. But if we compare the numbers of strangers who are recorded as emigrating from one part of the Continent to another with those who were not deterred by the Channel from appearing in this country, the difference is enormous. WALPOLE and VERTUE's pages record the names of many of the strangers. Among those connected with architecture in various ways and mentioned in Mr. BLOMFIELD's history were JOANNES DE MAJANO, TORRIGIANO, ROVEZZANO, A. CAVALLARI, A. TOTO, the BERNARDIS. They were among the pioneers who introduced the new forms. But Mr. BLOMFIELD maintains that, in spite of the number of Italians in England and the patronage they secured from HENRY VIII., "we cannot point to a single instance of a building of the sixteenth century designed and carried through by any one Italian in England; the evidence on every hand points to the conclusion that they were employed as workmen, and in no sense as architects." The region in which they were employed was restricted mainly to the southern counties. But the power and indirect influence of the Italians is recognised by Mr. BLOMFIELD, for, as he says, "The mere fact that men of the ability of TORRIGIANO, ROVEZZANO and MAJANO were working in England for several years must have had its effect on the native workmen among whom they worked, and families of Italian artists, such as the BERNARDIS at Chichester, must have done something to familiarise these workmen with Italian detail and its very high standard of workmanship."

The Germans had next a turn. HOLBEIN was prized for the naturalness of his portraits and his extraordinary versatility as a designer. His influence has not yet died out among us. HOLBEIN's architectural work, however, appears to have been confined to a couple of gateways, although he may have prepared drawings of many building projects. It is sometimes difficult to distinguish between Germans and Flemings. HENRY DE PAS was the designer of GRESHAM's first Exchange in London. The Germans were busy with mantels and chimneypieces, but the fantastic forms they carved were less injurious than the pattern-books they introduced. Then, as now, there was a weakness for "bits" which could be cribbed. Such obscure persons as CAMMERMAYER and WENDEL DIETTERLIN, says Mr. BLOMFIELD, were preferred to ALBERTI and PALLADIO, and "the various superb Italian editions of 'Vitruvius' seem hardly to have been known in England till the time of the sixteenth century. It is evident, in fact, that the English builder-architect of the time of ELIZABETH was a somewhat ignorant and ill-educated person, and did not follow better models for the simple reason that he was unconscious of their existence." German ornament was made up of a number of independent parts, and would be easier copied than an Italian design, in which there was only one subject. The number of straight lines was also an advantage. Hence it was, as Mr. BLOMFIELD tells us, that "for one piece of ornament that can be traced to an Italian motive there are twenty that are clearly due to German influence in Elizabethan and Early Jacobean buildings. That this influence, however, had not sunk very deeply into the minds of the English is evident from the ease with which INIGO JONES threw it overboard, and it did not reappear in England so long as the development of architecture was spontaneous and traditional, and though not unconscious was not the result of deliberate eclecticism."

If we assume that foreigners were mainly occupied with decoration, the question then arises, Who were the English architects and builders to whom we are indebted for so many buildings which have survived to our times, as well as

* *A History of Renaissance Architecture in England, 1500-1800.* By Reginald Blomfield, M.A., architect. Two volumes. George Bell & Sons.

others which were renowned? With all his endeavours Mr. BLOMFIELD is unable to resuscitate the names of many of them. What is more, he is not afraid to diminish the number by treating JOHN THORPE as an almost mythic personage. Mr. BLOMFIELD does not believe that the drawings in the Soane Museum are all THORPE'S buildings. He credits him with no more than a few, and there are good reasons for the contention. THORPE is considered by Mr. BLOMFIELD to have been "a fair instance of the class of men who worked in England during the transition stage from the builder-designer of Mediæval days to the academic architect of the following century." The SMITHSONS are described as over ambitious. HOLT is credited with several buildings in Oxford, but Mr. BLOMFIELD doubts whether he was more than a contractor for woodwork. JOHN ABEL had some reputation in his day for half-timber houses, which, we are told, "in their rude vigour of design and coarseness of erection closely resemble the half-timber work of Lancashire and Cheshire in the north and of Somerset and Devon in the south."

Excellent work was executed by builders who had no more aspirations towards fame than if they employed their labours in the fields. They merit the praise which Mr. BLOMFIELD bestows on them. There were many contracts going in the sixteenth century, for country gentlemen were then eager to possess more commodious houses. The chapter on sixteenth-century house-planning is one of the most interesting in the book. But the period was like so many others, one of transition. Mr. BLOMFIELD says:—

The architecture of the hundred years from 1520 to 1620 was in fact tentative. The builders were losing their old tradition and had not yet replaced it by a new one, and, on the other hand, a certain sense of expansion and intellectual enfranchisement in the air at the time tempted them to bold experiments, for which they were ill-equipped. So long as they adhered to plain building their work was admirable, but directly they attempted what they probably considered to be serious art they were on uncertain ground, and the result might be an elaborate and costly building, but it was seldom architecture. The specialisation of building had already begun: the builder instead of being an artist, who built and designed in one and the same process, was already becoming a person who built buildings, and then thought it necessary to adorn them with ornamentation borrowed at random. The conclusion is borne out not only by the buildings themselves, but by the rapid increase in architectural treatises and pattern-books, a sure sign of the increased demand for novelty and of the recognised inability of the builder to meet it. Soon after the middle of the sixteenth century, a vague consciousness of the Orders, as some terrible mystery at the root of all architecture, had begun to present itself to the mind of the English builder-designer. It is, indeed, at once comic and pathetic to think of some good mason who could build a building well, but sign his name with difficulty, wrestling laboriously with all the intricate terminology involved in the system of the five Orders as elaborated by scholarly Italians.

The arrival of INIGO JONES in England was the cause of a transformation, in spirit as in forms. Mr. BLOMFIELD tells us how "the homely fancy, the lovable humility, as one might say, of the traditionally art were laid aside; the art of this country was to be no longer an affair of happy instinct, but completely conscious, dependent on scholarship almost as much as on capacity in design. Henceforward, abstract thought and imagination, under rigid restraint, were to supersede the poetry of Mediæval fancy." Apparently INIGO was unlike the men who were accepted as artists in England. BEN JONSON, who as a bricklayer may have distrusted innovations in building, called him a butterfly, a fop, and gibes his "pedling poetry," for on occasion JONES attempted verse-making. It was also suggested that his buildings were only reproductions of his scenery.

O wise surveyor, wiser architect,
But wisest Inigo, who can reflect
On the new priming of thy old sign-posts,
Reviving with fresh colours the pale ghosts
Of thy dead standards; or with marvel, see
Thy twice-conceived, thrice-paid-for imagery,
And not fall down before it, and confess
Almighty Architecture, who no less
A goddess is than painted cloth, deal board,
Vermilion, lake or crimson can afford
Expression for.

It was fortunate; however, that JONES'S patrons were

not afraid of being taunted with possessing theatrical buildings, and there can be no doubt he was served by his connection with the Court. Although he was fined heavily, he was able to practise under the Commonwealth. Mr. BLOMFIELD ascribes to JONES the merit of having "freed English architecture from the imbecilities of the English designers, and started it on a line of fresh development, borrowed, it is true, from Italy, yet so successfully adapted to English traditions that it was at once accepted and followed by the best intelligence of the country for the next hundred and fifty years." To have emancipated architecture is a distinction which few artists can claim, and it is enough to insure INIGO JONES'S reputation.

The chapter on seventeenth century Gothic is curious, but the time was not ripe for a revival of Mediævalism. Where WREN failed it was not likely that men with weaker powers of observation could succeed. That WREN was unable to perceive the characteristics of a Gothic building and yet could appreciate Renaissance forms is one of those psychological puzzles which can never be explained. Mr. BLOMFIELD does not attempt to represent the architect as a heaven-sent, infallible genius. He demonstrates how WREN improved by practice, and insists that the existing St. Paul's is superior to any of the projects which appear in WREN'S drawings. The reproductions of some of the original designs support his argument. But Mr. BLOMFIELD claims that WREN'S later work was "eminently English in its sober power," and that he was the true successor of INIGO JONES "in all that makes architecture vital, in all the qualities that gave to the English Renaissance its sterling masculine character."

The names which appear in the second volume have not the interest which belongs to JONES and WREN, although among them are VANBRUGH, GIBBS, WARE, PAINE, CHAMBERS, GANDON and the ADAMS. Excellent work was produced, but there is less difficulty in following precedents than in establishing them. The amateur continued to be respected. It was open to anyone who could design and have a design realised to pose as an architect. HENRY BELL, whose name is associated with the Custom House, King's Lynn, was an engraver. ALDRICH was an Oxford dean. BURROUGH was master of a college in Cambridge. The explanation offered by Mr. BLOMFIELD is that "when a correct use of the Orders according to the recognised canons was the test of architecture, and the question of cost was seldom raised, the amateur very soon stepped to the front and began to furnish designs of his own—or, at any rate, to give instructions to draughtsmen, who were content to leave to the amateur the credit of the design." But an art which is supposed to be easily attained is not generally appreciated, and if amateurism helped architecture at one time it aided in its decline in the eighteenth century. Lord BURLINGTON as the Apollo of art might find "a proper priest in the person of Mr. KENT," but there were also gods and priests who did not appear to possess celestial qualities, and co-operated in designs which were not inspired from Olympia. Mr. BLOMFIELD analyses their works with care and without any of that sense of superiority which is usually found in modern criticisms on the buildings of a period which is not in favour. Nor does he set up works as models for the sake of running against common opinion. It might easily be supposed the historian considers that under similar conditions he also might have lapsed into errors against good taste and good sense.

A writer on the English language who supposed that men like Sir THOMAS BROWNE, JOHNSON, GIBBON and other rhetoricians expressed it most faithfully would be held to be altogether wrong. The vernacular was not for them. In the same way there is a homely as well as a stately architecture. Mr. BLOMFIELD has a leaning towards the former. He is never more happy than in his descriptions of houses which appear to have been erected without any striving after impressiveness, and somehow are striking by their beauty. An architect is bound to respect conventional ornament, and more especially when treating of Renaissance work, but Mr. BLOMFIELD expresses admiration for "the stonemason at Dorchester who was cutting on the tombstones the mallows and forget-me-nots of the meadows round his home," while ARTARI and BAGUTTI were modelling conventionalities for JAMES GIBBS. Unless we are mistaken the chapters on "The Trades" contain to a great

extent Mr. BLOMFIELD'S theory of architecture, and they bring the book to a suitable conclusion.

Nowadays students of architecture appear to consider that intuitively a knowledge of the history of architecture can come to them. They will, however, find it profitable to study Mr. BLOMFIELD'S two volumes with all the earnestness they can command. The subject is made more interesting than it commonly appears in technical treatises, and it has, moreover, the recommendation of expressing the author's own thoughts. The illustrations, which are abundant, consist of reproductions of Mr. BLOMFIELD'S sketches, of old drawings and engravings, and of photographs. The last are not the most successful. In his sketches the author generally avoids subjects that have become familiar. An architect will find it difficult sometimes to avoid feeling remorse when he observes interesting buildings and details derived from places which he has visited, but the whole wealth of which he overlooked. If there are any followers of Gothic who still hold English Renaissance to be pestilential, Mr. BLOMFIELD'S work will convince them to the contrary, while admirers of the style should be glad to have a demonstration of the national qualities which English Renaissance exhibits.

ELECTRIC TRAMWAYS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from page 214.)

The Overhead Trolley System.

THIS is the most used of any of the various systems, and is on the whole most satisfactory at the present time. The Dublin tramways is one of the most instructive examples of overhead traction in this country. The opposition to the use of overhead wires was very violent, and the Corporation would not submit to their use until visits had been made to continental towns and a report on the subject had been submitted by a consulting engineer. The result was that the Dublin Tramways Company were allowed to equip their lines with the overhead trolley, and the work was completed in 1896. This line, which is seven and three-quarter miles in length, extends from the corner of Haddington Road, in Northumberland Avenue, Dublin, to Dalkey, *via* Kingstown, there being a short branch down to Kingstown Harbour.

The generating station is at the Dublin end of the line, the object being, no doubt, to facilitate the extension of the system to other lines, the station thus being fairly central. As the furthest point is some $7\frac{1}{2}$ miles from the generating station, the ordinary 500 volts continuous current was not suitable for transmitting the energy such a long distance; a high-tension system was therefore devised. The generating plant consists of three 250 horse-power Babcock boilers, working at 120 lbs. per square inch, fitted with mechanical stokers, the feed pumps being electrically driven. There are four 150 brake horse-power engines of the Willans type driving the dynamos by means of belts. The dynamos consist of two 100 kilowatt four-pole 500 volt tramway generators, which are further designed to increase their voltage to 550 volts at full load to overcome the extra line losses.

These generators are connected to the line at the Dublin end, while there are two six-pole 120 kilowatt three-phase generators, wound for 2,300 volts to 2,500 volts. The continuous current machines run at 625 revolutions and the alternating machines at 600 revolutions per minute. The three-phase alternators feed the further end of the lines by means of rotary transformers, which convert the high-tension alternating currents into 500-volt continuous currents. These motor transformers are placed in two sub-stations, one at Blackrock and the other at Dalkey. The Blackrock sub-station contains two direct coupled sets, each consisting of a synchronous three phase motor coupled to a 60 kilowatt (80 electrical horse-power) direct current generator, the pressure being from 500 to 550 volts, and there is a switchboard for controlling the motor generators. The Dalkey sub-station is similar, except that the machines are smaller, being of 50 kilowatt each.

In the Dublin example the line is divided into half-mile sections, the sections being connected together and to the feeders from the generators in switch pillars along the road, and also there is in each pillar a lightning arrester.

A lightning arrester is necessary in every case where there are uninsulated overhead wires. It is a device for providing an easy path to earth for the lightning, while allowing no permanent connection to earth. There are various devices for effecting this, but they all consist of an extremely short spark gap, over which the discharge passes in preference to travelling along a line which has some self-induction. The type used at Dublin is the "Ajax," which consists of two brass wires insulated with silk and placed side by side, both being sealed into a glass tube. One wire is connected to the line and the other to the earth plate, and the lightning discharge sparks between the two parallel wires, probably fuses them together, but the wires are immediately fused by the earth current. There are several of these fuses, which come into operation successively, so that the pressure can be discharged many times before the line is left without any protection.

The feeders and also the high-tension mains are laid in a special trench, usually under the pathway. The trolley wires are throughout nearly the whole route suspended from span wires supported by poles on either side of the road. This method of construction is no doubt more objectionable than the centre pole with double bracket arms, but it does not affect the appearance of the roads very much, especially when the side poles are hidden by trees. The poles are tubular and of steel, being in three sections and having overlapping joints shrunk together while hot. The tube has a cast-iron base, and is set 6 feet into the ground. The span wires are of mild steel cable $\frac{3}{8}$ inch in diameter, and they are insulated from the poles. The trolley wires are slung from these wires by means of insulators. The type of insulator used in this case is that known as the "West End." This consists of an insulator into which is fixed firmly an iron double grip for the span wire, and from which hangs a grip for the trolley wire. This grip is arranged so that the wire is not increased in size to any great extent, and does not therefore impede the trolley. The trolley wires are of hard drawn copper, $\frac{1}{32}$ inch in diameter. A trolley wire is suspended over every turn-out and cross-over, and also over the tracks in the car sheds. At turn-outs the branch-line conductor is not usually connected to the main, but there is a small gap; when the trolley comes to this gap it is pulled down by means of a cord and swung over from the main to the branch conductor.

The trolley itself calls for little attention. It is mounted on a cast-iron pedestal bolted to a plank running the whole length of the roof. The height of this pedestal is 6 feet 6 inches, sufficient to keep the arm from touching any passenger. Fixed to this pedestal is an inclined arm pivoted, on the far end of which is the trolley wheel which runs on the wire, and which is pressed up to the underside of the wire by means of two helical springs, fixed to the pedestal and to the arm on the opposite end, *i.e.* the near side of the pivot.

There are several trailer cars used on the Dublin line at times of heavy traffic, which may also be used with the horse traction. The rails are connected together for the return circuit by the "Chicago" bond in this case. This rail bond consists of a copper rod or wire having tubular or thimble-shaped terminals, which are bent at right-angles to the bond and, with its two tubular terminals, is composed of one solid piece of rolled copper. The tubular or thimble-shaped terminals are inserted into holes through the web of the rail, and the end of the terminal (which has slits in it) is spread or rivetted over the other side of the rail web with a hammer and punch. This prevents its being withdrawn while a drift pin, which is larger than the hole in the terminal, is driven in. This pin expands the copper and makes a solid contact between the bond and the rail, making an absolutely solid joint from which every particle of air and moisture is excluded, and which therefore will not corrode.

It may be of interest to mention the construction at curves. The number of span-wires have to be increased very much to keep the trolley-wire in an approximately correct position, and frequently there must be a single side

straining-wire. These span and straining-wires cause great disfigurement to a street, and this is admitted by almost everyone.

The Third Rail System.—A description of the Bessbrook Electric Tramway may be of interest in this connection. This tramway partakes somewhat of the nature of a light railway, as it is enclosed for the greater part of its length. The line is three miles long, and runs from Bessbrook to Newry; it is used for goods traffic as well as for passengers. The tramway was designed for carrying 200 tons of goods per day in addition to passengers. The generators consist of two 18 kilowatt 250 volt machines, driven by water-power. The track has a gauge of 3 feet, and the average gradient is 1 in 86, the maximum being 1 in 50. A very ingenious arrangement has been adopted with the goods waggons, which must be capable of running on the ordinary roads as well as on the tramway. The method adopted is to have second inner rails laid an inch higher than the outer rails. The conductor consists of an inverted channel steel conductor, supported in the centre of the track on glass insulators. A large surface is thus obtained for contact and a mechanically strong rail. These steel conductors are jointed with fish-plates, with a soft copper cushion between the conductor and fish-plate.

Level crossings are met with in several places, and it becomes necessary to discontinue the conductor. The electrical continuity is maintained by an underground cable; and, as the car has two collectors, one in front and one behind, contact is made by the foremost collector before the hinder one breaks it. In one place the gap is too wide for this, so an overhead wire had to be erected, and a cross-bar collector fixed on the top of the car; and, as the steel conductor and the overhead wire, as it were, overlap, the continuity is maintained.

There is nothing calling for special notice in the motors or other details. This line carries about 17,000 tons of goods and 100,000 passengers, and 21,000 tram miles are run per annum. As a light railway it is an example of what can be done with electricity, as it is a financial success.

(To be continued.)

DESIGN IN LETTERING.*

(Continued from last week.)

IT is of no use trying to evolve new alphabets out of our inner consciousness. No one would understand us; and we want to be read. Originality is perhaps never the thing to seek: it comes; we are original or we are not; but least of all is it to be sought in lettering.

While the alphabet is alive there will be changes in it; but they must inevitably be gradual; we can only creep on to new forms. Practically, all that is left for us to do is to take one or other accepted type of alphabet and make in it such modifications as we may deem desirable, being careful that they do not too much interfere with its legibility.

The more general opinion is, I know, that nothing should interfere with its legibility at all. I quite appreciate that point of view, and yet I maintain the right of art to interfere with its legibility on occasion—and on occasion to interfere with it considerably.

It all depends upon the occasion. There are times when wording is introduced into design with the deliberate purpose of hiding it more or less, just as speech may be said to mystify. And just as in speech it is more to the purpose to suggest than to demonstrate, so in lettering there are times when a hint is more to the purpose than an advertisement. True, advertisement is the order of the day, and in advertisement there is no such thing as modesty, but there still are occasions when the almost obsolete thing called reticence is more becoming. If, for example, on a wedding gift (the modern equivalent of a marriage *cassone*), I choose to indicate in wording the occasion of the gift, there is no need so to shape the words that he who runs may read—they are not addressed to him—it is enough that they are there, decipherable to whom it may concern.

More than that, it would be an offence if they were too plainly readable. The more tender the sentiment conveyed in the words, the more inevitable it is that they should be expressed in something like a whisper. Here, then, I say, a certain mystery about the lettering is essential. Even where that is not quite so, it may still be permissible. If one were introducing the Lord's Prayer into church decoration, the first two words, "Our Father," would so infallibly put the Christian reader on the track of the inscription, that there could be no

possible difficulty in following even the most intricate lettering.

I do not know what liberty the Arabs took with the name of Allah, which they introduced so liberally into decoration, but they could hardly take too much. There seems a sort of reverence in veiling the characters employed. So with the inscriptions borne by angels and other holy personages in Mediæval design—the Mediæval pictures were not posters, though we try to make posters Mediæval. There was no fear that anyone would misinterpret the words on the scroll ingeniously decorating the background to a representation of the Annunciation—one reads them by anticipation—and the artist was free to make all and every decorative use of them.

There are occasions, then, when lettering offers considerable scope for art, and where something may well be sacrificed, nay, should be sacrificed, to considerations purely decorative. For the most part, however, all that the artist can do is to take, as I said, some accepted type of lettering (he needs to choose it with judgment) and better it, but without in the least making it less legible. If he knows what he is about he may possibly make it more legible. And it is because I thought it would be helpful to him in this to be reminded of the descent of lettering and the phases it has gone through on its way to what it is that I have ventured to discuss the subject at what may have seemed to you some length.

His type of letter once selected, what can a man do with it?

He can take liberties with its proportion—make it taller or more squat;

He can compress it or spread it out; **

He can incline it;

He can draw it in thick lines or in thin, or in lines of intermediate strength;

He can draw it in thick and thin and intermediate lines.

The implement employed, the chisel, graver, brush, pen, affects the form of your lettering—if you will only let it (I insisted upon that last week), but, except in the very simplest, rudest and most elementary forms of lettering you are early confronted with a difficulty, a difficulty which seems to have been felt from very early days indeed, in fact from the moment when men were no longer content with mere scratching, or with simple incised lines naturally blunt at the ends.

So soon as a man began to use the chisel he felt the need of a square cross cut to finish the lines of his letters. In the case of a broad stroke there was no need for this to extend beyond the width of the stroke itself. In the case of a narrower one it was obviously easier to make it extend beyond the stroke; then it did not matter if the carver overshot the mark a bit. Besides, one chisel would do for that. He would not want a smaller one for the end cuts.

This finishing off the broad line by a projecting cross line is technically called truncation, though literally that only means "cutting off." Slight but appreciable difference in character results from the angle at which the strokes are cut off.

In working with a pen this difficulty of finishing off the stroke occurs only in the case of very bold lettering. In smaller writing the strokes naturally take pen-shape. They start square and gradually diminish, or *vice versa*, or they thicken in the middle according to the pressure of the pen, which it is difficult to keep quite equal from end to end of the stroke.

It should be observed that the pressure is not naturally in the middle of the stroke, but at one end; you don't get the symmetrical Roman O which is chisel-bred—you get the Gothic O. That is the pen-born shape.

I say that the even sided O came of working with a chisel, not that it is easier to cut than the other, but it is as easy; there was nothing to prevent symmetry, which accordingly was sought. It is rather futile to try and get that shape with a pen; much better let the pen have its way, and its way is otherwise. You get most out of your tools by going with them—it is rather stupid to go against them.

In bolder writing, even with a pen, the necessity of truncating the thick strokes occurs. You cannot with one stroke of the pen make a thick line which begins and ends square. It wants trimming, and the easiest way to trim it is by means of a fine cross-stroke extending beyond its width, as in the letter I, which, observe, helps to preserve and to accentuate the regularity of the line of lettering, for which a writer worth the name naturally has a care. The broad stroke (we are still talking of penwork) being rather loaded with ink, this fine cross stroke would be inclined in crossing it to drag a little of the ink with it, rounding the angle to the right of the latter. The obvious way of rectifying that is to round the opposite angle also, and so we have the familiar finish I.

You can soften the angle at which the cross line joins the stroke until it disappears, and the stroke appears to be curved on either side—dilates, to use another term, at the ends. (Historically we arrive at that in Lombardic writing as early as the eighth century.)

Anticipating this dilation, the penman eventually makes strokes in which the elementary straight line altogether disappears. Further elaborating he gets the familiar in thirteenth-

* Abstract of a course of Cantor Lectures, by Mr. Lewis Foreman Day, published in the *Journal of the Society of Arts*.

century work. Devices such as forking the ends or breaking the outline are the beginning of fantastic elaboration to which there is no end.

With the use of thick and thin strokes comes another difficulty. Which shall be thick and which thin? The scribes were a long while making up their minds on that point, and they contrived some very awkward combinations. The solution we have at last come to is probably the best that could be found. I don't think we need bother ourselves much about trying to improve upon modern practice in that respect, it has been a case of the survival of the fittest.

The use of thick and thin strokes necessitates intermediate or graduated strokes; there is then no other way of treating the curved lines, which are intermediate between the two. If the thick strokes are truncated the thin lines appear to want accentuation at the ends, and so the "serif" runs all through the alphabet.

It is all-important that the letters of an alphabet should be in conformity, should be treated, that is, systematically; and that is the reason why I said that we begin by choosing a type of existing letter. There is no reason why we should not cross the breed in lettering and so improve the stock. But the thing must not look hybrid—when that occurs the artist has failed. Here, again, a man may do what he can. Effort is justified by success. We have to make our creation look as if it must be so, and could not well be otherwise.

The philistine will talk as if type were in every respect better than handwork—truer and more perfect. Truer, perhaps, it may be, in the sense of being more mathematically exact, but not necessarily so truly uniform in effect; for the unyielding letters of the type-founder come together as best they may, and if they come awkwardly he can't help it. The writer can, and I think he should.

I am quite ready to admit that many an artist who ventures to introduce lettering into his design does it ill, does it so carelessly, or is so easily satisfied with very indifferent penmanship, that one is bound to confess that of the two evils hard and fast letterpress would have been the lesser. On the other hand, I contend that an artist who has been at the pains to learn to write, can, if he aims at what the pen or brush will do, and does not enter into foolish and ineffectual rivalry with the printing press, not only do what that cannot do, but do better.

Looking at any good collection of early printed books you are astonished, each time afresh, at the beauty of the page. But if you go from that straight to a collection of fine manuscripts (the comparison is easily made in the King's Library at the British Museum) you realise that, after all, printing, even such printing as was done by the great printers, was a makeshift. It is a makeshift, I know, which we must make up our minds to put up with—and it is our business to make the best of it; merely petulant complaint is childish, but when occasion does occur by all means let us have the real thing, and don't let us be persuaded by readers of print who have lost all appetite for beautiful writing, that there is no flavour or artistic savour in it. It is not good MSS. but their bad palate which is at fault.

Having perfected machinery we are doing our best to make ourselves into machines. Until that happens (which God forbid!) man's hand is still the best—in art at all events; and were it not the best, it would still have the charm of character, that individual quality for which the public, brought up on printed type, has no relish. Print, with its mechanical smoothness and precision, has gone far to distort the modern ideal of lettering, just as photography, with its literalness, has degraded the artistic ideal generally. People are apt to resent as a sort of impertinence anything in lettering which the printing press cannot do. There is offence to them in the unfamiliar. Really the impertinence is in a makeshift thing like type usurping any kind of authority in a matter altogether beyond its jurisdiction.

It is possible, in the time I have, only to hint at what may be done in the way of modifying the shapes of letters.

I have roughly indicated on a diagram the kind of liberties it is possible to take with the construction of the letter A, but only indicated, for I have not shown the small "a" nor the later Gothic forms at all. It makes all the difference whether the two limbs of the letter are sloped at the same angle, or whether the top is crossed, or whether curved lines are used. Great also is the effect of varying the position or the angle of the bar, or of breaking its shape.

I have only just hinted the new possibilities which lie in curvature.

A group of Gothic A's, taken at random from early printed books, shows what variations can be played upon a letter of a single type. It is interesting to see the individual character of each letter there, notwithstanding the strong family likeness between them.

Gothic letters lend themselves to more variety in design than Roman—perhaps because they are not so perfect in themselves. I don't say they are not more interesting on that very account. Perfection palls, and some of the Gothic forms are

very beautiful. The Roman form is fixed—perhaps because it is Classic. Or is it that it is Classic because it is fixed? In those few Gothic ways of rendering the letter A what variety is there. And by what slight changes that variety is achieved.

I have tried in a simple alphabet of my own to give some character to the letters without doing much violence to familiar forms. The difficulty is to design an alphabet legible enough and yet not quite commonplace. It makes all the difference in the world, of course, whether you are designing an alphabet with a view to type printing, to monumental or other inscription, or use only as initials. "Design" is almost too pretentious a word to use in connection with this kind of variation upon orthodox forms. One can do very little that is new.

A more florid version of the alphabet obviously of Gothic derivation, without being deliberately based upon any "authority," may lack repose; but then it is not meant to have it. It is permitted to be playful sometimes—and even skittish.

In the alphabets so far referred to, the ornamental design is in the construction of the letters. That seems to me to be the principle to go upon. And it was followed by the best designers. But at the same time, as you will see in the group of letters next shown, the letter itself could be further decorated.

Various ways of doing that are shown there. In one case the letters are, as it were, split into ribbons in their thickest parts and ingeniously interlaced. In another the whole thickness of the letter is filled in with foliated ornament. In others again the ornament is compelled to take the shape of the letter, with more or less success.

A common device is to make the letters break out into foliage. Frequently also letters comparatively simple in design are just forked and cusped at the extremities and pierced at their thickest part, the ornament being extraneous to the letter, interlacing with it, piercing it or merely filling up the space behind it. In the shading of certain letters you see the beginning of evil. A more wicked practice still is what I may call the rustication of the alphabet. There we scent the rococo.

In an elegant interlacing alphabet from an Italian copybook of the sixteenth century the artist has first drawn his letters in outline, and then made the outlines loop and interlace, so that they occupy the thickness of the letter and at the same time break the formality of its shape. Yet not too much—everything is in that; the form of the letter is sufficiently preserved, and it is always a form worth preserving.

An ingenious elaboration of the lower case "black" letter, also from an Italian writing-book, is quite a good specimen of the "ribbon" letter. Whence once the carver or engraver began to consider the broad strokes of his letter as straps, and to suggest by ever so slight a cut that they were turned over at the ends, it was inevitable that he should arrive eventually at this kind of thing—to which the square black letter lends itself so easily. The result is florid but fanciful; one could not stand much of it at a time; but in moderation it is a distinctly pleasing excess—and it is admirably done.

Some highly ornamental letters were designed by Israel van Meckenken, late Gothic of course. The broad divisions of the letters filled with flamboyant German arabesque tell light upon a dark ground, which in many cases overflows its margins and fills the space contained within the closed letter. Elsewhere a separate spray of scroll-work fills the space. In every case it is (like the letters themselves) largely designed and vigorously drawn—as one might expect of this consummate "Little Master."

Much less interesting to me than Van Meckenken's letters are those initials, printed at Augsburg in 1483, in which the closed letters frame little pictures, quaintly conceived, but not eminently beautiful. It was a common practice to make the initial letter where it was possible enclose a picture; but it was obviously not always possible; and where it was it is doubtful if that makes the best frame. I think not. The picture frame idea is persistently carried out in an alphabet by Mathias Geron (1555). So absolutely are these regarded as frames that the pictures are cut on little separate blocks let into the larger one; you can see where the picture is cut off square. Often the letter is sacrificed to the frame. This is most felt in the letter S, in which the most emphatic part of the letter is eliminated to make room for the picture. In another alphabet of similar kind Geron has evidently felt that his initials did not speak for themselves, and has accordingly introduced a little explanatory letter so that there shall be no mistake about it. The little pictures were interchangeable. The same letter is used to frame separate pictures, and the same picture is framed by various letters.

The late Gothic letter of the more fantastic kind, penwork in excelsis, is effectively illustrated in the initials printed at Ingolstadt in 1563, which are very characteristically German. There is too much flourishing of not very carefully considered lines in them, the kind of lines which would lend themselves to braiding; but they have character, they are broadly penned, and they are not too difficult to read.

On the other hand, the identity of the smaller letters

(printed at Erfurt 1527) is lost in flourishes. Many of them are quite unreadable. They show the writing-master quite astray. Altogether saner German letters are those next shown. There is no mistaking there the broad sweeping lines which mean business, and they are freely and gracefully penned; the subsidiary flourishes are subsidiary, they keep their place, and merely furnish the space about the letter.

The influence of the goldsmith is to be traced, I think, in the initials of the elder Cranach, in which the outline of the letter is well-nigh lost in arabesque. These letters might almost have been designed to be beaten in gold.

The design errs on the side of the grotesque, to which beauty is sacrificed; but it took a master to design like that, and the letters are designed. In the next alphabet shown they are merely decorated by intertwining scrolls, which to some extent confuse them.

The elaboration of those Roman letters by Cranach indicates the lingering of the Gothic spirit in the artist. The Roman letter was for the most part not much tampered with by the designer of the Renaissance. He accepted the orthodox form, and emphasised the letter by ornament about it—just as we call attention to the commanding officer by putting gold lace on his coat, and, if he is very important, feathers in his hat. The idea is to distinguish the individual man or letter from the rank and file and to give him or it the dignity befitting the head of the column.

In the fairly well-shaped letters set in a framework of simple ornament—much the kind of thing that was done in damascening and niello—I am inclined to think that the character of the design comes from its having actually been cut in metal, not on wood.

In the Greek alphabet which follows the ornament does not go much further than a sort of scribble with the pen, just to relieve the plainness of the square panel enclosing the letter.

In the French initials the letters are again only in outline, relieved by a kind of niello pattern in black, which takes a square form though not enclosed in marginal lines. The breaking of the ground in that way gives importance to the letter, and in some cases makes it easier to read than it would have been merely an outline.

An English version of the same kind of thing is every way inferior to it. The thick line, to suggest shading on one side of the letters, is a vulgarity.

The French designs next shown are of a very different character. I say the designs because the letters are much the same kind of thing.

One very obvious way of giving emphasis to an initial is to show it in white on a black ground. That was quite commonly done. But, except on the very smallest scale, it was necessary to relieve the blackness of the ground by ornament in white upon it, if only to disguise any lack of solidity there might be in printing. And of course it was the simplest thing the engraver could do to engrave filigree ornament in white line. (Here, by the way, we get an early sixteenth-century instance of "white line" engraving which is claimed as the invention of Bewick. The ornamentists, at all events, were before him.) The background is frequently reduced from black to a dark grey tint by minute dots of white.

Many good Renaissance initials are blemished by a feeble indication of shading. But it is very plainly shown in other work of the same period that if it is desired to reduce the volume of the white in the letter, the way to do it is by a simple central line, which, though it may suggest that the letter is not flat but incised, does not pretend to give the effect of incision.

The feat of making black letters effective on a black ground is accomplished in the Greek alphabet shown, which is Venetian work. The black letters are in the first place outlined in white (even with a double line) and the ground is then diapered with white pattern, which reduces it practically to the value of tint.

In certain Roman letters (again Italian) we find the artist hesitating between two or three opinions. He has not made up his mind whether he will shade his letters or not (he is obviously least successful when he does). And he has not decided whether it is best to use figures or arabesque by way of accessory to the letter. To me he seems very much at his best in ornament.

Many ornamentists of the Renaissance were never so happy as when they were playing with little boys—"putti" as the Italians called them, a nondescript kind of boy, lending itself much better than babies would have done to the purposes of design. Whether on a white or a black ground, they form a rich background to the letter. The robust little men in the next alphabet have been ascribed (I don't know on what authority) to Dürer. They are the work of a strong man without too subtle a sense of beauty—which description would fit Dürer.

With regard to designs of this class, and to many others in which more distinct feeling for ornament is shown, I wish to point out that the design is not in the letter so much as in the background to it.

Some of the very best boy figures ever introduced into

initial letters are those ascribed to Holbein—and not unworthy of him. These little panels (they measure about 2 by 2 inches) are as large in treatment as a Greek coin; but this again is not to design initial letters, but to decorate the panels containing them. Just so in *The Dance of Death*, which Holbein also adapted to alphabetic use. But why turn the designs to that use—degrade them to it, I might say? They are not the best imaginable background to the letters, and the subjects would have been better. Holbein himself has shown that they were better without being mixed up with initial letters. I maintain that such designs are not designs for initials at all, though, when it is Holbein who makes them they may be something better.

To be decoratively right figures must be adapted very skillfully to the spaces about the letters. In sixteenth-century work the artist usually took care to do that, even in picturing the labours of Hercules, or Balaam and his ass and so on.

In the letters of the succeeding centuries, where figures are introduced, you rather feel that Bacchus, Ceres and the rest are trying to avoid the interference of the letter, or that, for example, it is only the attractions of Endymion which make the lady forget that her head is dangerously near the pointed serif of the E.

In the case of the other delicately engraved subjects you have the uncomfortable impression that the ill-shaped letters have been planted in front of them. They are art pictures spoilt.

A return to better things is shown in the alphabet by the late Godfrey Sykes. I don't say it is equal to the work of the Little Masters, but it shows at least that he went back to a source where there was inspiration left. Certainly we cannot afford to found ourselves upon a period when design appears to have run dry. We must go back to learn. That is my excuse for inflicting upon you so much ancient history.

(To be continued.)

ARCHITECTURE AND SUBSIDIARY ARTS.

ARCHITECTURE is mainly deserving of being ranked amongst the fine arts when it calls into action the varied and ingenious resources which the art of man has discovered and perfected. It is barely half a century since that the architect required, even for some of his largest works, churches, public buildings and palaces, little else than good masons, bricklayers, carpenters and plasterers. The bald and meagre imitations of ancient styles (excellent in themselves) which occupied the attention of most of the architects of the eighteenth century, to draw no nearer our own time, afforded no scope for artistic talent, and the works then executed, with a few exceptions, will never confer on their designers the ennobling title of artist. Thus no artists themselves, they called in no art to their aid, and the country was cumbered with ugly masses of stone and wood, in which the builder and not the artist alone triumphed, and to which the name of architecture in its full meaning is quite inapplicable. True architecture includes the practice of all the arts, and those buildings are the noblest, most satisfying and most interesting which have required and received the aid of the artist in marble, stone, wood, colour, metal, mosaic work, &c. The last-named branch of art has been entirely neglected in our own country until a few years ago, when it received some attention, for which we were indebted principally to the industry and talent of Digby Wyatt. In the adaptation of various coloured marbles to this particular and perfectly normal species of decoration no people have so distinguished themselves as the Tuscans, who have practised it with signal success, in more or less good taste, for many centuries. Of a peculiarly durable nature and capable of producing the most varied and charming effects, it has been applied by them to almost every purpose of external and internal ornament. Although the Duomo and Campanile of Florence are nearly covered with inlaid marble, sometimes in very beautiful designs, we do not think it well fitted for external use, except on a very small scale, even in so fine a climate as that of Italy; and although now, degraded by a false idea of its capabilities to the inlaying of tables with foolish and unmeaning representations of such subjects as books, music, pictures, &c., it was at one time, especially from the thirteenth to the sixteenth century, applied principally as an adjunct to architectural effect, and presents a large and interesting series of very beautiful designs, principally executed in black marble on white ground; the earliest examples are still the finest, and the inlaid pavements of San Miniato al Monte and of the Baptistery, executed at the commencement of the thirteenth century, exhibit fine specimens of its excellence and durability. The examples which are most admired are taken from pavements and memorial slabs. As regards the former, we need proffer no reasons for its use, wherever the application of an ornamental stone floor is required or its substitute for terra-cotta, but as regards its application to memorial slabs, there is a difference of opinion among experts.

NOTES AND COMMENTS.

WHEN the Observatoire of Paris was constructed after the plans of PERRAULT, three centuries ago, it might be considered as placed in the country, for it was beyond the Luxembourg. At present it is surrounded by houses, and the traffic is heavy enough to interfere with some of the delicate operations. But a new danger threatens the Observatoire. A laboratory is required for the students of the *Ponts et Chaussées*, and the minister considers no more suitable site is to be found than one adjoining the Observatoire. To have steam-engines, pile-driving machines, and, it may be, a steel hammer in such a place must affect the accuracy of the astronomical instruments. Remonstrances have accordingly been addressed to all the promoters of the new school. There may be a battle between Government departments, but we cannot imagine that French common sense would allow the Observatoire to be rendered useless, although the *Ponts et Chaussées* might be gainers.

It cannot be said that unusual expedition has been exercised in demolishing the Sorbonne. A good many years have elapsed since the square timbers which serve for scaffolding in Paris were first set up in order to commence the new buildings, and it is only now the last of the old buildings in the Rue de la Sorbonne has come under the hands of the wall-breakers. With that survivor will pass away one of the most renowned of European schools. In theology it was at one time supreme. It was founded in the thirteenth century by ROBERT OF SORBON for the poorest class of medical students. The professors were to be unpaid. RICHELIEU took great interest in the Sorbonne, and JACQUES LEMERCIER was employed by him as architect. The old buildings, however, were like the old educational system, and formed a maze. The Sorbonne lately erected typifies the power of science, for the planning is the result of determined principles.

THE subject of tendering came before the Master House Painters' Convention at Sheffield on Wednesday, when Mr. A. G. WHITE, of Liverpool, read a paper on "Standard Samples of Painters' Work: are they Practicable, and are they Desirable?" He said that when they were tendering for work the two dominant questions in their minds were, "Who is in for it?" and "What can I get off with?" He argued that it was high time something was done to check this, which was rapidly injuring their trade, and he suggested that the National Association of Master House Painters should establish classified standard samples of the various processes of finished work, below which the members should not be allowed to go. A discussion followed, and it was decided to refer the question to the general purposes committee of the Association for consideration, and if necessary recommendation. Mr. GOODYIER of Sheffield also read a paper condemning the present system of competitive tendering, and suggesting remedies. He said the present system was bringing down prices to such a point that the work was not worth having at all if it was to be done creditably. It had also largely conduced to the deterioration of their trade. His remedy was to charge a fee, according to scale, for all invited competitive tenders which were not accepted, and the abandoning of the old formula "estimates free." This would strike at the principal cause of the present state of affairs. Mr. A. G. WHITE was subsequently elected president for the ensuing year, Mr. WILLIAM ALLEN (South Shields) vice-president, Mr. PRESTON (Burnley) treasurer and Mr. SUTHERLAND was re-elected secretary. It was arranged to hold the Convention in 1898 at Liverpool.

A MEETING of some representatives of the building trades was held on Wednesday evening at the Craft School, Bow. Mr. LLEWELLYN SMITH, of the Board of Trade, who presided, said the object of the classes for the building trades in the Craft School was for the training of workmen, and not for the amateur, for they were of opinion the two could not be successfully mixed up together. A very considerable number of workmen in the district already took advantage of them. It was desired to make the school more useful to the great building trade. Mr. GEORGE DEW said the building trade had changed, and the title of "master craftsmen" no longer belonged to their employers. That was

unavoidable in the ordinary system of economy, therefore it was necessary to do more than was at present being done. Mr. HOLLOWAY deplored the fact that the system of apprenticeship had fallen out of practice, but his firm kept it up, for the apprentices turned out the best mechanics. As an encouragement to lads in his firm, on the completion of their apprenticeship, if they had behaved themselves during that term, they received 5*l.* to set themselves up with a set of tools. Such an encouragement was an inducement to lads to take up an apprenticeship; and institutions like that school ought never to take the place of apprenticeship, but simply to augment it. The advice given by Mr. HOLLOWAY should not be neglected. It will not be fortunate for the building trade if employers have to depend on schools for foremen and workmen. The opposition of the men is the true cause of the indifference to apprentices, the Unions, in that as in other important matters, being disposed to sacrifice the future to the present.

THE tall building appears to be frightening American Boston, "the hub of the universe," from its propriety. The local *Architectural Review* says:—"A not too well designed building of 125 feet in height is to compete with the tower of Trinity Church. Fortunately, the life of an apartment house is not likely to be as long as that of Trinity; but for the next thirty or forty years this towering mass will be a blot upon a square which has as distinct merit as any in America. In addition to this, the design for the embellishment of this square has been emasculated to a grass plot, because the city would not appropriate 80,000 dols., and private individuals considered that the work should not be done by private subscription. As a consequence, the city of Boston, half a million of people," says the reviewer, "lays down, rolls and curbs a grass plot in the centre of a square with Trinity Church on one side and the public library on the other, and, at the same time, permits the erection on its borders of a building which will absolutely destroy the scale and proportions of its neighbours. All this is ignominious. The tall apartment house is distinctly a curse to everyone but its owner and possibly its tenants. There should be definite laws against its erection higher than 60 feet in suburbs and 80 feet in cities. It is planted amid semi-suburban houses and villas, and next to rural churches or town-halls, dwarfing and stunting everything within sight. It is the epitome of greed and money-grubbing. In a city, where concentration has already occurred, it has a natural existence; elsewhere it is an anomaly, and is more of a nuisance than is a stable. The suburbs of all our large cities are infested with these perpendicular groups of cells. It is impossible to make fine architecture of them; it is improbable from their usual inception that they will be even good architecture. In some things we are a nation of extremists." The last sentence might be expressed by saying, "We belong to the Anglo-Saxon race, and demand as much liberty in treating building as is enjoyed in England."

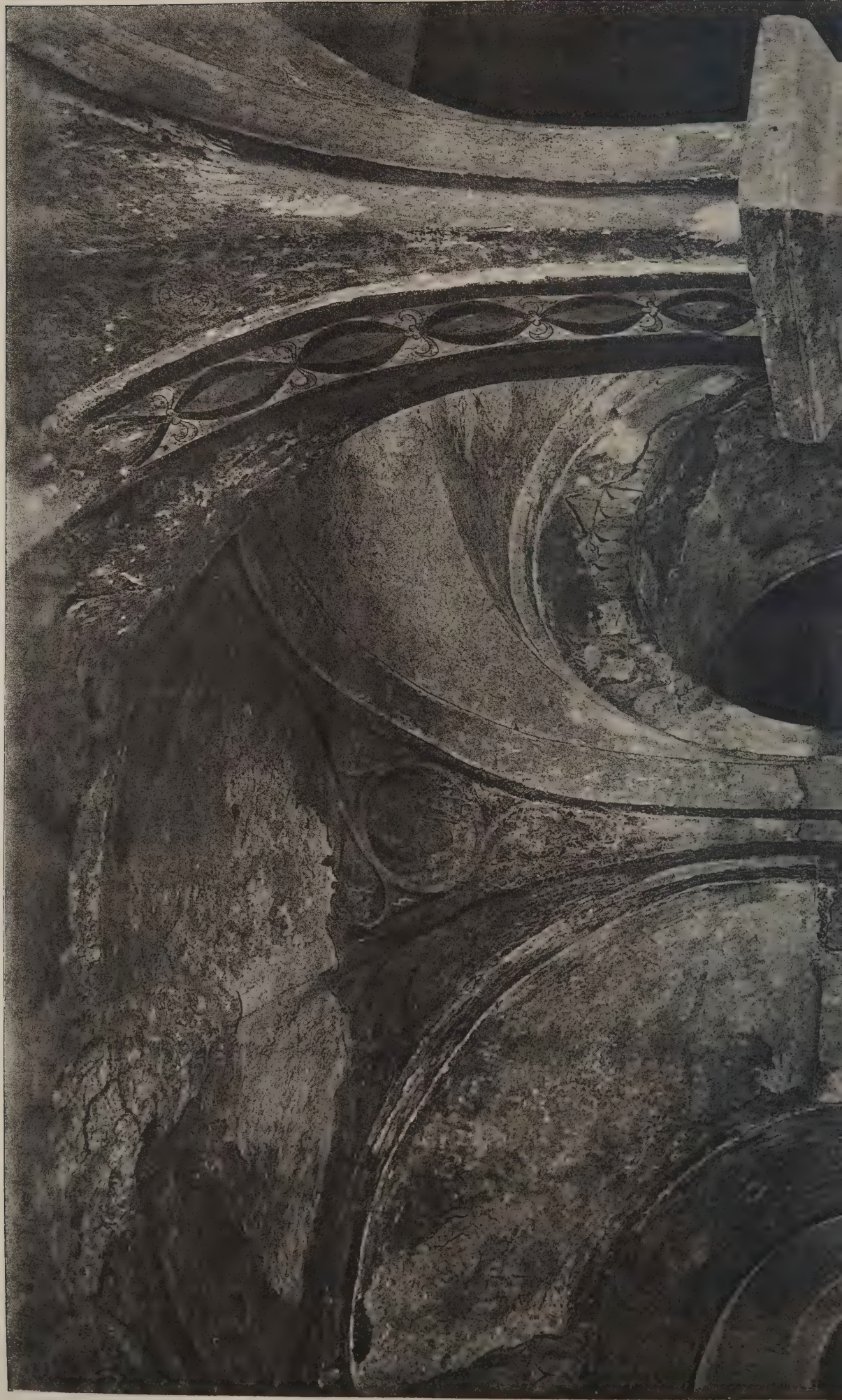
SEVERAL of the articles which appeared in this Journal by Mr. F. J. WARDEN-STEVENS are reprinted, and form a volume entitled "Electrical Installations for Architects, Borough Surveyors, Civil Engineers, &c." (P. A. GILBERT WOOD). In our columns the articles obtained the attention they were entitled to receive, and in their new form we have no doubt they will be appreciated by an additional number of readers. They are intended for those who have little time to study abstract science, but who are eager to possess knowledge which can be utilised. As the articles embody the results of a varied experience in applying electricity they will, it is hoped, be useful to many men who have failed to obtain the information they require in the ordinary books, which are more professorial than practical in their aims.

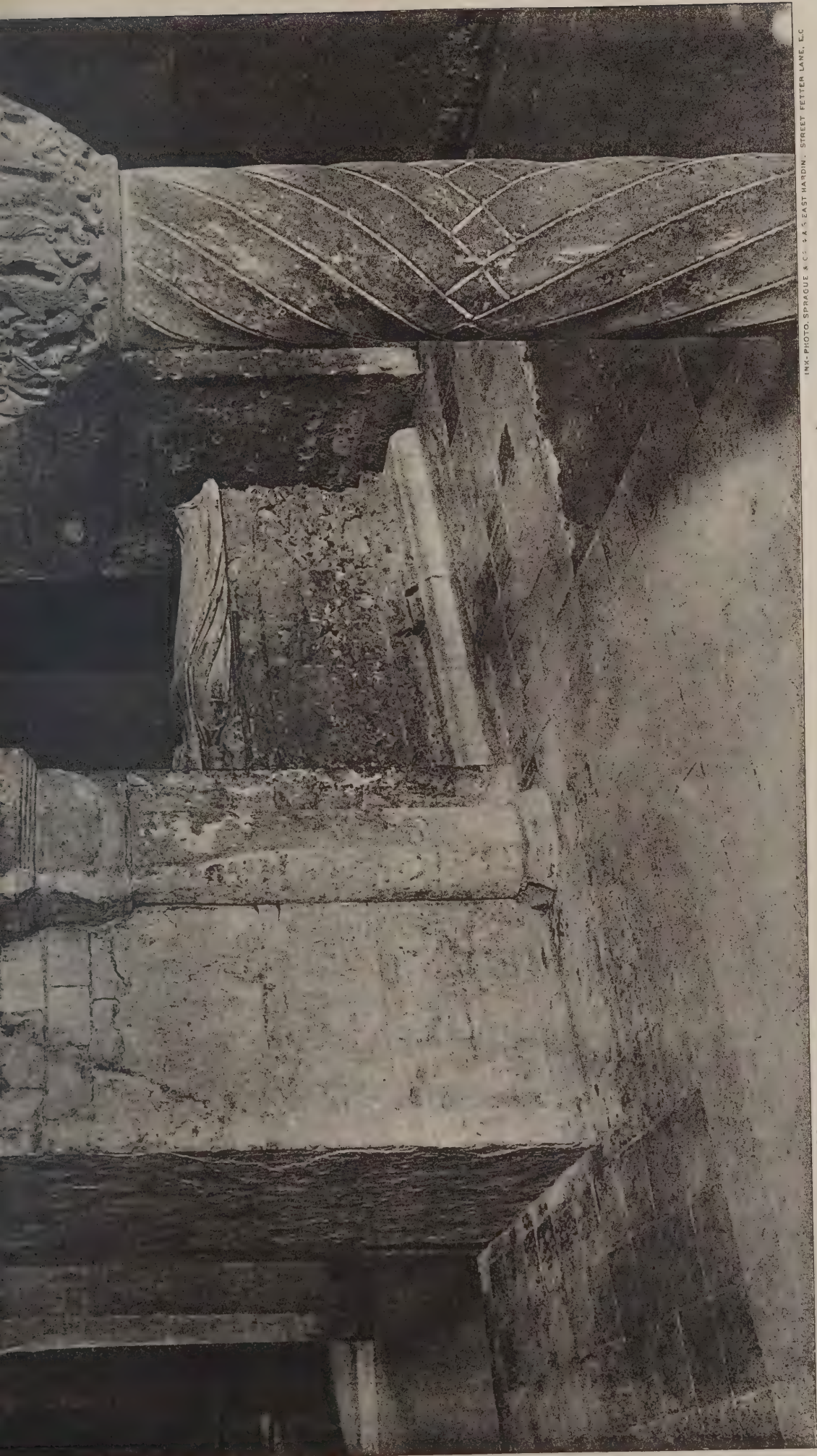
ILLUSTRATIONS.

CATHEDRAL SERIES—CANTERBURY: ST. GABRIEL'S CHAPEL.
CRYPT—THE WEST DOOR.

ROTHERHITHE TOWN HALL.

MINTERNE CHURCH: MEMORIAL WESTERN GALLERY TO THE
LATE LORD DIGBY.—FRONT AND END OF LORD DIGBY'S FEW,
NEW SEAT AND ENDS.





INK PHOTO, SPRAGUE & CO. 145 EAST HADIN, STREET PETER LANE, E.C.

PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

CATHEDRAL SERIES, No. 81.—CANTERBURY: S. GABRIEL'S CHAPEL, CRYPT.



PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

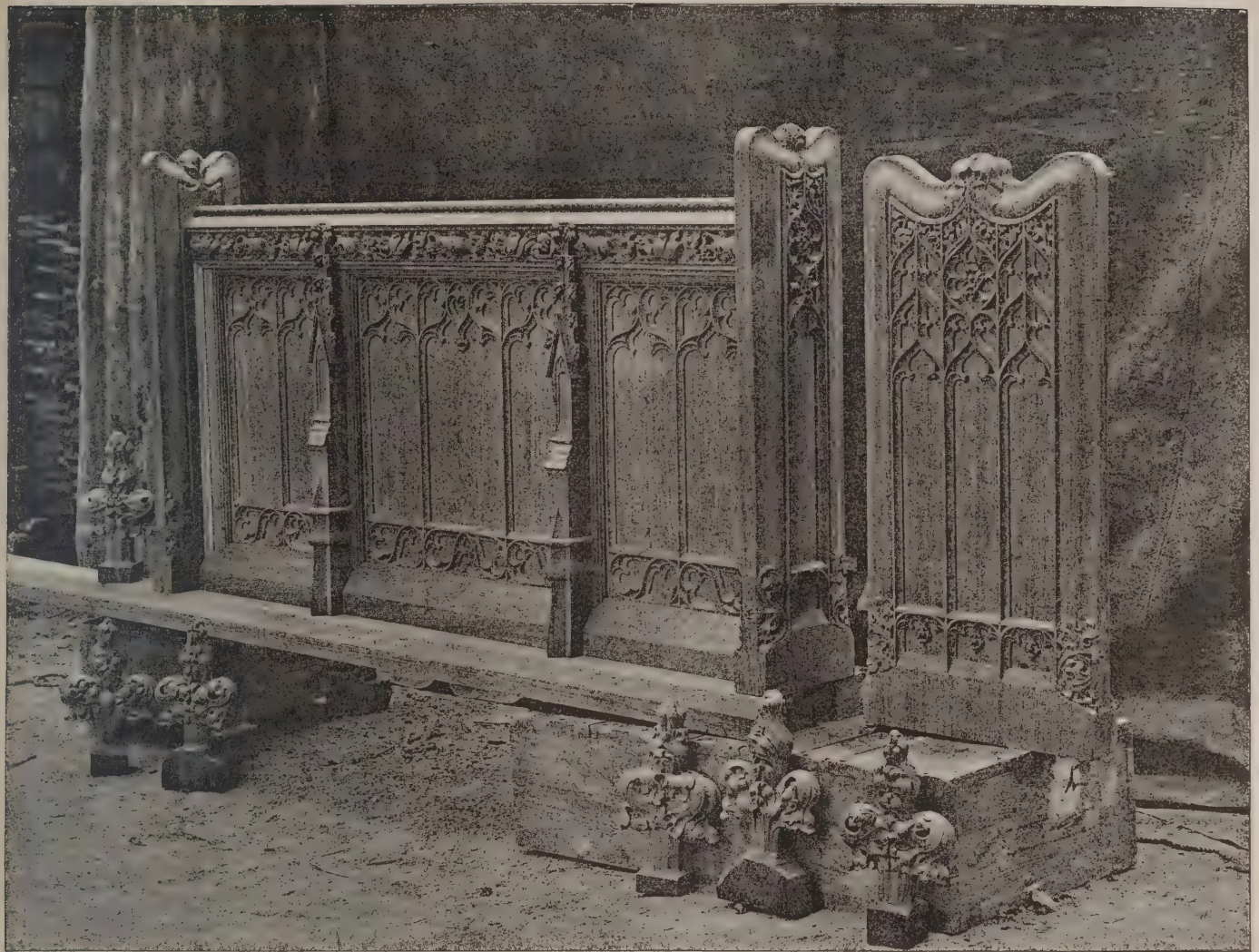




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MINTERNE CHURCH: MEMORIAL WESTERN GALLERY TO THE LATE LORD DIGBY.

A. H. RYAN TENISON, A.R.I.B.A.,
EDWARD THORNTON, A.R.I.B.A., } Architects.



FRONT AND END OF LORD DIGBY'S PEW, MINTERNE CHURCH.



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NEW SEAT AND ENDS, MINTERNE CHURCH.

A. H. RYAN TENISON, A.R.I.B.A., } Architects



PHOTOGRAPHED BY S. B. BOLAS & CO



ECCLESIOLOGIA GERMANICA.

By T. FRANCIS BUMPUS.

*(Continued from last week.)**Some Thoughts on the Arrangement of German Choirs.*

IN no country of Northern Europe—England excepted—is the prejudice in favour of strict orientation more strong than in Germany. One of the most remarkable evidences of this feeling is the rejection by the people of that country of that feature which had been brought to such perfection in France during the thirteenth and fourteenth centuries, viz. the apsidally terminated choir with its procession path and radiating chapels—evidently preferring those forms of it that secured the strict orientation for their altars, which could not be attended to when the French arrangement was adopted. Occasionally, however, we find the Germans employing the circumambiently-aisled choir and corona of chapels, but they can scarcely ever be said to have handled this plan with the success characteristic of their neighbours.

As the examples of this choir termination are not very numerous in Germany, they may as well be dismissed now with a few words before entering upon the wider and more important subject of German aisleless choirs, and their various arrangements of apses.

Of clerestoried German choirs built after the French model, that of Cologne is indubitably the purest and most harmonious example, emulating those glorious apses which had arisen, and were still rising, all over France, as at Amiens, Auxerre, Beauvais, Rheims, Tours and Troyes.

With Cologne, in this respect, the humbler but beautiful and comparatively little visited church of Altenberg may be classed. Then we have some rather clumsy arrangements of the chevet in the great churches of Münster, Halberstadt, Lübeck and Upsala.*

That of Freiburg-im-Breisgau is better, and at Magdeburg the arrangement of the chapels round its apse is a remarkable evidence of the strict regard the Germans had for orientation. Here the altars are all placed with their fronts looking due west, cutting regardlessly, and in the oddest possible way, across the main architectural lines of the building.

We are now confronted with another class of circumambiently-aisled church, viz. the "hall" one, or that in which nave and aisles are vaulted at the same level, a class of church peculiarly Teutonic, and one to which frequent reference will have to be made in the course of these papers. The most successful examples of the procession-path in connection with a church of this kind are, perhaps, St. Laurence, Nuremberg, and the Franciscan church at Salzburg.† The church of Unna, between Dortmund and Soest, the Marien Kirche at Lipstadt,

the Nicolai Kirche at Zerbst and the Stifts Kirche at Naumburg are more northern specimens of the same arrangement; a somewhat clumsy one, necessitating the presence of an immense extinguisher-like mass of roofing that, to English eyes, is particularly offensive.

The parallel-triapsal plan was the one usually resorted to by the Northern Germans through all the epochs of Gothic architecture, to insure the reasons alluded to above. Romanesque and Transitional examples of this arrangement occur in Westphalia at Hüsten, where a church whose plan embraces a nave and aisles only has each terminating in an apse in the same line. At Brecken and St. Kilda's, Lügde, an aisleless choir terminates apsidally, while a smaller apse projects from the eastern face of either transept. The Kloster Kirche at Lippoldsberg is a cruciform structure with a very elongated nave. The choir is, however, very short, being only of two bays, and it terminates, together with its aisles, in exactly parallel apses, as at Hüsten.

Of Decorated Westphalian examples of the parallel-triapsal plan, Soest presents two remarkably fine and interesting ones in the Petri Kirche and the Wiesen-Kirche (St. Mary-in-the-Meadows). In the former case a triplet of pure Geometrical Decorated apses has been thrown out from a Romanesque nave and transepts; in the latter we have a lofty "hall" church, illustrating a much later phase of Middle Pointed, consisting of a nave and aisles only, each terminating in a perfect pentagonal apse, contrived by the sloping inwards of the first bay of the central apse on either side. With their tall transomed windows glowing with the most brilliant coeval painted glass, these three apses at the Wiesen-Kirche produce a spectacle of singular magnificence, taken in conjunction with the Mediæval instrumenta of which the building possesses such a store.

✠ The Cistercian church of Loccum—simple and severe as the generality of the churches built by that Order are—presents us with an example of the parallel quatre-apsidal arrangement, i.e. that in which the high altar finds its place in the end of a square-ended choir, while the lesser ones are located in small apses, of which there are two opening from the eastern side of either transept. Curiously, these small apses are not

seen externally, being formed in the thickness of the wall. ✠ At Zinna, in Saxony—another Cistercian establishment—the cinque-apsidal plan is met with. Here, however, the side apses are placed at the end of much longer projections, parallel with the walls of the main choir, and terminating in a line with it. Another specimen of the same arrangement—i.e. of five apses—is found at the ruined abbey of Paulinzelle, near Erfurt. Here the choir and its aisles ended each in an apse, while another projected from either transept. St. Ulrich, at Sangershausen, was similarly planned.

Hechlingen, Gernrode, Naumburg, Lausnitz and Wechselburg have each an aisleless apsidal choir, with, from the eastern face of each transept, another projection of the same shape, and are among the most interesting examples of the plan now under consideration in Saxony. At Naumburg the side apses project from the eastern pair of steeples.

Saxon Middle Pointed specimens of the parallel triapsal plan are found at Arnstadt, in the Marien Kirche at Mühlhausen, and in the Petri Kirche at Görlitz, but they do not call for any special description.



THE EASTERN CHOIR OF THE DOM AT NAUMBURG.

* Limburg Cathedral on the Lahn, and the Marien Kirche at Worms, have the processional aisle, but no radiating chapels.

† In this example a lightsome Late Pointed choir, exhibiting that flattened vaulting the German architects of the fifteenth century were so fond of, opens out of a solemn Romanesque nave in a manner perfectly startling in its sudden transition. The Franciscan church at Halberstadt, and the church at Görlitz present remarkable instances of the same type of vaulting.

The transverse-triapsal church—that in which the choir and transepts have semicircular or polygonal terminations—seems almost exclusively confined to the Rhenish provinces, where it is exemplified in St. Quirinus at Neuss, St. Maria in Capitolio, Gross St. Martin and the Apostles at Cologne, and in the Minster at Bonn.*

In Westphalia we have a solitary example of it in the Romanesque church at Plettenberg,† while Hesse presents it in one of Germany's earliest complete Gothic churches—St. Elizabeth at Marburg.

Square Eastern Terminations.

Another eastern termination—one that is popularly supposed to be purely insular—now comes before our notice, viz. the rectangular one. Although it rarely makes its appearance down the Rhine, the square end is as common in Westphalia, through all the epochs of Gothic, as the apse, and in the long Middle Pointed choirs of the cathedral at Paderborn and the Minster at Herford, and in the Early Pointed ones of the cathedral and church of St. John at Osnabrück, it is seen on the most imposing scale, albeit sometimes deficient in the accompaniments which give that indescribable charm and grace to such English east ends, with their magnificent walls of glass, as Carlisle and Selby, Lincoln and Ripon.

At Osnabrück Cathedral, where the fenestration is effected by a triplet of very severe lancets, the choir was originally aisleless, but in Middle Pointed times an ambulatory was formed, and returned round the back of the east end, without, however, any arches of communication being cut in the walls of the choir's sides or end. Such an arrangement, which has a very peculiar effect, can also be seen in the conventual church at Marienfeld, between Münster and Bielefeld. Sometimes the aisles of a square-ended choir terminate in the same line with it, as in the Minster at Essen and the church at Büren; while of other rectangularly-terminated Westphalian churches, the Busdorf-Kirche at Paderborn, St. Maria in Hohe at Soest, the Pfarr Kirche at Billerbeck, the interesting Cistercian church at Loccum, and the Stadt Kirche at Frondenberg, where a charmingly traceried rose surmounts a triplet of small lancets, present a variety of styles to the student of this particular form of eastern termination.

The square east end is occasionally met with in Saxony, but never on a very grandiose scale. Romanesque churches in that part of Germany generally exhibit the shallow semicircular apse—distinct both in height and width from the eastern limb—while churches of the Middle and Late Pointed periods are almost invariably closed by a graceful polygonal apse, lighted

by tall windows of two or three lights. The churches at Nordhausen and Grimma—both with triplets of lancets lighting their eastern walls—the Augustinian church and several others of minor importance in Erfurt, and the ruined church of Stadt-Roda, whose elevation recalls very forcibly our beautiful Valle Crucis, go a considerable way towards exhausting the list of quadrangularly terminated churches in Saxony.

Aisles, Clerestories, and Anomalous Plans.

The Reformation, the neglect and bad taste of the last century, and the secularisation of such conventual churches as survived it, early in the present century, have, from a ritualistic point of view—I use the word ritualistic in its true sense—tended to deprive the North German churches of a considerable share of the interest they once possessed, but the churches which were once conventual (*Stifts Kirchen*) may be distinguished from those which were simply parochial (*Pfarr Kirchen*) by a much greater length of choir, a difference particularly marked in buildings of the fourteenth and fifteenth centuries. The Minorite, or Grau Kloster Kirche at Soest, and the church built by the same order at Münster have immensely deep choirs attached to naves of the "hall" type; while at St. Mary-in-the-Meadows in the first named town, and St. Lambert in the second, which were parochial edifices only, we find a much shorter choir, opening out of a nave of the same lofty unclerestoried type. Sometimes the churches built by the Preaching Orders, such as the Dominicans and Franciscans, are of immense length, as at Erfurt and Halberstadt. At Erfurt, where we once more meet with the clerestory, there is a difference in the planning of two of these, otherwise similar, great structures. The Dominican church in that town has its lofty, narrow, lean-to aisles carried along the whole of the fifteen bays, leaving only the apse—five sides of a decagon—projecting beyond; while in the Franciscan church the aisles are coextensive only with the nave, the five-bayed, apsidal choir being destitute of those appendages.

It was quite a relief to meet these two great clerestoried churches at Erfurt, after such a succession of "hall" churches as were encountered in Westphalia and Lower Saxony, elegant as many of such structures, with their aisleless apsidal choirs—veritable lanterns of painted glass—are.

Some conventual churches have only one aisle to their naves, as Romersdorff, the Minorite church at Andernach, the churches at Hamm and Höxter, and the Franciscan church at Ulm. Clerestoried parish churches, with a choir consisting only of an apse tacked on, are not uncommon in the north-west districts of Germany. Such are St. Matthias at Maastricht, St. Foilan at Aix-la-Chapelle, the Stadt Kirche at München Gladbach, and St. Mary at Oberwesel. At Xanten, the collegiate church of St. Victor is a very rich clerestoried example of a transeptless building, exhibiting in its arrangement a fusion of the French and German methods of apsidal planning.

The non-employment of the transept even in churches of such dimensions as Ulm, Vienna and Erfurt is one of the most striking national characteristics of the later German Pointed style. At Freiburg-im-Breisgau, the Romanesque transepts have been almost entirely obliterated by the rebuilding of the cathedral in Middle Pointed.



INTERIOR OF ST. MARY-IN-MEADOWS, SOEST.

* In Belgium we have an interesting example of the transverse-triapsal arrangement in the cathedral at Tournai, whose transepts with their cluster of five towers have a very German look. Noyon Cathedral, long connected with Tournai, exhibits the same plan. Several churches in the north-east of France betray Germanisms—notably Toul Cathedral and St. Loup at Châlons, with their aisleless apsidal choirs, and the same spirit seems to have influenced Verdun Cathedral, and the churches of St. Benigne and Notre Dame at Dijon.

† At Paderborn Cathedral the Middle Pointed north transept has an apse forming seven sides of a dodecagon, each lighted by a tall window of two compartments.

I fear I have already dwelt too long on plans, but I cannot quit this most fascinating and interesting branch of the subject without calling attention to such anomalous ones as those of the twelve-sided chapel at Drüggelte, near Soëst; the Nikolai-Kapelle in the same town, consisting of a nave divided down its centre by a row of round arches on slender shafts; the two-bayed, two-aisled, parallel-apsidal church at Girkhausen in South Westphalia; the double-storeyed castle-chapels at Warburg and Steinfurth in Westphalia, and those of St. Ulrich at Goslar, Landsberg and Conradsberg, in Saxony. The church at Schwartz Rheindorf, opposite Bonn, may fall into this last-named class, as regards its elevation. Nor must mention be omitted of the Dom at Aix-la-Chapelle and St. Gereon's Church at Cologne, where an aisleless choir is attached to an octagon and a decagon respectively; of the multi-foliated plan exhibited by the Liebfrau-Kirche at Trèves; of the double-choired cathedrals and churches of Bamberg, Gernrode, Hildesheim, Laach, Mayence, Naumburg, Oppenheim and Trèves; and of such churches as the Dom at Münster, and the Apostles and St. Cunibert's at Cologne, where the western transept not only forms a pleasing feature in the external outline, but affords a noble approach to the interior—the floor space at the crux formed by it being left unbenched.

There are other examples of short western transepts projecting either from a tower, as at St. Quirinus, Neuss, or from the western elevation, as at St. Andrew, Cologne, but in both these instances they open into the nave only above an internal narthex or construction gallery. This is a feature of frequent occurrence in the German Romanesque churches, and to be seen on a particularly impressive scale, besides in the two churches quoted above, at St. Patroclus and St. Peter at Soëst, at Lippoldsberg and Gandersheim, all in Westphalia, and at Hechlingen and Wechselburg, in Saxony.

(To be continued.)

THE ARCHITECTURAL ASSOCIATION.

THE opening meeting for the session 1897-98 of this Association took place on Friday evening, Mr. Hampden W. Pratt, president, in the chair.

Mr. Beresford Pite, past president, moved the adoption of the committee's report and the balance-sheet for 1896-97. The past session, he said, had in every way been a promising one, and showed an increase of 77 members, bringing up the total to 1,190. The various classes continued to improve, and although still dependent on its friends, the Association was financially in a satisfactory condition.

The motion was seconded by Mr. F. G. F. Hooper.

Mr. Banister F. Fletcher moved a vote of thanks to Messrs. H. P. G. Maule and M. Garbutt for auditing the accounts for 1896-97.

Mr. E. Howley Sim seconded the proposal, which was carried unanimously.

It was announced that copies of the A.A. excursion photos might be purchased of Mr. F. J. O. Smith.

The following were reinstated members:—Messrs. G. H. Smith, A. Lamb, A. W. Pocock, jun., A. Lovejoy, G. E. Withers, A. G. Turner and G. Bailey.

The President then distributed the prizes.

A.A. Travelling Studentship, value 25*l.*, and bronze medal, E. H. Evans; second prize, not awarded.

Architectural Association silver medal and 10*l.* 10*s.*, H. Inigo Triggs; hon. mention, F. D. Clapham.

Essay Prize, value 10*l.* 10*s.*, and silver medal, Alexander Wood.

The Andrew Oliver Prize, first prize, value 3*l.* 3*s.*, not awarded; second prize, value 2*l.* 2*s.*, not awarded.

The Arthur Cates Scholarship, value 10*l.* 10*s.*, H. T. Bromley.

Measured Drawings Prize, value 5*l.* 5*s.*, C. H. F. Comyn; hon. mention, H. Farquharson.

Discussion Section Prize and Architectural Union Company's Prize, not awarded.

School of Handicraft (Masonry) bronze medal, H. C. Lander.

LECTURE SIDE.

Division I.—R. H. Spalding, silver medal and certificate; A. Wood, bronze medal; H. White, hon. mention.

Division II.—G. S. Nicol, silver medal and certificate; H. C. Trimnell, bronze medal; E. Hale, hon. mention.

STUDIO SIDE.

Division I.—V. Wilkins, silver medal and certificate; T. Bee, bronze medal; R. H. Spalding, hon. mention.

Division II.—W. H. Ward, silver medal and certificate.

ORDER OF MERIT.—DIVISION I.

Greek and Roman Orders.—C. Brée, certificate; H. White, J. E. Franck.

Elementary Construction and Materials.—C. Brée, certificate and book; W. C. Butterworth, W. J. Davies.

English Architecture.—Alexander Wood, certificate; J. E. Franck, R. H. Spalding.

Elementary Physics, Formulae and Calculations.—J. E. Franck, certificate and book; R. H. Spalding, H. White.

Plane and Solid Geometry.—R. H. Spalding, certificate and book; R. C. Hall, J. E. Franck.

Mensuration, Land Surveying and Levelling.—J. D. Hunter, certificate; L. G. Detmar, R. H. Spalding.

DIVISION II.

History of Architecture.—G. S. Nicol, certificate and book; H. Badcock, S. E. Barrow.

Materials, their Nature and Application.—H. C. Trimnell, certificate and book; H. Badcock, G. S. Nicol.

Stresses and Strains.—G. S. Nicol, certificate; F. J. O. Smith, T. W. Aldwinckle, jun.

Construction.—P. Morris, certificate and book; H. C. Trimnell, G. S. Nicol.

Hygiene (Drainage and Water Supply).—F. J. O. Smith, certificate and book; T. W. Aldwinckle, jun., H. C. Trimnell.

Hygiene (Materials and Construction, Ventilation, Lighting and Heating).—F. J. O. Smith, certificate; G. S. Nicol, T. W. Aldwinckle, jun.

Specifications and Estimates.—S. E. Barrow, certificate; H. C. Trimnell, T. W. Aldwinckle, jun.

Professional Practice.—T. W. Aldwinckle, jun., G. S. Nicol, S. E. Barrow. No certificate was awarded in this class because there were only seven students, whereas eight is the number required by the rules.

Elementary Class of Design.—F. N. Reckitt, silver medal with scholarship value 5*l.* 5*s.* and certificate; C. L. Brierley, bronze medal and certificate; T. F. Green, hon. mention and certificate; J. S. Lee, hon. mention.

In the advanced class of design no award was made.

Before reading his address the President said there was one pleasing duty which devolved on him that night—the presentation of a silver tea and coffee service to Mr. D. G. Driver, their assistant secretary. When Mr. Driver came back from his holiday they learnt he had brought a wife with him, and therefore some members made the gift to mark their appreciation of his five years' work with the Association.

Mr. Driver, in returning thanks, said he had been greatly helped in his work by the kindness and good-fellowship of the members.

The President's Address.

The President then addressed the meeting. He said:—There are certain periods in the history of an institution when it is convenient and customary, not to say interesting and instructive, to look back and trace the course of events—in other words, to review the past; also to consider the present, and look forward to the future. For fifty years the Architectural Association has striven to supply the needs and promote the welfare of the architectural student, and it must be very gratifying to the founders of the Society—a few of whom happily survive—to look upon the flourishing body that still bears the name of the Architectural Association.

The object of establishing the Association was "to enable young men who are studying architecture to meet for general improvement in the various branches of their art." In a circular issued at the origination of the Society it was pointed out that "the great advantages a scheme like this, if carried out, would offer to the architectural student must be obvious at a glance. By this institution all the future members of the profession, their objects, their labours, their studies, would become known to each other. The incalculable advantages this knowledge and acquaintance would afford to those engaged in the same study; the mutual instruction and valuable assistance each could afford; the honourable spirit of emulation that would be engendered; the furtherance of their art in general, and the happy effect that must be produced by all the future architects becoming a band of friends intimately associated with each other in their plans and projects must and will prove of the greatest advantage to all those connected with the scheme." This forecast has been fulfilled to the letter, and we may truly say that the bonds which unite us to-day are as strong and as powerful as ever they were, and no one but a Hercules could sever or destroy them.

There is scarcely anything recorded of the early years of the Association; its proceedings were not reported as they are now, and it is mainly through the unpublished minutes of its meetings that we are able to glean something of its history. As we turn over the pages of its log-book we may note the chief incidents of the voyage, and trace its progress from year to year. The question of public competitions seems to have been early considered, for in 1850 a code of regulations was drawn up and issued; this interesting document was published in the jubilee number of "Architectural Association Notes," and contained some excellent suggestions which the agitation of many years has not succeeded in satisfactorily settling. As evidence of a desire to enlarge its scope, we find that Mr. R. Kerr

in 1852 laid before the committee a scheme for the formation of an Architectural Academy, comprising courses of study, professorships, lectures, graduation, &c., and a resolution was passed to the effect that "the proposition is well worthy the consideration of the profession generally, and that any assistance toward the furtherance of this object that can be rendered by the Association shall be liberally given."

Unfortunately, financial troubles proved a stumbling-block to the smooth working of the Society, chiefly owing to the members getting into arrear with their subscriptions—an experience not confined, by the way, to the infancy and youth of the Association, as subsequent treasurers can testify; but at the outset it was a serious matter, and led to the appointment of a committee of investigation in 1855. This committee reported that they "found the Association in a state of apathy, torpor and depression unparalleled in former sessions," the financial statements had been misleading owing to the concealment of heavy liabilities, and the management of the Society called for improvement. It was further suggested that a lending library should be formed, and an "Architectural Association Magazine" might, if published, be expected to pay its own expenses. The report concluded with an earnest appeal for a renewal of the enthusiasm which characterised the members at the formation of the Society. Following closely upon the reception of this report came a proposal to memorialise the Institute "for the establishment of an examination which should eventually serve as the basis for the issue of such a diploma as shall certify that the holder thereof is fully qualified to practise as an architect." A reply was received from the Institute in 1856 to the effect that the Council felt it was premature to pronounce an opinion upon so important a subject, and that before they could recommend the Institute to undertake such a charge it would be necessary to ascertain the opinion of the profession generally, at the same time they would be able to come to a sounder judgment after some experience of the district surveyors' examination recently instituted. Disappointment followed this decision, interest in the Society continued to flag, and in May 1856 a special meeting was held, at which a resolution was brought forward to terminate the existence of the Association; this, however, was defeated by a large majority, thus indicating that there was at any rate some vitality amongst the members. In the following month an important letter was received from the Institute suggesting an amalgamation of the Association with that body. This communication was duly considered, and a resolution passed to the effect that it is not expedient for the Association to join the Institute on the terms suggested. The crisis through which the Association passed in 1856 was followed by an awakening interest in its welfare, and a committee was appointed to take into consideration the defective means of architectural education and the desirability of forming classes for the special study of subjects immediately connected with professional practice.

In January 1857 a conversazione was held, at which Mr. Ruskin was present and read a paper on "The Use of Imagination in Modern Architectural Design," and though forty years have passed since then it is interesting to recall and record some of the words of a master in art who in times past has kindled so much enthusiasm in the architectural breast. Mr. Ruskin said:—"If they were asked abruptly, and required to answer shortly, what were the qualities which distinguished great artists from mean artists, he believed they might reply—first, their imagination; second, their industry. Some of them might doubt the justice of the necessity of attaching so much importance to this latter quality, because there might be dull men who were industrious and clever men who were indolent; but though the industrious man might be dull and the indolent man might be clever, he had never known a great man who was not industrious. But though this quality of industry was essential to an artist, it did not make an artist; for many people were always busy whose doings are of little worth. Neither did feeling make the artist; but the gift which distinctively made the artist—without which he would be feeble in life and forgotten in death—was that of imagination. Imagination was not manipulation, or calculation, or attention; it was something more, something higher than all or any of these. If an architect lays his bricks and stones well, we praise him for his manipulation; if he keeps well within his contract, we praise him for his calculation; and if he arranges his beams so that nobody drops through his floors, we praise him for his caution. But, if he is to be a great architect, he must do something more than possess and exercise these qualities." After referring with regret to the separation between sculpture and architecture in modern times and to the field opened to the fancy by the junction of sculpture with architecture, he remarked that "nearly every other art was limited in its space; but was there anything within the range of sight, or thought, or conception which might not be of use to the architect, or in which an interest might not be awakened to the advantage of his art?" Concluding an eloquent address, Mr. Ruskin said:—"So soon as they desired to build largely, they would find that their work must

be associative; one could not carve a whole cathedral himself; either their own work must be disgraced or they must raise their fellow-designers to some correspondence of power. They would take the lead in disposing of their building, but they must trust to the genius and invention of others in the disposal of its detail, and in doing this, too, they must rejoice in the very powers that may promise to rival them. If they endeavoured to depress or disguise the talents of their subordinates, they were lost to their art, for it was their own prosperity they were seeking, and their own skill that they were striving to perpetuate. He placed no utopian standard before them; he had said that they must surrender their own pre-eminence to their love of building, and whomsoever they found better able to do what would adorn it than they were, that person they were to give place to and rejoice at seeing their edifice growing more beautiful under his chisel, and next rejoicing that they had done kindly. The man who sees capacity in another and does not acknowledge it, or assist in bringing it forth, is not the refuser of a kindness, but the committer of an injury. They had the sweet consciousness that as their art embraced a wider field than all others, so it was more profound and holy than all others. The artist when his pupil is perfect must see him leave his room that he may pursue his destiny perhaps as an opponent in toil, but architects alone were called by kindness to fraternity of toil. Those massive piles which rise above the domestic roofs of our ancient cities have a meaning more profound and true than is commonly attached to them. Men say they are good for worship, but so is every mountain glen and rough sea-shore; they have the indisputable and distinguished glory that their mighty walls were raised by men who have given aid to each other in their weakness, and the strength of their structure has its foundations on manly friendship, which conduces to awaken the sweeter cadences and symmetry of the human soul."

What effect Mr. Ruskin's eloquent address had on the members is not recorded, but it is pleasing to find that the committee were able at the commencement of the next session to congratulate the members on the general improvement which had taken place in the prospects and financial position of the Association, which was at length freed from its embarrassments, a fund having been raised for the purpose. A movement was on foot at this period to provide a home for architectural bodies in London; the Architectural Union Company had been formed and was erecting a building in Conduit Street, and after prolonged negotiations the Association arranged terms and removed from Lyon's Inn Hall, holding its first meeting at 9 Conduit Street on April 1, 1859. In that year for the first time a prize was awarded in the class of design, and a prize essay instituted, the subject being "Street Architecture and its Proper Treatment." The acquisition of new premises might have been expected to mark a renewal of vigour in the work of the Association, but strange to say, only twelve months had elapsed when a resolution was passed regretting the want of support afforded by the members and asking the committee to consider and report whether there was any course short of closing its operations. The committee recommended that all office bearers, with the exception of three, should for the next session be members who had never held office before; accordingly some new blood was introduced into the direction of affairs.

A circular having been issued by the R.I.B.A., inviting suggestions on the establishment of a voluntary examination, the Association held two meetings at the close of 1860, and after fully discussing the matter passed two resolutions:—
1. "That in the opinion of the Architectural Association a strictly voluntary examination should be instituted with a view of guiding the student in architecture to such a course of study as would enable him to arrive at competence in his profession."
2. "That in the event of a professional examination being insisted upon, it should be limited to those subjects which bear directly upon the practice of the profession, and this Association is apprehensive that any examination upon the principles of taste might lead to results unfavourable to the progress of art."

In 1860 botany and modelling classes were formed, the latter proving very successful. In 1862 the library, which had been in course of formation for some time, was at length opened. In the same year Saturday afternoon visits were organised, the first being to Westminster Abbey, a prize being given for the best account of the visit. At the conversazione in October 1862 a musical programme was introduced for the first time, the services of the artistes being gratuitous. In 1863 the voluntary examination class was established for the study of practical subjects with special reference to the examination then instituted, the Association having pledged itself to use all its influence to induce the members to qualify themselves for it. In the following year a class for the study of figure drawing was formed under the direction of Mr. E. J. Poynter, and was so attractive that fifty members joined it. A water-colour class was subsequently started. In 1867 the A.A. sketch book was commenced, the parts being issued monthly at a subscription of one guinea per annum, as now, and an excellent publication

it has always been. At this time the class of construction was formed to carry on the work formerly undertaken by the voluntary examination class, and a year later the elementary class of design was started. The Association had now settled down to steady work, for in session 1868-69 a number of sub-committees were appointed and a balance sheet published for the first time, showing an income of about 240*l.* and a substantial sum in hand. It became necessary also to compile a catalogue of the library, and this was issued in 1869.

We next come to an important report drawn up in 1869 by a joint committee of the Institute, the Academy, the Architectural Museum, the Association and the Architectural Exhibition, on the question of establishing a "School of Art accessory to Architecture." This committee carefully investigated the scheme of the voluntary examination, and arrived at the conclusion that its failure was due to:—1. The absence of a formal certificate of having passed the examination. 2. The want of such a stimulus or pressure as would make the passing of the examination professionally necessary. 3. Inefficient preliminary education. 4. Want of system in architectural education. They accordingly recommended:—1. That a text-book or pamphlet should be prepared containing a complete curriculum of study for the architectural student. 2. That a certificate be granted to all who pass the voluntary examination. 3. That at some future period the membership of the Institute be made dependent on the passing of the voluntary examination in the class of proficiency. 4. That a preliminary examination be held in elementary subjects, open to all students who have been at least one year in an architect's office. 5. That the Institute should assist the Association to carry out the proposed drawing school. 6. That a committee be appointed to compile the text-book referred to. As a result of the fifth recommendation architectural art classes were established at the Architectural Museum under the management of a committee composed of representatives of the Institute, the Museum and the Association. These classes were commenced in 1870, and comprised figure drawing and architectural ornament, the latter being conducted by well-known architects as visitors. For two years the Association contributed 25*l.* annually towards the expenses of these classes, which, however, soon languished.

The first annual excursion took place in 1870, when Lincoln and district were visited, the party being conducted by the late Mr. Edmund Sharpe; and it may be remarked here that every year since then some fresh district has been visited. During the next ten years (1870-80) no important change or event took place; the membership grew from 500 to 800; two new classes were formed, viz. for the study of colour decoration and architectural science, the latter being subsequently called the advanced class of construction; some courses of lectures were also delivered; special arrangements were introduced for the benefit of country members in connection with the classes and library, and the Birmingham Architectural Association was admitted as a provincial branch. The Institute opened its library to members of the Association under twenty-three years of age. New and amplified rules were adopted in 1877, and four years later the entrance-fee was raised to one guinea. Additional rooms were taken at Conduit Street in 1879; the Architectural Association Medal was founded in that year, and the Architectural Association Travelling Studentship two years after, when a sum of nearly 700*l.* was subscribed by past and present members to provide the necessary funds.

In 1881-82 the committee thought it desirable to vary somewhat the arrangement of the classes, with a view to making them specially useful to members preparing for the new obligatory examination of the Institute, which commenced in 1882. Courses of lectures on the history of architecture and on construction were given and a new class started for the study of planning and specification writing.

In 1884 a special education committee was appointed to inquire thoroughly into the general organisation of the Association, with a view to further systematise its working and extend its usefulness, and a scheme was adopted in 1885 for amending and consolidating the work. The main feature consisted in forming two defined divisions of study, called the elementary and the advanced, the former comprising elementary classes of design and construction, preceded by lectures on history and construction, and the latter consisting of classes of design, colour decoration, advanced construction, quantities and surveying, but no lectures. The work was conducted by visitors, who were formed into a committee of advice. An attempt was made at this time to increase the subscription of members to one guinea, with the object of affording increased educational advantages, but the proposal was defeated by a small majority. In 1885 the Saturday vacation visits were first organised, and in the ensuing session many improvements were effected in the library, viz. a new system of registration, the addition of a reading-room, and the opening of the library twice a week instead of once. In 1886-87 a practical class of masonry was carried on as an experiment at the City and Guilds Institution, and a series of lectures started on graphic statics. A noteworthy step was the issue in April 1887 of the

first number of A.A. Notes at a small subscription, the desirability of providing a means of intercommunication amongst the members being at length realised, though it was not until four years later, when it was issued free to all members, that its purpose was more completely fulfilled.

The gradual increase in the number of members and the large attendance at the ordinary meetings forced the committee to consider the necessity of providing better accommodation, and by the kindness of the Institute we were permitted to hold our meetings in their room during session 1887-88, a privilege which has been courteously extended to us ever since. About this time rules were passed to facilitate a scheme of affiliation with the desire of creating a bond of union between the Association and provincial societies; the Birmingham and Glasgow associations joined us, but the arrangement did not long exist. An elementary class of ornament and colour decoration now appeared and was well taken up, and two years later the sketching and measuring class was formed for the purpose of visiting buildings in the neighbourhood of London during the summer. At the same time an A.A. cycling club was organised with the object of making runs to places of architectural interest, but this club soon disappeared, and notwithstanding the growing popularity of cycling no attempt has been made to restart the club. Another club was founded in 1888, viz. the Lyric Club, one of the objects being to promote friendly intercourse among the members; and those who appreciate the social advantages of music, dancing and smoking are still provided for at this club. Reference may be made here to the Camera Club, though founded at a later date (1893). Apparently, this club is not so prosperous as it was at first, and a hope may be expressed here that some effort will be made to revive its usefulness.

We have now arrived at the last great movement in the Association. In 1889 a special committee on education was appointed, and after exhaustive inquiries its recommendations were approved by the general body in May 1890. Following this a special committee was appointed to consider the revision of the rules, a new constitution and by-laws being adopted by the general body in the following January. These included the raising of the entrance fee to 2*l.* 2*s.* and the subscription to 1*l.* 1*s.* to all members elected after 1890; and also provided for the appointment of paid officials. A reorganisation committee was next appointed to prepare the new education scheme and resulted in the new curriculum. In order to establish the new scheme and provide for the extra cost and risk incidental thereto, as well as the outlay involved in obtaining suitable premises, an appeal was issued and generously responded to by members of the profession. The scheme provided for a complete course of study extending over four years, that being considered as the least time that should be given to the study of the subjects. It was laid down that the aim of the courses was to help members to fit themselves for their work as architects, by providing the means by which they may supplement the training acquired in offices; the principal object not being to prepare candidates for the examinations, although the courses were chiefly based upon the programme of the examinations.

Premises having been secured in Great Marlborough Street and adapted to meet our requirements, the new scheme was launched in 1891-92. From the outset the first and second years' courses were well supported, the third being thinly attended, and the fourth not fully started. In 1892-93 Divisions I. and II. continued to be well supported, and Divisions III. and IV. showed improvement. In 1893-94 there was a poor attendance in Divisions III. and IV., indicating the necessity of rearranging these divisions. Accordingly, in 1894-95 the complete course was arranged in three divisions, but the attendance in Division III. was again disappointing, and a special committee was appointed to inquire into the working of the classes. As an outcome of this inquiry the Institute agreed to alter the dates of the examinations so as to avoid interference with the working of the classes. In 1895-96 the curriculum was arranged in two divisions, the complete course extending over four years, and a school of design started, being attended with considerable success. Last session the work of the classes and studio showed a continued improvement, especially in Division I. The school of design and handicraft was most successful and encouraging; forty students joined the elementary class, and the whole session was devoted to one subject, which produced good results. Eight students joined the advanced class, the syllabus of which was amended as it was found desirable to have more than one subject. The Technical Education Board arranged special handicraft classes for the school, and these were appreciated by the students. The discussion section affords opportunities for the study and discussion of those subjects and difficulties which occur in actual practice; this is a most valuable part of our work, and it is gratifying to note its continued success.

A record of the Association transactions would not be complete without a reference to the special meeting held in December 1893, when the question of the admission of ladies into membership of the Association provoked a lively discus-

sion, and the proposal was defeated by a large majority. Since then no one has come forward to advocate the cause of the ladies, but we have, on several occasions, been reminded of such a class of students on the boards of the A.A. soirée stage.

We have now traced in outline the work and progress of the Association during the fifty years of its existence. There are, of course, many incidents and details that would have been interesting to enlarge upon, but on an occasion like this it would be impossible to do so. There are, too, many names that might have been mentioned as identified with the course of events, but it would be undesirable to single out a few where so many have borne an active part. The history of the Association is marked throughout its career by a fixed determination on the part of its members to maintain its independence, to uphold its traditions, to overcome all difficulties, to grapple with changing circumstances, to keep abreast of the times, to seek the counsel of its best friends, to encourage and help the young student, to provide the best training and education at its command, to keep in touch with those who have passed through the student stage, to keep alive the memories and maintain the friendship of those who have retired from active service, and above all to advance the noble art of architecture. May the same devotion and self-sacrifice, the same enthusiasm and loyalty, characterise the men who are entering our ranks to-day, so that the Association may accomplish in the future greater things than in the past, and heaven smile upon the works of their hands.

We have been looking into the past and rejoicing in our year of Jubilee at all that has been accomplished; let us turn for a moment to the present. We have entered upon a new session with the largest roll of members ever recorded, viz. 1,150. It may be interesting to note that of this number 11 have been members for forty years and upwards; 60 for thirty years and upwards; 110 for twenty-five years and upwards; 180 for twenty years and upwards; 302 for fifteen years and upwards, and 552 for ten years and upwards. Seven hundred and forty-eight of our present number joined before the subscription was raised in 1891, so that 402 have come in and remained since then. Various conclusions can, of course, be drawn from these or any other figures, but this at least may be said, that the Association has succeeded in retaining many of its best and most valued friends, who are ever ready to testify to the great advantages they have derived from its membership. On the other hand, there is a solid army of young men, many as yet untried, who are destined to take up the reins of government before long, and who have opportunities which, if wisely used, may be productive of lasting good to their own and future generations in raising the status of the profession and in the advancement of architecture as a living art.

There is one point in our comprehensive scheme of education which demands attention, and continues to disappoint us. While the students in Division I. attend in very satisfactory numbers on the whole (and, in fact, the present accommodation is somewhat strained to properly provide for them), those in Division II. are comparatively few. What becomes of those who have passed through the first stage? It is very evident that a large proportion of them do not continue their studies and complete the course we wish them to follow. This is a problem that we have not succeeded in solving yet, and it suggests the advisability of making individual inquiries of those who have passed through Division I. to ascertain the causes which apparently lead them to abandon the higher and more advanced studies provided for them.

The combination of practical with theoretical instruction is also a subject which is exercising the minds of many. At present the facilities we offer our students in this direction are very limited. In the handicraft classes last session the students were enabled to attend a course of manual training in masonry and leadwork, thanks to arrangements made by the Technical Education Board, and this session the Board has kindly arranged for a series of workshop demonstrations in stone-working to be given at the Regent Street Polytechnic.

There appears to be a difference of opinion as to how far it is necessary or desirable that an architect should be able to put his own hand to the work of any trade. If it is an advantage that an architect should have actual manual experience, would it not be better that a student should be taught or apprenticed to one trade—say mason or carpenter—before he serves his articles? Such a course would seem to be the most convenient as well as the most practicable; later on he might with advantage gain considerable knowledge in other crafts, not necessarily by handling the materials and tools, but by observation either on works, in shops or in craft classes; while later still the superintendence of works, either as clerk of works or otherwise, would be an experience of great practical value. After all, the years of a student are limited, and even if he should make the very best use of his opportunities he cannot expect to accomplish very much in this department of his education. By far the most useful and appropriate thing for an architectural student is modelling, and it is a question whether this is not worth all the other crafts put together. The tendency of the

times is, perhaps, to make too much of the manual work undertaken at the technical institutes. It is valuable as far as it goes, especially in the more scientific subjects, but it is a fallacy to suppose that it can in any degree supersede the training which an apprentice to his trade must and should acquire in the workshop, where the everyday practical problems have to be dealt with.

You will have gathered from the report of the committee for last session that it has been resolved to commemorate the Jubilee of the Association by establishing a fund for acquiring new premises, suitable and adequate for the work carried on. It would be quite contrary to the wishes and feelings of all who have the interest of the Association at heart, to let so important an occasion pass without making some special effort to permanently benefit a Society that has done so much to further the cause of architectural education, and in whose welfare the whole profession is concerned. Various suggestions have been made and discussed, but there seemed to be one predominant object which overshadowed all others. For the last few years the cry has gone forth for increased and better accommodation; numerous efforts have been made to obtain premises, but hitherto without success, and seeing that our need is as great as ever it has been determined to commemorate the Jubilee in the way mentioned. We have sought the advice and help of friends who have aided the Association generously in the past, and they have intimated their readiness to support us again, provided we are prepared with some definite scheme. This is a most reasonable attitude, hence we are now going forward in the matter with renewed energy and determination, and are hopeful that the way is opening up for obtaining a site on which premises could be erected to provide studios and classrooms, library, reading-room and offices, a common-room, and last, but not least, a meeting-room, so that under one roof we may combine all the essential accommodation for educational and social purposes. The provision of workshops might with advantage be arranged in a separate building more suitable for the purpose, if satisfactory arrangements could not be made with any of the public craft schools. This outline of a scheme may seem to indicate a large undertaking, but if carried out on the lines we have in view, and which it would be premature to discuss, there is little doubt but that it could be satisfactorily accomplished. Our desire is to formulate a definite scheme that is practicable and attainable within reasonable limits and a reasonable period, not forgetting, at the same time, that it should worthily commemorate our Jubilee.

The question of establishing a Municipal School of Architecture has been talked of and may yet come; but such an institution could never do the work that the Association undertakes, neither could the Association open its doors to outsiders and accept grants or subsidies from county councils or other public bodies without sacrificing its freedom and ceasing to fulfil the objects for which it exists. It is an advantage that cannot be too strongly urged, that the architectural student should be trained in an architectural atmosphere, that he should have every opportunity of associating with kindred spirits and forming lasting friendships with them. The true spirit of comradeship will be best promoted by such intercourse, and the higher claims of art will be more easily attained. If we would seek to stimulate the enthusiasm and fire the imagination of our fellow students, we must cultivate the love of the beautiful; we must continually strive for the advancement of our art, our sympathies and powers must be directed to raising the standard of our attainments and keeping a high ideal ever before us. Let us go forward, therefore, with renewed energy to the duties and studies of another year, remembering that the opportunities, the advantages and the privileges which are now the inheritance of our students have been obtained by the cordial co-operation, the self-sacrifice, the patient toil and the brotherly love of men who, for fifty years, have joined hands in promoting the advancement of architectural education and upholding the first principles and honoured traditions of the Architectural Association.

Mr. Cole A. Adams proposed a vote of thanks to the President for his comprehensive and interesting address on the fifty years' work of the Association. The falling off of the number of students in Division II. as compared with Division I. was a problem to be inquired into, and perhaps the only way to find the reason of it was to make individual inquiries. It was unwise to spend much time mastering the details of the manual arts—life was too short—but more time should be devoted to cultivating the imagination.

Mr. Beresford Pite, in seconding the vote, alluded to the healthy condition of the Association, which was perhaps due to the strong tincture of the practical with all their theories. The falling off in the numbers for the second division was a good sign. It showed that students after spending a reasonable time, perhaps three years, at the lectures and reading, went into the more serious part of their studies seeing much and remembering the great value of imagination.

Mr. Owen Fleming supported the vote, and the President briefly replied.

EXAMINATIONS IN ARCHITECTURE.

THE Directory of the Science and Art Department just published contains the following syllabus of the examinations in architecture:—

I.—The orders Greek and Roman.

The word "order" as applied to architecture. Its meaning as a combination of a column and its usual superstructure, or entablature. This combination, almost the only means of producing architectural effect employed by the Greeks, and the chief feature of Roman architecture. The term order as possessing also a wider significance and extended to denote a style or manner in keeping with one of the varieties of column in use in classic times.

The Greeks' use of the orders Doric, Ionic and Corinthian. The Romans' addition of two others, namely, Tuscan and Composite, so raising the number of orders to five.

Candidates are expected to make themselves familiar with the forms and general proportions of good examples of the orders—both Greek and Roman—so as to be able to draw them from memory with correctness, but it is not required that the dimensions of the minute subdivisions of height and projection which are met with in the books on the subject should be committed to memory.

II.—Mouldings made use of with each order; the capital considered as the index to each; the enrichments applied to the various mouldings; and the ornaments customarily made use of.

Candidates must be prepared to draw some of these from memory.

III.—Sources from which the orders were derived. Rudimentary and somewhat archaic forms in which they appear in early Greek work. The mode in which they were employed by Greek architects and by the Romans, including the way in which the latter combined arches with columns, and employed pedestals, thus variously extending the scope of the orders. The use made of the orders by Renaissance architects and the variations introduced.

From the first the attention of the student should be directed to the points of distinction as well as of resemblance between the Greek and Roman orders, extending to the mouldings, enrichments and ornaments, as well as the leading forms and proportions; and to the wide difference in architectural character thus created.

IV.—General knowledge. Terms in ordinary use in architectural books.

Candidates will be required to illustrate their answers under this head by sketches.

V.—Buildings of architectural character—Renaissance, Mediæval or Modern.

Candidates will be required to answer questions about buildings with which they are familiar, and the styles in which they are built, and will be asked to draw them or parts of them from memory.

Candidates cannot be too strongly impressed that architecture consists of buildings, not of representations of them; and that making studies of good specimens of architecture from buildings, or in the case of ornaments, &c., from casts, is the best way of obtaining proficiency in architecture. Such studies are often more instructive if drawn geometrically and to scale than if attempted in perspective.

Accuracy, combined with freedom, in draughtsmanship will always be taken into account in adjudging marks, and a thorough appreciation of the character of any object represented is of equal importance with the exact reproduction of the main proportions and prominent forms.

Candidates desiring to obtain a second class must be prepared to draw from memory, to scale, and with fair correctness, any of the orders, Greek or Roman; and to a larger scale, portions of the mouldings, enrichments, capitals or other features; and to answer questions on the architectural terms in general use.

Candidates desiring to obtain a first class must be able to do the work indicated above as required for the second class, but with more precision and completeness; they must also be prepared in some of the other branches of study indicated above, though not necessarily in all of them; and their draughtsmanship must be of good quality.

Candidates will be required to design a building, or some portion of a building, in conformity with a statement of requirements, or upon a sketch plan furnished to them and to carry out its architectural treatment in some definite style.

The object of the examinations is to show that the candidate possesses a competent knowledge of the decorative features and ornaments employed in some one style of architecture, such as Classic, Renaissance, Gothic, &c., and the ability to use them. Any style to which the above description will apply may be selected.

I. In planning a building, or in revising the plan of one, the masses must be thrown into such a shape as will admit of a satisfactory treatment of the exterior; and both the plan and section must secure that the interior (or each part of it, if it be

cut up into halls or rooms, &c.) be of good proportions and capable of satisfactory decoration.

Attention to these conditions must be combined with due attention to carrying out the statement of requirements, and to arranging for good access, lighting and general convenience.

2. A good balance of openings and solids and good proportions are essential to a successful design; and when the general lines have been settled, appropriate architectural decoration must be added. This does not simply mean ornament, it implies a familiarity with and the ability properly to introduce all that goes to make up architecture.

For example, in a Classic design the candidate must be able to introduce suitable rustication, the orders, possibly a dome, and the usual treatment of openings, cornices, balustrades, panels, &c., with their appropriate mouldings, enrichments and ornaments.

If the style be Gothic the candidate must show that he is familiar with, and can correctly employ, arches, buttresses, vaults, high roofs, dormers, tracery, carving, &c., such as were in use at the period which he selects.

Sufficient and correct knowledge of at least one style; draughtsmanship which, while exact and true, shall yet be free and spirited; and a little skill in the putting together of the parts of a design, such as is best acquired by practice and by study of existing buildings of good architecture, are the qualifications essential to success in this examination. The degree in which these qualifications are shown in the design will determine what award shall be made for the candidate's work.

TOMBS OF HUNGARIAN KINGS.

A CORRESPONDENT of the *Manchester Guardian* writes:—Being interested in the accounts which have been telegraphed to the English papers by foreign correspondents from Vienna, I took the opportunity during a recent holiday in Hungary of paying a visit to Széker-Féhervár (Stuhlweissenburg) to try and glean further information. I was fortunate in meeting with Dr. Hubert Szalay, a young Magyar priest acting as secretary to the Bishop, and he courteously put his time and knowledge at my disposal. To the main facts of the indictment against the town authorities he did not demur, there being no gainsaying the fact that a great act of vandalism has been perpetrated, but he seemed anxious to impress upon me that it was not the dignitaries of the Church who were to blame. When the old cathedral was destroyed by the Turks in 1543, the sarcophagi of the kings of the line of Arpád had been mostly removed to a vault in the garden of the Bishop's palace just across the road. These sarcophagi were examined by the archaeologist Henzelmann in 1869, and the contents, after being carefully labelled, were stored in cases in the loft of the town hall, under the care of the Mayor. In 1872 the then Mayor found them and had them placed in the vaults of the cathedral, one of the deans being made responsible for them. He, however, seems to have left them entirely under the charge of a drunken sexton and not to have troubled himself about them. In 1893 Professor Török received permission to take the bones to Buda-Pesth for his anthropological studies, and it was then found that the seals had been torn from the boxes and that they had been opened, several skulls being missing. The sexton on being questioned said that his predecessor, who is now dead, had informed him that a medical student named Tuzkay had come with a permit from the dean to take some of the skeletons for his medical studies, and that he had helped himself liberally. This student, who is now a respected doctor at Buda-Pesth, entirely denies that he did anything of the sort. So much for what has appeared in the press. Now Dr. Szalay objects to the statement that one of the deans was made responsible for the safe-keeping of the bones on their removal to the cathedral, and he further said that the present dean did not give permission to any medical student to help himself. With regard to the charge against Tuzkay, he seemed to think that it was a case of the sexton's word against the doctor's, and that as the former was now dead it would be difficult to arrive at the true facts. As regards the Royal remains, he said that not more than fifteen kings were buried there, and that Matthew Corvinus and Louis the Great were not among the number, their tombs being at Klausenburg in Transylvania. He further hinted that the list of kings given in the press reports must be received with caution, as they really had no definite data as to which of the kings were interred there. So much for this question, on which it is clear that further evidence is required before the stigma of carelessness and apathy can be considered to attach to anyone in particular.

Passing from this matter of doubt and recrimination, it may be said that to the archaeologist a visit to Széker-Féhervár, the Alba Regia of the Romans, is full of varied interest. Numerous inscriptions taken from the old cathedral have found a resting-place in the walls of the Bishop's garden, where they may be

studied, side by side with many Roman antiquities which, it is pleasant to say, have been carefully preserved. Again, the present cathedral, erected by Maria Theresa, contains in the recesses of its Reliquenschatz the scalp of St. Stephen, first Christian king of the Arpad line, enclosed in a glazed brass helmet. Another such helmet bears the inscription "Regis Hungaria caput S. Stephani." Other relics of this king are to be seen at Buda and Esztergom (Gran), the seat of the Primate, who, by the way, enjoys an income of about 60,000*l.* a year. The council chamber of the town hall, reached by an exterior wooden staircase, contains some pictures and further relics of the early days of Hungary. Altogether the visitor to the glories of Buda-Pesth will, if he be of an antiquarian turn of mind, find much to repay him in a visit to this quiet country town.

TESSERÆ.

Italian Memorials.

THE chief object in a commemorative monument is durability, and that it should make known for the longest possible period the object for which it was executed. This can only be done through the medium of inscriptions, and in that case inlay of marble is far more durable than engraved letters, which soon become defaced or filled up with the accumulated dust and dirt of years; indeed, nothing but wanton violence can destroy letters and ornament formed by flat inlay. A great number of memorial slabs of this description in the churches of Santa Croce and Santa Maria Novella at Florence have been walked over by the feet of many generations, and are as perfect as when first executed, whilst raised bronze is gone. The interest attached to these memorials is rendered doubly great by the addition of sculpture, and the effigy of the deceased lying within a framework of inlay ornament and inscriptions characterises a great number of monuments during the fourteenth and fifteenth centuries. These, executed in marble or bronze and let into the pavement of the churches above-mentioned, have been sadly worn by the feet of the living, and are generally so much defaced as to render them almost useless; nevertheless, the principle is excellent, and in the chapels attached to our great cemeteries monumental figures in bas-relief of this description, surrounded by an iron railing, would form most appropriate adjuncts. The expense of this method as far as material is concerned would not be great, as our own country affords sufficient resources for such purposes, and workmen would be more difficult to be found than marble. The church of Santa Croce is especially rich in examples of this combination of sculpture and inlay, and, were not the effigies so worn away by the feet of devotees, would form a most interesting series of costumes of laymen, priests, warriors and ladies.

Sir John Vanbrugh.

The value of a painter's opinion in regard to architecture is sufficiently apparent from what that of Reynolds has done for Vanbrugh. But for the honourable testimony borne to his peculiar merits by Sir Joshua, the name of that Sir John might still have had attached to it the ridicule endeavoured to be affixed to it by the puny wits of his day—or rather by the puny witticisms which, in their utter ignorance of art, they levelled against him, seeing as they did no other quality in his buildings but that of heaviness. That Vanbrugh was exceedingly careless and faulty in his details, sometimes coarse even to slovenliness, is not to be denied; still, he showed himself to be a master in picturesque composition, especially if compared in that respect with his contemporaries. To unqualified praise he is assuredly not entitled, but assuredly also it is not difficult to discriminate between his defects and his merits—not difficult to avoid the former, although not so easy, perhaps, to rival the latter.

Exiled Art.

The great art of a nation or the great work of a master can only be fully known and valued when seen in its own country or its native place. Carried elsewhere or disunited from its proper adjuncts it is always deteriorated. The calm, glowing sunlight of Egypt gives to the vast figures in *bassi-relievi* a softness and beauty they could not receive elsewhere. They are like gigantic *camei* and as delicate and as lovely. The sharpness, cleanness and warmth of tint also bestowed by the wondrous atmosphere of Egypt completely change the character of these ancient works from what they receive in our gloomy land and gloomier British Museum. In the same way pictures dissevered, like the Madonna di San Sisto at Dresden, from the architectural and sacred adjuncts amid which they were designed to be placed, are by that much diminished in effect and injured as compositions. Nothing but a visit, not even a plaster cast well placed, can give an idea of Michel Angelo's statue of Lorenzo de' Medici in the chapel at Florence; it wants its surroundings in the grand and gloomy mausoleum with the light playing on it, as its creator designed it to be placed. Museums and picture-galleries are too often wearisome collections of *disjecta membra*, contradicting and clashing with each

other, and the moderns have not scrupled to destroy in forming them much that the ancients would have revered and willingly have gone a long pilgrimage to see.



The Royal College of Art.

SIR,—Since an institution with which I have been connected for many years has been very unfairly attacked, and since your readers are just those for whose opinions we should most care, may I hope that you may find a corner in your valuable space for a few words of defence. A cutting from the *St. James's Gazette* has been sent me in which, after complimenting the Birmingham, Glasgow and Manchester schools on their high honours in the national competition, the writer continues:—"South Kensington lags far behind, with but eight medals against Glasgow's thirty-four and Birmingham's twenty-three." Where the journalist obtained his information from I cannot say, although I can recognise that it is a kind of which a good deal is printed.

The official report, however, is as follows:—

	Gold Medals.	Silver Medals.	Bronze Medals.	Books
Birmingham	3	3	16	33
Glasgow	3	8	23	23
Manchester	—	3	13	20
Royal College of Art, South Kensington	4	25	86	110

Otherwise, the R.C.A. has 225 awards, while the aggregate of the three selected schools has 148.

In conclusion, I would add that of the much coveted British Institution scholarships of 50*l.* per annum for two years, in 1895 the R.C.A. won four out of five offered, in 1896 the R.C.A. won two out of five offered, and in 1897 five out of seven offered. In other words, the R.C.A. has won eleven of these prizes in competition against all the art schools throughout the kingdom, including the Royal Academy Schools, leaving only six to be shared among all the others.—Yours faithfully,

E. S. BURCHETT.

GENERAL.

Mr. F. C. Penrose, M.A., having resigned his position as architect and surveyor to St. Paul's Cathedral, after holding the office for a period of thirty-four years, the Dean and Chapter of the Cathedral have appointed Mr. Somers Clarke, F.S.A., to succeed him.

A New Church for Seamen is to be erected at Poplar from the designs of Sir A. Blomfield & Sons.

A Pulpit in the form of a horse-block now stands, surrounded by a rail, in front of a Wesleyan chapel, at Wednesbury. The founder of Methodism preached no less than forty-five sermons from it. In his time it stood by the side of a building in one of the open spaces of that town.

M. Gustave Maincent, a French painter who only lately obtained the recognition he merited, has died suddenly in a railway carriage on the line near Croissy.

The Prix Chaudesaigues of 2,000 francs has been awarded by the Académie des Beaux-Arts to M. Léon Jousely, for his design for a theatre which would be specially employed for matinées.

The Exhibition of the Institute of Painters in Oil-Colours will be opened next week.

A Statistical Return lately published shows that in Germany many women take part in building operations. Among them are 309 masons, 2,000 workers in marble and slate, and 53 roofers.

A Third Version of the *Vierge aux Rochers*, by L. da Vinci, has been sold in Paris, which in some parts is considered to be superior to the painting in the Louvre.

Messrs. Wood & Hutchings have been instructed to prepare plans and to obtain tenders for the Sutherland Institute, Longton.

The Société de Monte-Carlo have employed the new Denayrouze light for the illumination of their buildings and grounds.

M. Maurice Lobre, the painter, has been nominated Chevalier of the Legion of Honour, as a reward of the services rendered to French art in Russia.

The First Ordinary General Meeting of the Surveyors' Institution of the session 1897-98 will be held on Monday, November 8, 1897, when the president, Mr. Christopher Oakley, will deliver an opening address.

A Special Meeting of the Liverpool Architectural Society will be held at the Law Library, Union Court, on Monday next, October 18, at 6 P.M.

The Architect.

THE WEEK.

ON December 2, the two-hundredth anniversary of the opening of the existing St. Paul's Cathedral will be commemorated by a Masonic service. The Grand Master (the PRINCE OF WALES), who will be represented at the ceremony, has granted the necessary permission, and invitations will be sent to all the lodges in and near London. Opportunities will be also given to all lodges in the United Kingdom that desire to be represented. Tickets will be issued only to members of the craft. The Bishop of LONDON has promised to preach the sermon. There is a tradition that Sir CHRISTOPHER WREN was Master of the Lodge of Antiquity, the oldest Masonic lodge in England, which used to meet at a hostelry in the churchyard during the building of the Cathedral. It is believed also that most of the workmen were Freemasons. According to the late Dean MILMAN, the opening of the new building on December 2, 1697, was a glorious day for London, especially a glorious day for COMPTON, Bishop of London, and he might have added for the architect and his subordinates. It had been proposed that King WILLIAM III. should in person attend this ceremony. He was himself anxious to be present. But it was said that at least 300,000 jubilant people from all quarters would so throng the Metropolis that the King could only with extreme difficulty make his way to the cathedral. The City authorities appeared in all their state and pomp. Bishop COMPTON took his seat on his throne, that throne, with the whole of the choir, rich with the exquisite carvings of GRINLING GIBBON'S. For the first time the new organ pealed out its glorious volume of sound. The Bishop preached the thanksgiving sermon. He took for his text that noble song, "I was glad when they said unto me, Let us go up into the house of the LORD."

LORD HERSCHELL'S speech at the opening of the Reading Art Gallery demonstrated that skill in drawing is not necessary for a successful lawyer, and without it a man can become Lord Chancellor. He said that he did indeed try earnestly when he was a boy to draw, but the result did not encourage any further efforts in that direction. The performance was of the most extreme description of Impressionism. He believed he created the impression that he intended to depict a man and a house, but beyond that everything was left to the imagination. But he had found that it was possible, without being an artist and able to create works of art, to be a thorough lover of art. That conclusion will be gratifying to many who have no aspirations towards the woolsock or the presidentship of the Royal Academy.

THE annual report of the Glasgow Institute of Architects, which was read at the meeting on Tuesday, stated that further communications had been received from the Master Plasterers' and Master Glaziers' Associations regarding a proposed revision of the rules of measurement recently prepared, but the Council had not seen any reason to alter the opinion expressed in last year's report that the proposed revision should be deferred for a time. The Council still considered that, however the rules might be modified or amended in the future, it must still be left to architects and measurers to apply them intelligently and to adapt them to changing conditions, and to the varying requirements of different buildings. It was reported that the Corporation of Sheffield had appointed a jury of three members of the Sheffield Society of Architects as assessors to prepare the conditions and adjudicate upon the designs submitted in competition for a public building in that city. The Council trusted that this example would be followed by other important Corporations. In the triennial competition for the travelling studentship prize of 60*l.*, the successful competitor was Mr. GEORGE A. PATERSON, Edina Cottage, Dalmauir. The Council had appointed a committee to consider and report as to a curriculum of architectural education for architectural students. The Council

had been invited to appoint two delegates to attend a meeting called for the purpose of considering the formation of a Scottish Architectural Institute. While the Council felt that in view of the non-success of a former institute of this kind, the proposal was of doubtful expediency, they agreed to appoint delegates to attend the meeting, and the matter was still further discussed by delegates of the four principal societies. The following Council was elected:—Messrs. T. L. WATSON, ALEXANDER PETRIE, JOHN B. WILSON, JAMES M. MONRO, JOHN JAMES BURNET, JAMES A. MORRIS, DAVID BARCLAY, ALEXANDER M'GIBBON, CAMPBELL DOUGLAS, W. FORREST SALMON, A. N. PATERSON, JOHN KEPPIE, H. K. BROMHEAD, JAMES LINDSAY and JOHN L. MURRAY. There are now sixty-six ordinary and nine honorary members of the Institute.

IT is remarkable that no arrangement appears to be feasible in any place in this country to prevent the waste of money which is inevitable whenever a gas or water pipe has to be laid down. When Southwark Street was constructed there was a subway for pipes, but there was no power to compel the companies to make use of it. There was a fear that the Metropolitan Board might seize the pipes. Accordingly the street was scarcely opened when the roadway, which was laid with as much care as an ashlar wall, was torn open to admit pipes. New streets in the Metropolis could not be treated with more indifference by gas and water companies if they resembled the American corduroy roads. But London was for a long period disorganised. That excuse cannot be offered in Edinburgh, where the Corporation, the water trust and the gas commission are at loggerheads as if they were rival companies and at war. A rational arrangement between them is now proposed. It is suggested that whenever the streets and buildings committee of the Corporation intend to take up the surface of a street a request will be sent to the Trust and Commission requesting them to take advantage of the opportunity to overhaul their pipes. On the other hand, the Trust and Commission are expected to inform the streets committee of any contemplated pipe-laying in order that repairs or alterations of the surface should be undertaken. It is not yet settled whether the parties can agree to avoid weakening the streets, for it is well known to paviors that every alteration has an ill effect upon surfaces in which stone is employed. In London repeated efforts were made to bring about a similar co-operation, but without much success. In Edinburgh common sense may, however, prevail.

THE fortieth annual report of the National Portrait Gallery announces that during the past year sixteen portraits have been presented to the Gallery. Among them are John Curwen, painted by William Gush; Sir Henry Holland, M.D., F.R.S., marble bust sculptured by W. Theed; Sir Henry Halford, M.D., painted in 1811 by Sir W. Beechey; Sir John Banks, painter unknown; Sir Richard Francis Burton, painted by Lord Leighton; Sir William Maynard Gomm, painted by James Bowles; Dean Stanley, a miniature; William Morris, painted by G. F. Watts; Coventry K. D. Patmore, painted by J. S. Sargent; Dr. Colenso, painted by Samuel Sedley; Richard Jefferies, a bust in plaster; Thomas Stothard, R.A., by John Flaxman; and Joseph Hume, by C. B. Leighton. Thirty-one portraits were purchased, including William Pitt, first Earl of Chatham, painted by William Hoare, R.A., and Thomas Flatman, painted by Sir Peter Lely; with twelve works by the late George Richmond, R.A., selected and purchased by the trustees from his executors for 100*l.*, namely, Samuel Wilberforce, Rowland, first Viscount Hill, Charles Thomas Longley, D.D., Charles, Earl Canning, John Ruskin, Edward Bouverie Pusey, D.D., Henry Parry Liddon, D.D., Sir George Gilbert Scott, R.A., Sir Robert Harry Inglis, Sir George Cornwall Lewis, Sir Charles Lyell, Cardinal John Henry Newman, D.D., James Bradley, D.D., and David Cox. As there are now 1,085 portraits in the rooms the report says that in a very short time the want of additional room will be still more severely felt, as there are numerous gaps in the historical collection which it is desirable to fill up, and the supply of personages of historical importance in the present or the future does not as yet show any signs of diminution.

THE GREEK COLOUR-SENSE.

BY A CORRESPONDENT.

ACCORDING to the doctrine of the evolutionists, man is a less imperfect animal now than he was at a remote period. Evidence of various sorts is forthcoming in support of that belief. The anatomist, for instance, holds that the bony structure of prehistoric man, as far as can be judged by occasional remains, was more nearly allied to inferior animals than is the structure of modern "subjects." The relative delicacy of the human organs is less easily determined, but as far as can be judged there was a time when not only were the organs of speech incapable of uttering more than a few sounds, but the powers of sight, of hearing, and of smelling were also more limited than among living men. It is needless to say that the amount of proof of these assertions cannot be of the kind which would be necessary to satisfy a jury in a modern law case. If a witness in a trial were to say he was competent to distinguish between colours, it would be easy to test his vision by the process adopted by the Board of Trade when examining sea-captains. His competence to judge musical compositions or perfumes would not be so readily determined; but much could be done towards determining whether the witness was an exception to ordinary men. We cannot judge the powers of the former inhabitants of our world with so much precision. It is well known also that the possession of a delicacy of sense is not enduring, for tea-tasters and judges of wine can be efficient for only a limited number of years, and experts in perfumes have a more brief tenure of power. They are the victims of excess, but there are many causes besides which affect the uniformity of sensibility on the organs of sense. A man who was born colour-blind, or another who became blind through over-study, would not be considered as evidence that optical weakness was universal. In fact, it was only at a recent period that the world became convinced of the prevalence of short-sightedness and colour-blindness. Many a man still living is able to recall punishments which were inflicted on him at school for inattention to explanations of diagrams which he was unable to see, and it is well known that fatal accidents have occurred through unconscious incompetence to distinguish between red and green flags or lamps. For many hundreds of years it was assumed that everybody could see clearly and perceive all varieties of colour. Descriptive writers at all times may therefore be assumed to have taken the average man as their model. WORDSWORTH, for example, was prone to talk freely about himself in his poems, but nobody would imagine from what he says so frequently about the delight offered by flowers that he was deprived of the sense of smell. He suppressed his individual weakness. When, therefore, we find earlier poets and writers expressing themselves in a way which to later knowledge suggests deficiencies, we are not justified in concluding that they were speaking or writing about things as they appeared to a few of their contemporaries alone. They stood for the majority and are to be taken as accurate, although there might be a minority to whom nature was more liberal and to whom their words were not applicable. If, for example, there is nothing said about perfumes as an element in religious services in the oldest Indian ritual, the Rig-Veda, and in the ancient books of other Eastern peoples, whilst they are supposed to be indispensable in more modern rituals of the same races, it is reasonable to conclude that in so remote a period priests and people resembled the English poet, and as a rose under any name did not smell sweetly for them, they could not imagine it would give pleasure to their gods. Or let us take another case. Anyone who listened to a lecture on ancient Greek music, or who heard one of the lately discovered pieces performed, would not believe that the Greeks were far removed from the savage state unless he was acquainted with their history, their architecture and their sculpture. The Greek ear was apparently less sensible or less developed than the Greek eye.

But exquisite as was the perception of form among the Greeks, it is doubtful whether they were as susceptible of differences in colour. The world has a belief in the infallibility of their artists, and consequently much ingenuity has been exercised to soften down the impressions which naturally are made by many descriptions of their chromatic

experiments in sculpture and architecture, as in painting. We are shocked when we read of gods and goddesses with vermilion or cinnabar faces, of beautiful marble columns painted in glaring colours, of paintings with the strangest contrasts. But if we can believe that their colour-sense was most limited if compared with the capabilities of living Europeans, then their obtuseness of sense will not appear so extraordinary.

There is one scale which can be applied to measure the degree of keenness of Greek sight, viz. the rainbow. All the references to it agree in suggesting fewer colours than are now visible. According to one fragment of XENOPHANES the bow is a cloud of purple, red and yellowish green. ARISTOTLE, whose powers of observation were extraordinary, also speaks of it as tricoloured, but the colours according to him were red, green and violet. He adds that sometimes yellow was visible between the red and the green, but explained the phenomenon as if it were one of the fallacies of the senses. The clouds around being dark, he supposed that the red from being in proximity to the green appeared as a lighter tint, and might even be taken for white; if the sky were not sombre there was no deception. It is remarkable that the theory of the Greek physicist should correspond with the belief of the tribes of the North, to whom the rainbow was a bridge in which materials of these colours were employed.

It is doubtful whether red, green and yellow expressed to the Greek mind similar ideas to those which are now connected with the words. In modern German *roth* or red is a generic term, which can stand for a variety of tints, and as for *grün*, it can signify rawness and freshness. The Greeks utilised colour terms with more economy. Some believed there were four principal colours, viz. white, black, red and yellow. But it is doubtful in what way green, which nature spreads so lavishly, was regarded. "Chloros" seemed to be a word that could be made generally applicable so long as it was not used to suggest a field. In the single case where it appears in HOMER in connection with ground, it is supposed to mean a sort of yellow, for it was likewise applied by him to honey, and to men's faces when they were overcome with fear. The "green and yellow melancholy" of VIOLA in "Twelfth Night" would suit the word. The Greeks, moreover, applied it to steel, sand, white wine and so forth. Less vagueness was attached to the word in the time of ARISTOTLE, for the philosopher confines it to the delicate or immature green which is found in plants in spring and to the faded greens of autumn. Some translators of his works render it by the compound "greenish-yellow." At a later period chloros signified a complete green, and became a designation of plants and herbs. The differences in signification are hardly to be explained, unless on the supposition that the eyes of the Greeks in the course of time had undergone some change, and colours were in consequence less hazy.

Dark green, *prasinos*, was another colour which was used to characterise things in common with vegetation which in our time are not described as green. Blue *glaukos* was applied indifferently to a host of greys and blues, while *kuaneos*, which also meant blue, was used alike for human hair and mourning robes. There are physiologists who are surprised by the want of definiteness in the employment of colour terms by men who were generally precise in language. They have explained the peculiarity by supposing that the material world appeared to the Greeks as a mass of lights and shadows, or let us say symphonies in greys, browns and whites, rather than as parti-coloured. An artist in black and white would therefore be able to render a scene as satisfactorily to the Greek mind as TURNER himself. Whether Mr. WHISTLER would also succeed is not improbable.

It was perhaps owing to the difficulty of appreciating, if not of observing, the colours which nature spreads over the earth that there is no record of a Greek landscape painting. The artists were like the majority of their countrymen who did not employ paints. The poets also passed over the scenery amidst which their characters lived or merely made occasional allusions to it for the sake of effect. It was man they were ambitious to describe, and a wall erected by him, especially if the stones were well set, was of more importance in their eyes than the most picturesque hill from which the stone was derived. The animating of rivers, hills and

woods, and endowing them with voices and the power of thinking, is enough to suggest how all things were measured by a sort of human standard. Greek travellers were also as little impressed by foreign scenes as by their native place, and to judge from their description all the world formed a colourless region. So long, as it was fruitful a man need not be dissatisfied, and it was possible to brighten it by a troop in well-polished armour. Thus HOMER speaks of the light from arms flashing to heaven or striking the skies, words which reveal a general dulness in the place of assembly.

It is remarkable that a similar sense of monotony is suggested by writings far older than the "Iliad," viz. the Indian hymns. By instinct or ignorance, in the East as elsewhere, man appears to have looked to the sky for manifestations of extraordinary effects. But in the hymns, it appears, there is not a word which is evidence that to a sun-worshipper the sky appeared blue, or that the azure canopy "fretted with golden fires" impressed them with its grandeur. In Northern Europe the sky appeared to the poets as black, which is equivalent to saying it was colourless. According to some etymologists the German word *blau* originally stood for black. Enough passages could be quoted from Latin literature in proof that among the Romans it was not impossible to confound black and blue.

As we have already suggested, we are not able to consider the physical qualities of a past generation except, as it were, through a glass darkly. Two alternatives are placed before us. First, the men who made use of the names of colours in a loose way were either deficient in language, like some partly civilised people now living, or were colour-blind; or secondly, their eyes were less sensible to variations of colour. We cannot suppose that the earth and sky were different from what they now appear. The solution must, therefore, be sought in the observers. As the Greeks were not likely to allow themselves to be deficient in words to describe things which were worth naming we cannot ascribe the absence of allusions to colours to the poverty of their language. We are therefore compelled to suppose that the cause was either indifference to colour or the possession of vision better adapted to take general views than to observe the elements of colour which were combined in all created things. The Greeks could be almost as analytical as the men of a later time, and sometimes carried the process to extremes. In colour and colour alone their strength failed them. The eye can see, we are told, all that it brings the power to see; but whether with the Greeks it was mental or physiological power they were deprived of, or more probably both, is a question which for the present, at least, must be left to conjecture.

ELECTRIC TRAMWAYS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from page 245.)

Open Conduit Systems.

THESE systems next claim attention, as many have been proposed, and they have been tried in England, on the Continent and in America, especially the latter.

The general principle is that of the third rail, which is in this case below the surface of the road, contact with it being made by means of a plough fixed to the car and passing through a slot in the road.

The chief difficulties which have to be contended with are undoubtedly those of insulation, the inaccessibility of the conductors making any fault exceedingly difficult to repair, and also the fact that the conduit becomes a drain for surface water in storms and a receptacle for dust, &c. in dry weather.

It will, I think, be sufficient here to give a description of one of the latest systems, the "Simplex," which has been brought out by an English company of high standing.

In most conduit systems the conductor has been fixed, the connector being flexible; in this one the connector is fixed to the car and the conductor is flexible, being merely supported on hooks which are insulated.

The conduit is quite a small one, being about 8 inches wide and 12 inches deep, and is placed under one of the

rails. The rail under which the conduit is placed consists of two ordinary double-flanged rails (not tramway rails), which are supported on iron brackets fixed into the conduits. There is a space between the two rails which serves for the slot in the roadway. Each insulated hook which supports the wire is placed in a box on the inside of the rail. This box enables each insulator to be examined, and there is nothing in the conduit between each box except the conductor. The conduit is made of concrete, and there is a connection to the surface-water drain at each insulator box. These latter are about 30 feet apart. The slot between the two rails is about 1 inch across at the top and $\frac{3}{4}$ of an inch at the bottom.

There is thus a conductor simply resting on a series of insulated hooks at distances apart of 30 feet on the straight, and more frequently at curves. The next and most essential point is the straining device which keeps the wire taut. This is arranged to take up any slack due to variations in temperature or other causes. The straining device is so arranged that, while it keeps the wires stretched, it also can be lifted by the collector as it passes the junction. Thus the conductor is kept continuous and flexible. The straining apparatus at points is rather different, as the conductor is discontinuous, one end being fixed at a level a little higher than the collector level. Thus the collector leaves the conductor at points, &c. As, however, there are two collectors the continuity is maintained, the foremost one again making contact with the conductor before the hinder one leaves it. The electrical continuity of the line is maintained by an insulated conductor laid in a separate conduit.

The collector is, as before mentioned, rigid, while the conductor is flexible. The working part of the collector is U-shaped, and the cable makes contact in it. The collector is about 12 inches long and is bevelled down at the ends. As it passes along the conductor is lifted from the insulated hooks and is dropped down again behind. The great advantages of this system are that every insulator is accessible; the collector is extremely simple; there is absolutely nothing between the boxes in the conduit except the conductor, and that this latter can be drawn out from the boxes and a fresh piece be drawn in at once if a breakage occurs.

The usual difficulties with mud and moisture are, of course, met with, but there is no doubt that the great simplicity of the arrangement would admit of this being overcome to a great extent by a brush or plough fixed to the collector, or by periodical flushing. There would be no danger in the latter case of affecting the insulation, as the insulators, being accessible, could be wiped if the moisture reached them.

There is an experimental line a quarter of a mile in length with points and gradients at work at Prescott, and the results are said to be excellent. The cost of constructing this track is said to be only half as much again as the ordinary horse tramway, and if this is the case it will have a great future in the places where overhead wires are prohibited. It would, in fact, be a very serious competitor to the accumulator system.

There are many other conduit systems in use, including the Holroyd-Smith at Blackpool, the Siemens and Halske, and the Thompson-Houston; but, generally speaking, they are very expensive to construct and unreliable in working. It may be mentioned that the Blackpool line is about to be converted to the trolley system. However, there is no doubt that these systems have not yet had their last trial, and the impression concerning them is somewhat similar to that in connection with accumulator traction, viz. that the demand is ahead of the supply, and for that reason the supply must be forthcoming sooner or later. Whether the fixed collector or the flexible will survive it is difficult to say.

Surface Contact or Closed Conduit Systems.—This branch of the subject has attracted more inventors, perhaps, than all the others together. The distinctive feature of this system is, as before mentioned, that there are neither overhead wires nor slots in the roadway. The conductor is buried in a closed conduit, contact being made with the car by surface studs, &c. As a general description has already been given, a description of a particular example may be of interest.

The Westinghouse is a system which, if it does not prove entirely successful in itself, will certainly give a very good idea of the requirements of closed conduit systems.

The only visible apparatus is the contact stud in the roadway between the rails, and these studs are connected to the main cables by means of wires buried in the ground, through automatic switches which are placed in boxes at the side of the track. In one form there are three contact studs arranged triangularly on the track, each being about 4 inches in diameter. The studs are made of wrought-iron, slightly rounded on the surface, being fitted into an earthenware block with connections laid in pipes from them to the boxes. Two of the studs are for the purpose of leading the current to and from the motor. The other one, the auxiliary, is for working the mechanism. The distance between each set of studs is about 13 or 14 feet, but of course this can be increased if the car is long. The action of the apparatus is as follows:—Underneath the car three iron bars are suspended, so that while they touch the surface of the studs they do not trail on the road. Each is a little longer than the distance between the studs. Now one of the bars touching the auxiliary stud causes a current to flow from a small storage battery in the car through the stud into the switchbox, where it passes round the shunt winding of an electromagnet, causing it to attract an armature. This connects one of the other two studs to the main wires, and enables the current to enter the car through the two collector-bars. This armature has on it a carbon contact which is brought into connection with another and similar one; the current passes from the positive cable through the armature and contacts to a series coil, which further strengthens the magnet when current is flowing, and renders any discontinuity of current impossible. The end of this coil is connected to the positive stud, and the negative stud is always connected to the negative main. In the other form the negative cable is connected to the rails, and in this case there are only the auxiliary and positive studs on the road.

When the bars leave the studs, both the series and shunt coils are rendered inactive and the armature falls, disconnecting the positive stud entirely.

The arrangement of the box is excellent, as regards insulation and prevention of moisture and dirt affecting the contacts, &c. The working parts are enclosed in a bell-shaped case which dips into an oil seal, thus effectually preventing the entrance of moisture or dust.

The great advantages of this system are that the apparatus is very positive in its action, all the apparatus can be easily inspected, the current cannot be switched on without the application of an auxiliary battery, which renders it very safe. The only danger is that the armature may not fall. This could easily be provided against, or at least its effect could, by having a trailing contact on the car which would ring a bell, or switch off the motor, or otherwise call attention if the pressure should by any means be left on the stud after it leaves the contact bar. This trailing contact could be connected to the negative contact bar, so that the main would be short-circuited and the contact be permanently disconnected by the blowing of a fuse if the above eventually occurred. If some such precaution were taken this system would be absolutely safe. The cost of this system is said to be much lower than that of other closed conduit systems, as there is really no conduit; the excavation needed is only a foot or so, and the cables may be buried direct in the ground.

Combination Systems.—There are, in addition to the systems already mentioned, cases where various combinations are used. The reason for such combinations is usually the fact that overhead wires are used in the suburbs and are not allowed in the town. Thus the combinations are nearly always those of overhead and other systems.

The useful combinations used, or suggested, up to the present are:—

1. Overhead and third rail.
2. Overhead and accumulator.
3. Overhead and surface contact.
4. Overhead and conduit.

The overhead and third rail has already been discussed in the case of the Bessbrook and Newry Tramway.

Overhead and Accumulator.—This combination has been used with great success in Hanover, where the municipal authorities refused to allow overhead wires. The accumulators are carried on the cars permanently,

charged by the current from the overhead wires in the suburbs, and discharged when the overhead wire is discontinued during the run through the town. At the beginning of 1897 the total mileage of track was 23·4 miles, of which 10·6 miles were worked by accumulators alone. The charging takes place over parts of the track, the length of which varies from $1\frac{1}{2}$ to $4\frac{1}{2}$ miles, the discharge being from 3 to 7 miles. The accumulators are placed under the seats, the cells numbering 208, the boxes being constructed of vulcanite, and the weight of the batteries is said to be $2\frac{1}{2}$ tons. The method of charging the cells appears to be as follows:—The cells are connected to the line first in two halves, paralleled, the current being regulated by means of a variable resistance. When the motor is to be driven from the battery the cells are put in series. Careful tests have been made of the running on this line, with the result that the efficiency of the battery was found to be 74 per cent., while the economy of the central station was found to have been very considerably increased. This latter result is due to the fact that on the trolley line the battery acts as an equaliser, keeping the current more even on the dynamos and keeping them working more economically. For instance, on mounting a gradient the energy which had been going into the cells goes to the motor, the total load being increased comparatively little. The amount of fuel used per car mile has been decreasing steadily as the ratio of "accumulator miles" to "trolley miles" has been increasing, thus practically proving that the system is more economical with than without the accumulators. The cost of maintenance of the battery appears to be very low (16*d.* per accumulator kilometre). The total cost per car kilometre works out at 6*d.* after allowing for interest, depreciation and attendance. It is also estimated that the total cost is less than $\frac{1}{4}$ *d.* per car kilometre above that if all the line were on the trolley system. This system has, it will be seen, been very successful and could no doubt be used with economy in England for towns having suburbs, &c. However, this system does not strike one as being the final one, especially as it is now stated that the system is about to be converted to accumulator traction altogether.

Other Combinations.—With regard to the combinations 3 and 4, the surface contact one presents no difficulties. When the end of the overhead wire is reached the trolley is clamped and the collector bars let down, and it would not be even necessary to stop the car. In the case of a conduit system more difficulty is met, owing to the fact that the plough must either be removed from the conduit or disconnected from the car. Either arrangement must cause some delay, which would be serious on a busy line. There is, however, no difficulty which is insurmountable.

Generally speaking, either of these two latter systems are preferable to accumulators when the gap to be bridged over between the trolley wires is short, as the cost of the accumulators would be too much, and the loss due to carrying the accumulators over a long distance of trolley line proportionally too much.

(To be continued.)

LIBRARY CONSTRUCTION.*

PEOPLE who patronise libraries, especially those which are public, expect to have enjoyment at the expense of others, and we are unable to imagine how a "Library Series" like Mr. ALLEN's can pay him. Copies may be obtained for the use of those to whom a library is a gratuitous club, but there are hardly enough public institutions of the kind in Britain to exhaust an edition. Mr. ALLEN, like some other publishers, probably imagines that when a volume of his series enters a library its merits will be recognised immediately, and everybody who sees it will hasten to purchase a copy. That is a delusion. A public or society's library might be defined as an obstacle to the sale of books, for it is well known that people who are not poor will spend days or weeks waiting for an opportunity to obtain a loan of a volume rather than pay a shilling or two for its possession.

* *Library Construction, Architecture, Fittings and Furniture.* By F. T. Burgoyne M.A. (London: George Allen.)

It is not our mission to take charge of the interests of publishers or booksellers, and how can an architect desire to see the series gain success if all the volumes are to be enriched with introductions resembling one which appears in the volume before us? The writer is Dr. RICHARD GARNETT, who edits the series. He is a gentleman of fine character, and there is nobody in England who is more influential as an authority on administration with librarians. But unfortunately Dr. GARNETT is not proof against the prejudices of the time, and, like experts in various professions, he does not value the co-operation of architects at the high rate it merits. Every one who is acquainted with architects knows that when designing libraries they are only too glad to have the help of specialists and of local specialists, for the arrangements which will suit one part of London may fail elsewhere in the Metropolis and become impracticable if introduced in a country town. Dr. GARNETT, however, considers an architect to be no more than a façade-maker who is employed because library committees and others are unwise. Here is one passage from the introduction:—

The same architect is equally ready to turn out a church, a library, a theatre, or a bank. It is inevitable that in the absence of special knowledge of and special devotion to a particular style of edifice, the sentiment of architectural display should gain the upper hand. Hence a continual conflict between the architect who desires a handsome elevation, and the librarian who aims at practical convenience, frequently determined by a committee endowed with no great feeling for either. Parodying a famous saying, it may be safely affirmed that this state of things will continue more or less until architects are librarians or librarians architects.

Dr. GARNETT is hardly the man to condemn the versatility which makes the designing of various buildings a possibility. He also lays claim to a like quality, for his name appears on the title pages of books on various subjects. It is not perhaps so difficult for an architect to design four or five kinds of buildings as for a *littérateur* to write verse and prose, translate, and lay down the law on art. But we need not apply the *tu quoque* in this case. It is more satisfactory to be able to state that Mr. BURGOYNE, the author of the book, does not take the same view of the aid given by architects as his editor. He tells us that Sir THOMAS DEANE & SONS carried out the librarian's arrangement of floors and book-cases in the National Library in Dublin. All he desires for the central library in Bristol, if one should ever be erected, is that the plans will be as successful as those of Mr. GOUGH's branch library. By Mr. HOSKINS's planning at Darlington the work of supervision is said to be materially reduced. As much is affirmed of Mr. ADAMS's library at Shepherd's Bush. The variety of plans which Mr. BURGOYNE introduces manifests at a glance the desire of the architects to avoid stereotyped arrangements, and to produce buildings which will be convenient to visitors and lighten the work of the officials. If objections are raised, as when buildings are too small, the architects cannot be considered as the culprits, but in not one case do we find Mr. BURGOYNE referring to a conflict between architects and librarians, or to any sacrifice of practical convenience to a handsome elevation. The descriptions, plans and other illustrations are the most effective refutation of Dr. GARNETT's allegations against architects.

Mr. BURGOYNE is the librarian of the Tate Library, Brixton, and has every day opportunities of considering an important problem. In the old days, as he says, the "librarian's chief duty was to preserve his books from assaults of would-be readers, instead of acting as a key to unlock the stores of his library." The ancient librarian could, however, with tolerable accuracy gauge the character of his enemies, but in the miscellaneous company that now invades a library there is a strange variety of readers. In some suburban libraries a party of householders will practically transform a reading-room into a private club, and outsiders can perceive they are not welcome. Borrowers of books for home reading are generally patient, but in districts where liveried footmen come from carriages outside it is expected that patronage will be rewarded by expedition and priority. There are libraries where borrowers can select the books they desire from the shelves; elsewhere a privilege of that sort would quickly diminish the stock. It is not easy to foresee how all interests are to be

met. Then, again, the accommodation for an increase of books cannot be based on any uniform calculation. Between 1875 and 1895 the stock in Birmingham increased from 57,081 to 155,633, but in Cardiff the increase was from 8,310 to 55,080. In Manchester 61,213 books were issued in 1875, while in 1895 the number was 416,100; in Liverpool the respective numbers were 517,393 and 619,259. In 1885 more books were issued in Liverpool than in 1890 or 1895. A librarian's temper must be often tried in endeavouring to meet the fluctuations, and it is no wonder if he sometimes grumbles at the inadequate space which the architect provides. A modern public library is one of those buildings which can never be perfect until elastic materials come into fashion, or they are so constructed as to be compressed or expanded at will.

Mr. BURGOYNE would have the site of a library as central as possible, but in a position where the noise of traffic should not distract the students. A corner site is preferred. The building should contain "a reference department, a lending department, a reading-room or rooms for newspapers and magazines, working rooms for librarian and staff, separate reading-rooms for boys, girls and women, an inner room for students, lecture-hall, museum and art gallery, residences for librarian and caretakers, strong-room, and rooms for binding and repairing." The public rooms are not to exceed two storeys in height unless there is a ventilator. A corner site with an area of 10,000 square feet will accommodate, says Mr. BURGOYNE, 150 readers of newspapers and magazines, a lending library of 50,000 volumes, a reference library of 150,000 with 100 readers, with offices for staff. No less important is the question of shelving. French and English ingenuity have produced most economical arrangements in metal, and TONKS's fittings obtain due praise. They are most effectual. Mr. COTGREAVE, of the West Ham Library, has devised numerous helps in the form of indicators, racks, steps, &c. But it would be vain to attempt to suggest the contents of Mr. BURGOYNE's volume in the compass of an article. His "Library Construction" will be found most suggestive to architects, and his descriptions become more clear by means of 140 illustrations, which are of a practical kind and are produced in excellent style. Altogether the book impresses the reader as the work of a man of business whose time is precious, and who believes that his readers resemble himself.

LISKEARD CHURCH TOWER

AT Liskeard Town Council on the 12th inst., Alderman Lang inquired what powers the Council possessed in dealing with dangerous buildings. As was well known, the tower of Liskeard Church was a source of great danger, and in his opinion there was no other way to deal with the structure than to remove it. Before very long, they might depend upon it, the tower would come down. What powers did the Council possess in the matter?

The Town Clerk (Mr. H. Lyde Caunter) thought if the tower was shown to be a source of danger to the public, the usual clauses of the Act of Parliament would apply, and the borough surveyor would have power, after due notice, to remove it. That was the law relating to ordinary buildings that were shown to be dangerous; he did not know whether the fact of the tower being an ecclesiastical building would make any difference.

Mr. Lang: I think the surveyor's attention should be called to the condition of the tower.

Mr. Husband said the subject was discussed at a meeting of the sanitary committee last week, and notice given to remove a dangerous stone on the top of the tower, forming one of the battlements, which might come down at any moment.

Mr. Henwood: It is a question whether the Town Council and not certain parties at Truro are not responsible for the safety of the public.

Mr. Lee believed notice had been given to a large number of seatholders at the west end of the church to remove for their own safety.

Mr. Husband thought it was deplorable that the present state of things should be allowed to exist, and although a vestry meeting had been called, it was right and proper the members of the Council should voice the feelings of the public. He called it a downright shame that the church people of Liskeard should not be allowed to manage their own business in their

own way. In the interests of the public, and especially as church people had been requested to remove their seats for their own safety in church, steps should be taken to remove the dangerous building.

Mr. Lee suggested whether a resolution sent to the Ecclesiastical Commissioners would not have some weight.

Mr. Henwood thought it was very much to be regretted that the people of Liskeard could no longer hear the lovely church bells.

Mr. Colmer failed to see why the tower should not be treated in the same way as the dangerous buildings belonging to private individuals.

The Mayor said before they could take steps in the matter the borough surveyor must certify the building to be dangerous to the public. The surveyor had inspected the tower, and the only part he reported dangerous was a stone on the top.

Mr. Husband: I propose the surveyor be asked to examine the tower and report.

Mr. Colmer: And pronounce it to be dangerous to the public safety.

The Mayor: You must leave the judgment with him. You must not be his "assessor."

Mr. Henwood: The tower has become more dangerous according to recent examinations.

Mr. White seconded Mr. Husband's motion, which was unanimously adopted.

The parishioners of Liskeard were on Thursday evening, the 14th inst., summoned by the vicar and churchwardens to a special vestry in the Guildhall, to receive the judgment of the Chancellor of Truro refusing to grant a faculty to take down and rebuild the tower of Liskeard parish church, the tower committee's report on the same, and to determine thereon. The vicar (Rev. J. Norris) presided, supported by the churchwardens.

The Vicar regretted the necessity of their meeting that night, and while confessing temporary failure and asking the parishioners what they would like him to do in the future, he felt pretty certain that the people of Liskeard would show the same spirit voiced in "Trelawny," where they sang that "Twenty thousand Cornishmen will know the reason why." It would be necessary to speak plainly, but, he hoped, soberly and with full moderation of the treatment they had received. In the first place, they invited a gentleman to come to Liskeard and make an examination of the tower of the church, and agreed to pay him seven guineas for his labours. He (the Vicar) knew nothing of his coming, and only knew, when too late, that he had come and gone. He gave them a very elaborate report and described the tower carefully and properly—they would give him all the praise they possibly could—but how Mr. Prynne came to his conclusions about the foundations, the nature of which he had never ascertained, he was at a loss to know. In the next place, they applied for a faculty, plans having been previously prepared (in accordance with the requirements published in the "Diocesan Kalendar") at an expense of about 80*l.*; the citation was duly published and no opposition was lodged, not even by the Society of Antiquaries or the Royal Institute of British Architects. The first letter from the Chancellor of the Diocese gave them an indication of what they might expect in the future. Mr. Prynne told them the tower was in a dangerous condition. Mr. Sedding corroborated that statement. The Chancellor made a mistake in one of his letters, in which he stated that Mr. Prynne said the tower must be taken down. Mr. Prynne never said anything of the kind. Mr. Prynne had been opposed all along to pulling down the tower. Mr. Sedding reported that the only conservative way of dealing with the tower was to take it down and rebuild it. On May 17 last the Chancellor wrote that if they would take down the present tower, and rebuild it precisely, he supposed, on the same lines, he would grant them a faculty. They could not carry out that scheme, although he candidly and fearlessly confessed that it was a wiser and better scheme than the one proposed by Mr. Prynne. Certainly no architect would have undertaken to carry out such a proposal as the Chancellor made, and besides it would have prevented their obtaining the 1,000*l.* left by Miss Pedler. That legacy—he was not going to shut his eyes to the fact—was a strong incentive and encouragement to the rebuilding of the tower. On May 24 again the Chancellor was prepared to grant a faculty for the pulling-down of the tower and rebuilding it, provided there was no departure from the general design of the present tower. That was a wiser decision than his previous suggestion to re-erect the present tower, and he (the Vicar) did not know whether they were quite wise in refusing that offer. He rather thought they were unwise. Certainly they had not the worldly wisdom, but it must be remembered they had another gentleman to deal with—the architect of the church, who rightly or wrongly deliberately stated that he would not, on any ground, reconstruct the tower or change it in any way. Therefore they could not deal with the question as, perhaps, some of them would have liked. Then came a deadlock. They could not see their way to fall in with the wishes of the Chan-

cellor, because they wanted the tower built according to Mr. Sansom's plans. The bishop and himself had several letters, and he dared say they crossed swords a little bit, for which he was very sorry; but he felt he must be honest and straightforward, and he told his lordship that his first interest was in, and his first duty towards Liskeard—that he must study the town in which he lived and the church of which he had charge. The bishop was exceedingly nice, and at his suggestion the archdeacon was called in and gave them his best counsel, advising the committee to ask the Chancellor to reopen the case with an assessor and expert of his own choice and selection. He told the archdeacon that he could not be a party to that, that he had no confidence in it, but he was willing to stand aside if the committee thought it the best course to pursue. The reins were taken up by the churchwardens, who did their best to steer the boat from the rocks and lead them safely into the haven. He asked the question, Was it fair, after the churchwardens had placed implicit confidence in the Chancellor and allowed him to select a gentleman to whom they agreed to pay twenty-seven guineas—was it fair he should have appointed a Fellow of the Society of Antiquaries? He did not think it was fair; he told the archdeacon and the bishop it was not fair. It was a most unfair thing to do. As to the Chancellor's judgment, it seemed to him that Mr. Paul, when he got to a certain point, found he had been writing everything for Liskeard and nothing against it, and that he had then quickly thrown overboard Mr. Sedding, Mr. Lang and others, and brought forward the statements of Mr. Ponting and Mr. Prynne, and so refused the faculty. But when he (the Vicar) was beaten he did not know it; if he got knocked down once he tried to get up and have another go. He was determined to fight to the last moment, and so far as he was concerned, there would be no repairing or patching up of the tower. The tower might stand as long as it could, or fall down as soon as it could, but he would be no party whatever to any patchy or botchy work for the repair of it at a cost of 800*l.* or 1,000*l.* The advice he had to give was that they put their shoulders to the wheel and promise to do what they could to raise the 2,000*l.* That was the safest way, he thought, to proceed. Let them have the promises of the money and go forward with the work. Let them notify the executors of Miss Pedler's will that they had raised 2,000*l.*, and if they found they could not go forward they would not require the money. The Vicar read the following encouraging letter received from Rev. G. E. Tate, of Widcombe Manor, Bath, senior member of the Simeon Trustees, the patrons of the living of Liskeard. It was dated October 13, as follows:—

"You have been very hardly dealt with at Liskeard and put to unnecessary expenses, which must cause in the parish considerable irritation. I entirely sympathise with you, and feel that the Chancellor has made a great mistake in refusing a faculty. However, you have done your best for the church along with the bulk of your parishioners, who have co-operated with you. I am truly sorry for them and for you, but you must not lose heart. It may yet be overruled for good. The Chancellor would evidently force you to restore the tower if he could, but if the present strong local feeling continue, he will find out his utter inability to do so."

The letter was received with applause. The vicar also read a reply he had sent to the Society of Architects, wherein he stated that the least the Society could have done was to have sent a gentleman to judge the merits or demerits of the tower without prejudice.

Mr. S. Bone proposed the first resolution:—"That this meeting of parishioners, in vestry assembled, has received the refusal of the Chancellor of the Diocese to grant a faculty for rebuilding the tower of the parish church with great sorrow and regret."

The resolution was carried unanimously.

Mr. W. Hammond moved, "That notice of appeal against the Chancellor's decision be lodged at once, and that a fund be started to cover the preliminary expenses and also any costs incurred by the committee for legal and other necessary purposes."

Mr. T. Peters seconded.

Mr. L. C. Foster proposed an amendment and said he was afraid he represented a minority of one. The Vicar had said he did not know when he was beaten—that when he was knocked down he got up and tried to hit again. That was not his feeling at all. He advocated a certain course at a previous vestry and was beaten. He then said he would do nothing to oppose, although he could not assist, and he and his family had loyally kept to the promise. His position was this. Miss Pedler in 1885 understood that the tower must come down, and she gave 1,000*l.* (provided another 2,000*l.* was raised) to pull it down and rebuild it. The vestry then set to work to get the money, applied for a faculty, and the law stepped in and said they must not do it. Therefore he thought they had very good ground for trying to set that portion of the will aside which said they must not apply the money in Liskeard for any other purpose. He proposed as an amendment, "That this vestry

instruct the churchwardens to approach the executors and trustees of the will of Miss Pedler, and those having an interest in the residue, with a view to obtaining legal power to use the legacy of 1,000*l.*, or some portion of it, towards the restoration of the tower, instead of rebuilding." Addressing the people, Mr. Foster said it was not necessary for them to hiss, as he was at liberty to have his opinion. He thought they had in Liskeard three pressing calls which they ought to respect before they gave themselves the luxury of a new tower. The parish got 60*l.* a year from a farm on which there was a cottage which one of the churchwardens, who was medical officer of health, said was unfit for habitation. They ought not to take 60*l.* a year from a farmer until that cottage was rebuilt. Another thing was that the churchyard should be enlarged, and they frequently heard that the money the Vicar received was not sufficient, and they might augment the living.

Mr. Husband seconded the amendment.

Mr. Borlase Childs defended the Chancellor of the Diocese, who was a personal friend of his, from any imputation. He did not conceive Mr. Paul had been influenced improperly by any living soul, least of all by a party at Truro. Mr. Paul was a man they could not buy. He was sorry for the mistake Mr. Paul had made as a friend, a man, a Cornishman, and a lawyer—because he was wrong in his law. Let them be fair all round. Mr. Paul had tried to do his duty and signally failed, but he gave him credit for good intentions. Mr. Foster had his esteem and regard, but he had wandered from the flock, and it was to be hoped he would see the error of his ways and come back again. He supported the motion, and reminded them that if they did not appeal the judgment of a court of law was against them, and he was distinctly of opinion that the 1,000*l.* was lost to Liskeard. Had a faculty been granted, they would have had no trouble in raising a sufficient sum to rebuild the tower. The court being against them, it seemed clear to him they could not claim the legacy, and the raising of 2,000*l.* was no good at all. He advised them, therefore, not to adopt Mr. Foster's amendment. In 1878 Mr. Foster appealed for funds for rebuilding the tower.

Mr. Foster: I wish you would speak to the amendment.

Mr. Childs: I cannot dissociate the amendment from yourself. When a gentleman shifts his position—

Mr. Foster: I have never shifted my position.

Mr. Childs: If not your position, you have shifted your ideas. In 1878 you asked for funds for rebuilding the tower.

Mr. Foster: Pardon me—

Mr. Childs: There are printed documents to prove it.

Mr. Foster: I signed the appeal as secretary of a committee. It was my duty to sign it, just as I signed the application for a faculty as a churchwarden.

Mr. Childs: Then come back and sign your name once more. I would not say one word to hurt your feelings, but the question before us is a public one. Continuing, Mr. Childs said they meant to build a new tower if they could. It had been said that they were dreadful fellows, desiring to tear the tower to pieces. He emphatically denied the allegation. They desired to carry out what Mr. Sedding had suggested, a scheme of conservative craftsmanship.

Only two voted for the amendment, and the motion was carried.

The tower committee were reappointed, with power to add to their number; and thanked for their past services.

PHOTOGRAPHY AND EXPLORATION.

A LECTURE was given on the 14th inst. by Professor Flinders Petrie at the Camera Club on "Photography, the Handmaid of Exploration," but the lecture was different and better than its title promised. There were three distinct interests in it—a photographic interest, an archaeological interest and a topographical interest. The simplicity of the Professor's apparatus and methods astonished members of the club. His camera is a home-made, tin-plate contrivance that can be dropped on rocks with impunity; his drop-shutter is made of pieces of milk tin and of blind lath, and he never troubles about a dark-room. Yet if members of the club were scandalised by the means they could not do other than rejoice over the results. Low desert hills covered with flints, enormous valleys without a green leaf, the swollen Nile, limestone plateaus 1,400 feet above the river and commanding a horizon fifty miles away, pleasant groves of young palms, bashful Egyptian girls, men with their eyes screwed up because of the sun—these and other things were thrown upon the screen amid the applause of an audience of experts. Every detail was sharply shown, thanks to the bright sunshine and the photographer's skill. He explained that the difficulty was to get plates that were "slow" enough. The most interesting part of the lecture was the part of it dealing with Professor Petrie's work as excavator, explorer and scholar. He displayed and described some of the many important discoveries he has made in Egypt during recent years.

Several statues were shown of which the date is 3500 B.C. Digging his way through a cemetery of 150 tombs, he came upon a basket, some wooden mallets and a chisel that one of the workmen had left behind. The astounding thing (to the audience) was that the basket, with pieces of palm rope attached, should have survived in an absolutely unimpaired condition since 3500 B.C. To the lecturer there was, however, nothing astounding in the circumstance. He as good as said that anything kept air-tight in dry sand would exist for ever. Photographs were shown of skeletons dating probably from 5000 B.C. There was no injury; the whole cage of ribs, in their original articulation, remained united to the spine. Among the Professor's "finds" were spoons and harpoons of ivory, possibly belonging to the pre-historic ancestors of the Egyptians; ivory combs, with animals carved at the apex, which the Egyptian ladies of long long ago must have found invaluable for keeping together their thick, brown, wavy hair (Professor Petrie has found some of that too); a death-mask from the capital of that king who worshipped the rays, as distinguished from the ball, of the sun; a marvellously beautiful piece of sculpture; a tablet, 1200 B.C., with a unique reference to the subjugation of the Israelites; and a papyrus version of part of the second book of the "Iliad," with marginal notes. What particularly struck some members of the club was the portion of a frieze showing two naked princesses attending a court function. The flesh had been done in ruddy brown, and white particles had been powdered on to indicate where the sunlight had caught the skin—the earliest known example of light and shade. "You will notice," said the lecturer, "that the elder girl has drawn up her knees with some dignity, and that she is chucking her little sister under the chin."

SMOKE-DUCTS IN ANCIENT HOUSES.

THOSE passages of the ancients which speak of smoke rising up from houses have with equal impropriety been supposed to allude to chimneys. Seneca says, "Last evening I had some friends with me, and on that account a stronger smoke was raised; not such a smoke, however, as bursts forth from the kitchens of the great and which alarms the watchmen, but such an one as signifies that guests have arrived." The true sense of these words undoubtedly is that the smoke forced its way through the kitchen windows. Had the houses been built with chimney funnels, there could be no cause for alarm; but as the kitchens had no convenience of that nature, an apprehension of fire when extraordinary entertainments were to be provided seems to have been well founded, and on such occasions people were stationed in the neighbourhood to be constantly on the watch to extinguish the flames in case a fire should happen. There are to be found in Roman authors many other passages of a similar kind. Aristophanes, in one of his comedies, introduces his old man, Polycleon, shut up in a chamber whence he endeavours to escape by the chimney. This passage may readily be explained, when we consider the illustration of the scholiasts, by a simple hole in the roof, as Reiske has supposed; and, indeed, this appears to be the more probable, as we find mention made of a top or covering with which the hole was closed. It has been said that the instances of chimneys remaining among the ruins of ancient buildings are few and that the rules given by Vitruvius for building them are obscure; but it appears that there exist no remains of ancient chimneys and that Vitruvius gives no rules, either obscure or perspicuous, for building what, in the modern acceptance of the word, deserves the name of a chimney. The ancient mason-work still to be found in Italy does not determine the question. Of the walls of towns, temples, amphitheatres, baths, aqueducts and bridges there are some, though very imperfect remains, in which chimneys cannot be expected; but of common dwelling-houses none are to be seen, except at Herculaneum, and there no traces of chimneys have yet been discovered. The paintings and pieces of sculpture which are preserved afford as little information, for nothing can be perceived in them which bears the smallest resemblance to a modern chimney. If there were no funnels in the houses of the ancients to carry off the smoke the directions given by Columella, to make kitchens so high that the roof should not catch fire, were of the utmost importance. An accident of the kind, which the author seems to have apprehended, had almost happened at Beneventum, when the landlord who entertained Mæcenas and his company was making a strong fire in order to get some birds the sooner roasted. Had there been chimneys in the Roman houses, Vitruvius certainly would not have failed to describe their construction, which is sometimes attended with considerable difficulties, and which is intimately connected with the regulation of the plan of the whole edifice. He does not, however, say a word on the subject; neither does Julius Pollux, who has collected with great care the Greek names of every part of a dwelling-house; and Grapaldus, who in later times made a collection of the Latin terms, has not given a Latin word expressive of a modern chimney.

NOTES AND COMMENTS.

THERE are fewer pictures than usual in the exhibition of the Institute of Painters in Oil-Colours, but the attractiveness is not thereby diminished. The four hundred and five works can be seen without discomfort, and that is an advantage. The President's *Rest* appears to be another of his costume portraits. The woman wears conventional robes, which allow the nude arms and feet to be seen, but, unlike her predecessors, she is seated beside a river that resembles one of the upper reaches of the Thames. As usual, every part is worked out with much deliberation. Mr. G. F. WATTS is one of the honorary members of the Institute, and he contributes this year *A Study*, which is valued at 630*l.*, a sum that appears stupendous to frequenters of the gallery. It is a portrait of a girl in red, and the background is also red. It is vigorously painted, but will hardly rank as one of the great works of the master. There are some ambitious figure pieces. Mr. KENNINGTON, in his *Cephalus and Procris*, has taken a hint from the history of Greek art. The grief of AGAMEMNON, it is said, was concealed in the old picture by a veil, and we are unable to realise the wonderful beauty of CEPHALUS, of whom AURORA was enamoured, for his face is completely hidden. The Greek princess appears to be sleeping rather than slain by her lover's arrow. But with all shortcomings the picture attains the highest standard reached by the artist. M. FANTIN LATOUR has a *Diana*. The goddess is reposing in a wood, and is of an English type. *Fortune's Favourite*, by Mr. LOMAX, is a gambling scene in which a youth is winner, and it tells its story without any straining after effect. Mr. MORGAN'S *Jack Ashore* shows the British tar with children. Mr. STOCK'S *Humiliation* (an *Ecce Homo*) would be more satisfactory if the surrounding demons were omitted. Mr. FRANK DADDS'S *Track of the Matabele*—some troopers with natives looking at a skeleton on the ground—has the qualities which gain popularity. *The Signal*—a Highlander on a rocky point overlooking a lake and sounding a pibroch—by Mr. J. W. NICOL, is one of the most effective illustrations of a subject that might easily be made commonplace. Mr. WALLER has a capital charge of the *Inniskilling Dragoons* at Tournay, in 1794.

THE landscapists are in force this year. Mr. COTMAN never produced a more satisfactory work than his *Rainy Sunset, Wells Cathedral in the Distance*. Mr. BREWTNALL departs from his customary style, and *Doomed*, a vessel on a shoal near high cliffs when night is approaching, might have been painted by STANFIELD or DANBY. In a *Dartmoor Storm* Mr. WIMPERIS has a scene where the fury of the water recalls a northern "spate." Mr. ORROCK'S principal work, *The Estuary of the Nith*, is a more peaceful scene, in which a range of low hills and woods form a contrast with the water that scarcely appears to flow. The scene may be compared with Mr. AUMONIER'S *Sussex Valley*, for both appear to be equally true to nature. Mr. E. HAYES has a wider expanse of water than usual in his *Alone on a Wide, Wide Sea*, which, in spite of the title, is not tragic. The characteristics of the district are well rendered by Mr. EAST in his *Between Abbeville and Amiens*, a river scene with the peculiar hard trees that seem to aim at becoming fireworks, and a placid fisherman. *Starting for the Herring Fishery* suits Mr. R. W. ALLAN'S peculiar blottesque style. Mr. FULLEYLOVE presents *The Parthenon* before it was encumbered with scaffolding of American timber. Altogether the exhibition may be pronounced a success.

THE Corporation of Edinburgh have asked Mr. CAMERON, one of the members, to prepare a scheme for dealing with the building sites which are created by the North Bridge Improvement. It will be remembered that there is a division of opinion among the members on the subject. Some of them wish to have the sites sold to the highest bidders, while others desire to see the Corporation undertake the erection of the buildings. Mr. CAMERON proposes the division of the area into separate blocks, with frontages varying from 50 to 80 feet. The plan shows on the west side of North Bridge Street a slope area of 18,900 superficial feet, exclusive of 3,000 superficial feet of saloon area. On the east side of the street a large increase of saloon area has been secured by a rearrangement of

the lower buildings in the rear, and a large block of general business premises is shown running from North Bridge proper to the west boundary of the area. Taking the shop areas as having the same value as those in George Street, Mr. CAMERON brings out the gross rental of the buildings as 21,881*l.* 8*s.*, and of the same value as those in Princes Street, he assumed the amount is 24,700*l.* The average price of feu-duty per lineal foot of frontage is taken at 7*l.* 2*s.*, and if this figure is capitalised at thirty-three years' purchase the result would be 210,563*l.* for the whole area. The capital value of the increased assessment would be about 52,000*l.* The total feu-duty is 6,378*l.* Mr. CAMERON, however, considers that the cost of carrying out the amended plans could be brought down to 200,000*l.*

A CURIOUS case which should serve as a warning to clergymen who are eager to transform their churches without legal authority, was heard in the Southwell Consistory Court on Tuesday. It appeared from the evidence that the arrangement of the east end of the parish church, Heage, Derbyshire, was considered unsatisfactory, for the parishioners in order to face the pulpit were obliged to be seated with their backs to the holy table. The Rev. G. A. TINDALL, the rector, proposed to make the desired alterations by bringing the table to the west end, and for that purpose submitted a plan to the parishioners. The meeting was, however, said to be irregular. There was no application for a faculty, but without it the rector proceeded to effect the alterations, dismantling the church so that the services had to be performed elsewhere. When, however, he sought to obtain the necessary funds for payment of the cost of refitting the church according to the proposed new arrangement, he was unable to get the money which had been collected, the treasurer of the fund declining to hand it over as the rector could not produce any legal authority for what he had done in the church. The rector was, moreover, threatened with an injunction to restrain him from further interfering with the church unless authorised by a faculty to do so. Application had then to be made for a faculty to authorise what had been done and what it was proposed to do; but it was opposed by six parishioners, who put forward another plan which did not involve any alteration in the position of the holy table. On Tuesday the rector and churchwardens abandoned their proposed scheme, and expressed their willingness to accept that of the six parishioners, but, in answer to the Chancellor, said that they did not themselves propose to ask for a faculty to sanction it. The Chancellor then pointed out that Mr. TINDALL had placed himself in a very awkward position. He had dismantled his church without any legal authority, and by abandoning his own proposal without putting forward another in its place was doing nothing to remedy the illegal act of which he had been guilty, and for which he could be proceeded against under the Church Discipline Act. Under the advice of his solicitor the rector thereupon prayed the Court to grant him a faculty authorising the carrying out of the plan suggested by the opponents. After hearing the evidence of the architect, Mr. P. H. CURREY, the Chancellor (Mr. A. B. KEMPE) said he was, as then advised, of opinion that this plan was a very satisfactory one, and if it were unopposed he should be prepared to sanction it by decreeing a faculty; but, as it had not yet been laid before the parishioners, he must treat the application as one for the issue of a citation only, which he decreed. If, on the publication of the citation, there were no appearance entered in opposition, and the parishioners in vestry approved of the proposal, he would then be prepared to decree the faculty. The petitioners having, in consequence of the opposition of the six parishioners, withdrawn their application for a faculty authorising their original proposal, were ordered to pay the costs of the opponents.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: FROM BECKET'S CROWN LOOKING WEST INTO TRINITY CHAPEL.—CAPITAL IN CRYPT, CHAPEL OF HOLY INNOCENTS.—CAPITAL IN CRYPT, CHAPEL OF ST. GABRIEL.

HAMMERSMITH TOWN HALL.

ROYAL COUNTY THEATRE, KINGSTON-ON-THAMES.

The Architect, Oct. 22nd 1897.





PHOTOGRAPHED BY F. B. BOLAS & CO. LTD., LUDGATE HILL, E.C. 4.

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CATHEDRAL SERIES, No. 83.—CANTERBURY: FROM BECKET'S CROWN LOOKING WEST INTO TRINITY CHAPEL.

The Architect, October 22, 1897.



PHOTOGRAPHED BY BOLAS AND CO.

CANTERBURY No. 84.—CAPITAL IN CRYPT, CHAPEL OF HOLY INNOCENT'S.

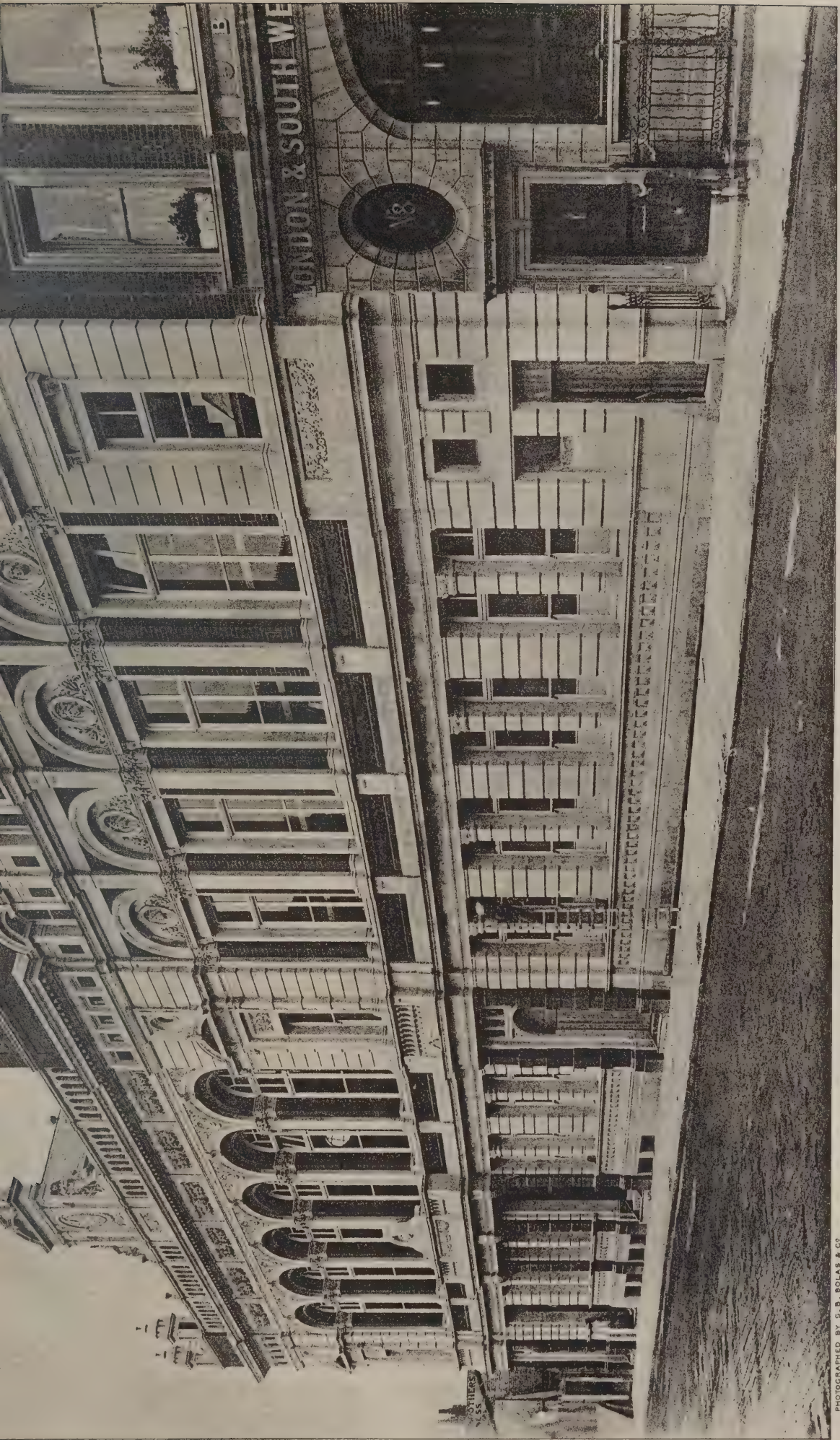
The Architect, October 22, 1897.



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CANTERBURY No. 85.—CAPITAL IN CRYPT, CHAPEL OF S. GABRIEL





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HAMMERSMITH TOWN HALL.

J. H. RICHARDSON, Architect.



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ECCLESIOLOGIA GERMANICA.

By T. FRANCIS BUMPUS.

*(Continued from last week.)**Characteristics of Westphalian and Saxon Architecture.*

THERE are certain districts of Europe that must ever have a peculiar charm for the ecclesiologist. Such are the valley of the Nene from Northampton to Peterborough, along and near whose banks extends such a peerless line of churches as Earls Barton, Higham Ferrers, Raunds, Irchester, Tichmarsh, the Aldwinckles, Barnwell, Oundle, Nassington and Caistor; Lincolnshire, from Sleaford to King's Lynn, with such noble specimens of parochial architecture as Ewerby, Heckington, Boston, Spalding, Whaplode, Gedney and Sutton; the Marshland district to the east of Wisbech,* a tract of country in which, if nature has been niggardly, art has been bountiful, the eye being gladdened at frequent intervals by such noble piles as West Walton, Walsoke, Walpole-St.-Peter, Terrington-St.-John, the Wiggenhalls, Emneth, Elm, Outwell and Upwell; the valley of the Oise from Beauvais to Paris, where a continuous architectural feast is afforded by such noble Early Pointed specimens as Cires and Mello, Creil (with the not far-distant Senlis), Nogent, St. L  u d'Esserent, Champagne, Persan-Beaumont and Auvers, and Normandy between Rouen and Coutances, this last route presenting a succession of buildings which for magnificence can hardly be matched, as witness Lisieux, Caen (with its countless neighbouring village churches, such as Berni  res and Langrune), Norrey, Audrieu and Bayeux.

In the same category Westphalia may, in a modified degree, be said to fall. Although its buildings cannot compete in point of size and purity of detail or conception with those of the other districts just alluded to, they are extremely numerous, valuable as specimens of Northern Romanesque and Transition, and interesting as having come down to us in an almost entirely unaltered state. No student need repine whose lot is cast in Westphalia, for not only in the large towns such as M  nster,† Dortmund,‡ So  st,§ Paderborn,|| H  xter,|| Herford,¶ and Minden** will he find abundant material for the pencil and note-book, but in almost every village or smaller town surrounding or neighbouring to these places, a few of whose names, to be alluded to hereafter, are mentioned below.

One of our most eminent architectural critics has given the buildings of Westphalian Prussia a very bad character. "As a general rule," he remarks, "it may be asserted the churches of Westphalia are singularly devoid of taste and good design. They are extremely numerous, and many of them sufficiently large for architectural effect; but in the earlier or Round Gothic period they betray a clumsiness which is very unpleasing, and in the age of the Pointed Gothic their style is wire-drawn and attenuated to a degree almost worse than the heaviness of that which preceded it. The fact, indeed, is only too apparent, that the Northern Germans were not an artistic people, for neither in Westphalia, nor in any of the countries between it and the Baltic, do we find any churches displaying that beauty of style or constructive appropriateness which characterises those of Cologne or the cities to the southward of that town."††

* A most enjoyable tour taken this summer among many of the examples quoted above has served to awaken all my recollection of their glories, and to impress me with a deeper sense than ever of the vast superiority of our own architecture.

† For Billerbeck, Havixbeck, Notteln and Asbeck; Vreden and Osnabr  ck are also best visited from M  nster.

‡ For Bochum, Kirchlinde, Aplerbeck, Methler, Unna, Frondenberg, Drugelte, Hamm, and J  serlohn.

§ For Lipstadt, Erwitte, Geske, Obern-Tudorf, Boke, Neuenhersee, Brenken and B  ren.

|| For Corvey, Lippoldsb  rg, Warburg, Obermarsburg and L  ge.

¶ For Bielefeld, Lemgo and Enger.

** For Loccum, J  densen, Fischbeck and Hameln.

†† A perusal of L  bke's "Mittelalterliche Kunst in Westfalen" and of Puttrich's "Baukunst des Mittelalters in Sachsen" will be found useful, preparatory to visiting the churches of this part of Germany.

Much of the heaviness of these Westphalian churches, particularly the early Romanesque examples, which have, as I mentioned just now, come down to us in an interestingly unaltered state, is attributed by our critic to the absence of colour from their broad expanses of wall-space. His words, it must be remembered, were penned more than forty years ago, ere the great tide of church restoration and embellishment had made much headway in Germany. This reproach must, however, to a considerable extent be now removed from such buildings as the cathedral at M  nster, whose interior glows with colour in every part, fresco being a species of decoration admirably adapted to the large flat surfaces displayed by that building, with its domical vaults and arches, with their unmoulded intrados springing directly from their pilaster-like columns. With his strictures upon the general character of the Westphalian churches no person of taste will differ, but the student who cares to take up his quarters for a short time in any of the large towns named in the earlier part of these notes will find abundant material in small details for the employment of his pencil. The sculptured saint-guarded portals of M  nster and Paderborn, the window traceries of So  st, Herford and Minden, the furniture of the Dortmund churches, and such charming bits of Romanesque detail as exist in the doorways at Aplerbeck, Boke and Obern-Tudorf, and in the capitals at Corvey, Methler, Ober-Marsburg, Vreden and Wunstorf, are but a few that could be named of such subjects for the sketch or note-book in this part of Germany.

The architecture of Saxony is, generally speaking, of a much more refined character than that of the province just alluded to, recalling in some respects the Byzantine-Romanesque of the south, while the eastern elevations of such churches of the Harz district as Gernrode, Hechlingen, Querfurt and Wechselburg



ABBAY CHURCH OF LAACH: A TYPICAL GROUP OF RHINELAND STEEPLES.

suggest our North of England examples, such as Lastingham, &c. These churches bear a very striking resemblance to one another, being cruciform in plan, with a small apse projecting from the eastern side of either transept in addition to the main one, which, as a rule, is of less breadth and height than the limb to which it has the appearance of being tacked on.

The arcades of the Saxon Romanesque churches exhibit considerable variety, from the Doric simplicity of St. Ulrich at Sangershausen, where the workmanship recalls that in the eastern part of St. Albans Cathedral, to the more exuberantly ornamented ones of St. Michael and St. Godehard at Hildesheim, Gernrode, Paulinzelle and Thalb  rgsel. The triforium rarely appears; an example, however, occurs at Gernrode on a somewhat grandiose scale, while at Hechlingen—where the piers supporting the simple round arches are alternately a cylinder and an elongated square block with a slender shaft niched at each angle—a species of M  nnerchor has been formed on the south side of the nave by inserting a low Pointed arch within each of the main bays, evidently for the purpose of extra accommodation. This M  nnerchor at Hechlingen communicates with a deep western gallery or narthex extending into the nave to the depth of two bays, besides the short space formed between the

towers. These, by the way, are highly picturesque but simple erections, surmounted by low, broad spires of a type met with in Kent, and of which that of Birchington Church, near Margate, appears before the mind's eye as a home illustration. The whole church at Hechlingen is replete with interest, and the student of sculpture will be delighted with the angelic figures which occupy the spandrels of the nave arcades. A piece of unrelieved wall here, as almost everywhere in Saxon Romanesque churches, and probably intended for pictorial enrichment, divides the clerestory—a row of simple round-headed windows—from the arcades. The roofs throughout the building are flat and of the plainest description; * indeed, vaulted roofs in Saxony at this period—eleventh and twelfth centuries—are rarely met with, nor do we find any preparations for groining. Sangershausen and Dobrilugk may, however, be named as exceptions. The latter church exhibits clerestory windows of unusually elongated dimensions, consisting of two round-headed lights of the plate-traceried type, but the head of their circumscribing arch is not pierced. Arnstadt is another rare instance of a vaulted church of the Romanesque period, verging on the Pointed, the triple slender shafts supporting the groining ribs being banded at intervals. The arcades here are exceedingly simple Romanesque ones placed in pairs, those opening into the Männerchor—another noteworthy instance of this appendage remote from the Rhine—being still more simple, and looking as though they had been merely cut out of the wall. Even in such great churches of the Transition period as Naumburg, Mildenfurt and Schulpforta we miss the triforium arcade. Indeed, it is wanting generally in Germany through all the ages of Pointed, as witness Magdeburg, Freiburg and Ulm, where its non-employment causes a blank which, to English eyes, is a great blemish upon those otherwise grandiose interiors.

Churches having Nave and Aisles of the same Height.

The Saxon churches of the Middle and Late Pointed periods are almost exclusively of that class to which allusion has frequently been made in the course of these notes, viz. the one in which the nave and aisles are of equal height and contained beneath one slope of high-pitched roof, the clerestory being of course absent.

Several very noble and refined examples of these churches are found in Saxony: Meissen, Nienburg and Arnstadt belonging to the Early Middle Pointed, and Mühlhausen, Erfurt, Görlitz and Zerbst to its later phases. To all these Saxon examples I shall hope to recur shortly, after a few remarks on the Westphalian ones.

These "Hallenkirchen" or "drei-schiffigen Kirchen"—literally, three-naved churches—are not of very frequent occurrence in the Rhineland, but in Northern and Central Germany there is hardly a town that does not contain one or more such churches; indeed, in Westphalia it seems to have been the prevailing type through all the ages of Pointed. Although exteriorly these churches are too often ungraceful, they must, internally, command our admiration on account of their suitability for town use, their light lofty columns and their spacious areas contributing materially towards this result; but in later examples the workmanship and detail exhibit great slovenliness and attenuation.†

In Westphalia this unclerestoried church made its appearance as early as the Romanesque period, examples being the chapel of St. Bartholomew at Paderborn, St. Ludger at Münster, and the churches of Balne, Jdensen, Kirchlint and Methler; while the Marien-Kirche at Lipstadt, St. John at Billerbeck, the two churches at Obermarsburg and one at Barsinghausen are Transitional specimens of the same class.

The middle of the thirteenth century introduces us to two of the most imposing "three-naved" churches, viz. the cathedral at Paderborn and the Minster at Herford. Later in the same century we have the Dom at Minden. In each of these examples the ungainly appearance of the roof is considerably mitigated by gabling the aisle walls above the windows, the continuous serrating of up-gabling roofs being productive of a very pleasing outline.‡

As I find I have dwelt upon Paderborn Cathedral at some length in a former series of papers, I shall not make further allusion to it at present, but say a few words on the Minster at Herford, to which Paderborn Cathedral in several points bears a very striking resemblance.

The town of Herford, whose picturesque streets are frequently crossed by a small stream—the Werre, a branch of the Weser—grew up around a Benedictine nunnery, whose abbess formed a member of the ninth circle of the Estates General, and in that capacity wielded some influence over the town. This powerful establishment, however, succumbed to the great wave of the Reformation which swept over Northern and Central Germany early in the sixteenth century.

Few churches in this part of Germany afford so interesting an example of the reluctance with which the people of that country abandoned the Round-arched style as this great Minster at Herford. Here we find the tall piers and arches dividing the nave from its aisles unmistakably Pointed, while the windows, placed high up in the walls, are triplets of Romanesque lancets, having richly moulded heads on clusters of slender banded shafts. The ensemble of the interior of Herford, looking across the nave, will recall to those familiar with the churches of South-west France, St. Pierre at Poitiers. Of the two sides of the Minster at Herford the northern one is the more interesting, from its unaltered character; here, beneath the windows, we see such traces of the once magnificent conventual buildings as the vaulting shafts and some springers of the arches belonging to the cloisters. The south side is, however, pleasing from its diversity of outline, presenting not only a Late Gothic transeptal projection, but two very elegant Early Pointed porches. The more western of the two has a Paradise and some mutilated sculpture, an humble edition of those appendages at Münster and Paderborn; the papyrus-like foliage of the central shaft from which this Paradise is vaulted is suggestive of some of the thirteenth-century French work. The eastern doorway has no Paradise; the outer arch to the shallow porch is corbelled off, and the inner doorway has its two openings trefoil-headed, like the western one at St. Cross, Winchester. The tympanum is plain.

A very noticeable feature in the exterior of this church is the enrichment of the transeptal and eastern gables with panel work and pinnacles. Such an arrangement is very common in Central Germany, Herford presenting another example of it in St. Mary-on-the-Hill, quite a gem of fourteenth-century Gothic, and remarkable, as a hall church, for the manner in which it is roofed from north to south, instead of from east to west under one continuous slope. Here the roofs, passing across the church from one gable to another, give it a serrated appearance which is far from unpleasing. Hildesheim and Münster Cathedrals have the gables of their north and south transepts respectively, enriched with a group representing the Procession to Calvary, a favourite subject in this position with the Germans, and of which doubtless other examples could be quoted. Saxony offers several specimens of this gable enrichment, most beautiful of which is that at the church of Schulpforta, close to Naumburg, where there is a group of the Crucifixion in plaster. The Dom at Merseburg, the Marien Kirche at Mühlhausen, and the churches of Jüterbog and Zinna afford other instances of this treatment, chiefly in the form of steps and pinnacles. Some of these examples are, to English eyes, not a little grotesque; indeed, this kind of work must generally be looked upon as more curious than admirable. In Darmstadt, and other towns bordering on the Baltic, it may be seen carried to an extent not a little grotesque at times.

The third of this trio of Westphalian hall churches (*drei-schiffigen Kirchen*) is that of Minden, where one of quite the most beautiful Decorated naves of this province has been inserted between a western tower and a crux of much earlier date. Eastward of the latter is a three-sided apse of tall Flamboyantly-traceried windows. Three very wide arches separate the nave of Minden Cathedral from its aisles. They are borne on magnificent piers, composed of a cylinder round which eight slender ones, four large and four small, are disposed, all with richly-carved capitals. The aisle windows, three on either side, are of extraordinary size, generally of six lights apiece, and with the head filled with tracery, which may be truly said to run riot in fantasy.

In one or two instances the lower part of the great traceried rose filling the window above the lights is cut off, thereby imparting a curious fan-shaped appearance to the composition.

Although not so picturesque as the cathedral of Paderborn, the Dom at Minden, fitted as it is for Catholic worship, with its low open benches, unencumbered area, and rich but not profuse polychromatic decoration, is equally impressive. It is a building no student should omit seeing. Indeed, the whole town abounds in material for the sketch-book. St. Martin's Church in particular deserves to be visited on account of its window tracery, which for elegance and refinement I have rarely seen equalled, that bizarre which is the fault of that in the Dom being absent from it.

Towers and Steeple Groups.

As a rule, the towers of German churches taken singly are rarely successful in impressing us at a first view, a failure attributable in no small degree to the absence of

* The church of St. Michael at Hildesheim has its flat roof gorgeously painted—a roof which it will be remembered formed the model for Mr. L'Estrange when about to undertake his great work at Ely.

† This is very disagreeably illustrated in the Minster at Essen and St. Martin at Münster, where their feeble vaulting and pier arches spring from clumsy thick round columns with mere apologies for capitals.

‡ A good idea of this treatment may be gained by a study of two remarkable London churches of Sir G. G. Scott—St. Mary, Stoke Newington, and St. Andrew, Westminster.

buttresses. Their outline, too, whether of the Later Romanesque, Transitional or complete Gothic periods, is monotonous, owing to the manner in which their height is divided by string-courses, the towers of one period being only distinguishable from those of others by their fenestration.

Considerable variety is, however, observable in the roofing of German towers, and this, together with their position and grouping—which varies with locality—renders their study one of no little interest.

The Apostles' Church at Cologne, the cathedrals of Limburg, Mayence, Speyer and Worms, and the churches of Andernach, Coblenz, Gelnhausen and Laach present the most imposing steeple groups in the Rhenish provinces. In this district, when a church is cruciform the central steeple is not infrequently a low octagon pyramidally capped, though at Bonn, Limburg and Mayence it assumes majestic proportions. At Laach there is an assemblage of six steeples; the Apostles' and Gelnhausen have four apiece; but in all these examples the pair placed in the angles between the transepts and choir is too near the central one to be productive of anything but a confused effect, at least from certain points of view. The Limburg group is in every way the most pleasing of all, the pairs of towers flanking the western façade, as well as that of either transept, being so placed as not to interfere with the octagonal tower and its elegant spire.

The church at Andernach and St. Castor at Coblenz have each a pair of steeples flanking the western façade and the eastern apse, offering pleasing groups. Bonn has slim turrets, with spirelets grouped around a tall central octagon, from which springs direct one of the most graceful of early German spires, while those of Sinzig and Heimersheim—two most interesting Ahr Valley churches—although more humbly dimensioned, assist in imparting an air of great grandeur to the piles which they surmount.



THE PARISH CHURCH OF SINZIG.

Another good example of a solitary central Rhine steeple is that of St. Martin at Cologne, which rises in the most pleasing manner from the crux of three simple round apses. That of the interesting double church at Schwartz Rheindorf, opposite Bonn, deserves mention, while the western tower of St. Quirinus at Neuss, flanked north and south by quasi-transepts, and recalling in general outline that of our own Tewkesbury, plays no small part in composing one of the most dignified western façades on the Lower Rhine.

Generally speaking the spires crowning the Rhenish towers—particularly the slender ones occupying angles—are quadrilateral in plan, sometimes of stone or slate, at others of

metal, and with their ribs starting from the apices of the gables with which the towers are finished. When the tower is flat at the top a pyramidal capping, generally low, takes the place of the above-mentioned spire. Occasionally the angle towers are octagonal, as at the Apostles' Church, Cologne, and at Gelnhausen. In both these instances each side of the tower is gabled, and the whole is crowned by a spirelet of corresponding form. Certain of these unbuttressed German steeples have quite the effect of North Italian campaniles, especially where a very low pyramidal roof covers them, as in the church of Murbach in Alsace, whose square-ended Romanesque choir, with its towers partly forming transepts, are all the remains of a once noble Benedictine establishment.

Passing from Rhenish into Westphalian Prussia, groups of steeples become exceedingly rare, the solitary western one being almost universally the rule in that district. The Middle Pointed churches of St. Peter at Dortmund and St. Catherine at Unna offer pleasing examples of that rare addition to a German tower, the crocketed stone spire; a slate or leaden one, not broached, but spreading itself out at its base like some of our Kentish specimens, being generally employed; and these are in most cases very tapering.

The railway journey from Soest to Paderborn introduces us to a series of steeples which, without possessing much elegance of contour, are truthful purposed pieces of work, and as such elicit our admiration.

The type to which I refer is the gabled one, with or without the addition of a spire. Being much broader, and of more majestic proportions than the Rhenish steeples, these of the district alluded to are better qualified to stand alone, the position they almost invariably occupy being the west end of the nave. Occasionally we find these solitary western towers gabled on their east and west sides only, but more generally on each side, as in that noblest of examples St. Patroclus at Soest,* where the tower supports a well-proportioned octagonal spire of metal. Paderborn Cathedral has had its "cruciform saddleback" tower surmounted by a too attenuated spire of lead, and its original outline thereby destroyed, but the idea may still be seen in the steeple of the Busdorf-Kirche, where the four roofs meet in a turret, and this seems to be the prevailing type in the churches around this city. Gesecke, a village on the line between Soest and Paderborn, has a remarkably imposing tower, gabled north and south, with a pinnacled turret rising from the ridge-crest.

(To be continued.)

DESIGN IN LETTERING.†

(Concluded from last week.)

Lettering in Ornament.

MY discourse has been so far on "Lettering; its Design, its Decoration and Treatment." To-night I am going to speak more especially of its use and application, once its design is mastered. The question is no longer of ornamental lettering, but of lettering in ornament. But first I have a word to say about the initial letter generally and its ornamental use.

The *raison d'être* of an initial letter is that it should mark a beginning. It may be desirable to mark that beginning more or less emphatically; and there is opportunity and need, indeed, of considerable judgment on the part of writer or printer in proportioning this emphasis to the occasion. I can imagine a case in which two or three series of initials might be used with varying emphasis in the same pages, but it would tax the judgment of anyone so to use them.

Nothing is gained by devising a variety of names for what is after all practically the same thing. The distinction, for example, between "initials" and "versals" is ecclesiastical. I use that ugly, made-up word to express a made-up thing. For whether it is an initial (which begins), or a versal (to which the priest turns), is a matter of no account: in either case the letter is a sort of signal or reminder. If a versal does not mark absolutely a beginning it indicates at least where the reader is to begin afresh. The initial heads the chapter, then, as the capital heads the sentence or the word. It all means emphasis.

William Morris, in the very beautiful title-page to his "Story of the Glittering Plain," makes most effective use of what would commonly be called initial letters as capital letters, not, you will observe, honouring the initial "t" of the word "the" with so much as a plain capital, which, in fact, it does not deserve—for, though it happens to come first, it is relatively

* The steeple of this church, as well as the beautiful fourteenth-century lanterns of St. Mary-over-the-Water and St. Lüdger at Münster, will be found described and illustrated in *The Architect* of July 24 and October 2, 1896.

† Abstract of a course of Cantor Lectures, by Mr. Lewis Foreman Day, published in the *Journal of the Society of Arts*.

insignificant. The art of design is in putting things in their places and giving them their right value. That is what William Morris did.

An initial need not, because it is meant to be emphatic, on that account be very big. In common speech we emphasise a word more effectually by pausing before it than by shouting it. And the idea of pause may well explain, and to some extent justify, a certain disregard of obvious legibility in the initial. In the initial, if anywhere, it is permitted to be fanciful; it makes a pause before reading. Ornament which elsewhere might be altogether superfluous is here of distinct use in calling attention to the letter: by the time you begin reading, the form of even a rather involved initial will probably have emerged plainly enough from its ornamental entanglement.

That, to my mind, is no excuse for the pictorial initial. A picture may be more beautiful than any letter, and it may answer just as well to mark a beginning. In that case let us, if you like, have the picture instead of it, but don't let us disguise it by clapping a letter in front of it.

There are obvious limits to the purely ornamental initial, but I think there is still scope for design of the purely ornamental kind from which designers were diverted as early as the sixth or seventh century by the attraction of torturing birds, beasts and fishes into shapes which might do duty for lettering: the interlacing capitals of the Anglo-Saxon scribes would have been more beautiful if they had not been always breaking out into heads of nondescript creatures.

An initial letter attracts attention to itself (even though it be not very large) by its very weight and character. You cannot well overlook it. And there is no occasion because the letter is put in by hand that it should gesticulate wildly at you, as it often did. Without saying that such a thing should never be done, I must own I am inclined to resent the initial that sprawls all over the margin of the page. The illuminators, I know, looked upon the margin of a book as their own, a field for their exploits; but, once accustomed to the margin, I can't bring myself to consent to its sacrifice even to the ornamentist. By all means let us have ornamental borders and the like, but let us plan them within the margin, which is the fitting, the only, the necessary frame to MS. and type alike. The justly famous choir-books at Siena are illuminated with a delicacy rare even in Italian MSS. The pictures are perfect miniatures, but they are miniatures rather out of place. A delicate little figure should not be framed by a disproportionate initial decorated with dolphins as big as the saint herself. The charm of the page shown is in the perfection of the work, both in the miniature and in the ornament; as a page it is by no means perfect; it is not a whole.

The illuminated initial naturally affords scope, which printing does not. It may quite safely encroach upon smaller lettering, and it is the business of the illuminator to make it break the text pleasantly. Many of the Mediaeval initials are beautiful; the letters are enriched and glorified by ornament, which yet does not overstep the bounds of reticence, and the result is dignity.

A more serious danger than that of losing the letter in superfluous ornament is lest it should be detached from the context. The larger the initial the more danger there is of that. You may separate the "D" in "Danger" so entirely from the word that it reads "anger." I remember my eye being once caught by the word "election" on a placard. It turned out to refer to "popular songs"—a "Selection" it should have read, but the "S" did not count as part of the word. There is a vice doubly vicious in the case of an advertisement.

Lettering is so bound up with the printing of books that these inevitably come in for a large share of consideration in discussing the subject. The title-page naturally assumes extreme importance.

You have there another of William Morris's strongly personal designs (we have lost William Morris, but his influence will live). In this title to Rossetti's poems we have a bold Roman letter encircled by meandering ornament too delicate to interfere with it, merely greying the ground, as it were. And, observe, the border has the value of a deeper grey tint.

Yet more effective is the title to "The Book of Wisdom and Lies," in which the letters are in white on a black ground, filigreed over with delicate ornament, the stems of which interlace with them very happily. The initial T on the opposite page just sufficiently carries the black into that, and makes the double page one.

A yet more beautiful page of Morris's bears the title of the "Tale of King Beowulf," also in light letters upon dark; but here the border, bold and effective as it is, is merged in effect with the panel it encloses, and we get one mystery of richest ornament, out of which the words grow, as it were, into significance as you look.

Not only in the pages of books, but on their covers, lettering forms often a valuable ornamental feature—sometimes a very important one.

In the Grolier binding shown it is not conspicuous, but it is

enough, and it requires taste to do so little. Clearly the more exquisite the design of the "tooling," the more seriously it would be hurt by coarse or ill-considered lettering.

Lettering is in itself ornamental; a well-printed page, consistently set up in type of all one character, though it may be, as here, of various sizes, not displayed after the distracting fashion of the modern printer, nor disfigured by superfluous squiggles or ornament, a merely well-planned page is a thing of beauty; but it wants planning with that rarest of qualities—taste.

A mere inscription is yet more susceptible of decorative treatment, even though devoid of ornament. The deviation from the simplicity of the normal letter may be but slight and the effect yet ornamental. Of the two modern inscriptions there, both, as it happens, designed by way of advertisement, the upper one (designed some twenty-five years ago or more) is excellent. It departs from orthodoxy, but not from moderation. The lower one (American) is rather affectedly up-to-date. The letters are all "kicking up behind and before." High kicking is the rage; but I think the advertiser takes too readily for granted our interest in what he has to say.

I don't see why the artist should not take, on occasion, all manner of liberties with the size of letters, but there should be a reason for it. It should be done for the purpose of emphasis, to fill the line more evenly, to make the letters compose better, and not for the sake of mere oddity.

I have no faults to find with the freaks of the thirteenth-century scribe whose handiwork I show you; but then he was not writing an advertisement, but inscribing at the head of his chapter, as a mere formality, words which might be "taken as read." Their use, in fact, was, as much as anything, ornamental.

The decorative value of a simple panel of lettering is conspicuously shown in the tomb of Mary of Burgundy, at Bruges. The inscription itself is beautiful and legible enough, for all the flourishing of the letters, which are fantastic only at the base, where they can afford to be playful, their work being done. Mere inscription occupies there the place of honour—and deserves it.

Lines of lettering play again an important part in the composition of Sir E. B. Jones's gesso panel, "Perseus and the Grææ." The deep band of Roman text occupies the vacant space above the figures without in the least disturbing its breadth. You feel it is just what was wanted there. It has the value of ornament without any of the attractiveness which might have injured the picture.

There is a reminder in this most modern work of the inscriptions, as old as Sennacherib, deliberately carved in broad horizontal belts of cuneiform characters right across the figures in the reliefs from Nineveh. It is strange how readily one accepts that kind of brutality. The truth is the writing does but little hurt to such broadly conventional figures, and it has considerable decorative value.

In early sixteenth-century tapestries we sometimes find the name of a personage written straight across his body, not, as it were, embroidered on the drapery, but planted boldly in front of it; and I, for one, accept that as perfectly satisfactory.

Another use for inscription is by way of border to the picture, as in the little terra-cotta shown, and on many a Mediaeval brass and monumental stone. It was a favourite practice in the fifteenth and sixteenth centuries and never failed of success.

A very pronounced use of inscription was made to separate subject from subject in those little figure groups in which the Mediaeval designer delighted. The door from Le Puy, there, is designed in little square panels enclosed in bands of lettering, at least as important as the pictures it frames. It is all very flatly carved, not much more than grounded out. The contractions in the lettering make it difficult to decipher; but it proves to be Latin hexameters (explanatory, of course, of the subjects) running right across the four divisions of the door.

It was a favourite plan of the glass painter also to keep his pictures apart by interspaces of lettering.

In the Jesse window, on the other hand, from Troyes, the inscribed words form part of the picture, and ornamentally a very valuable part; remove them and the design would suffer considerably. They give just the horizontal lines necessary to counteract the uprightness of the window mullions.

A much simpler use of lettering is shown in the glass from New College, Oxford, where the background to the figure is just sprinkled with crowned "M's." They are just enough to break the monotony of the ground, at the same time that they convey to you that this is indeed the Virgin Mary.

In coins lettering forms naturally an item in the design. We always arrange it round the rim. That is one way of doing it—but not the only one. The Greeks were never so wedded to one mechanical idea. They worked quite as often in columns, vertical or horizontal, and you see by the direction of the arrows there that the writing took all manner of directions—we are as conservative in that as in the way we pass the wine

Again, the medallists of the Renaissance were not anything like so bigoted as we. Where the words follow the rim they are as likely as not interrupted, perhaps by a band of lettering across the medal, and the interruption is usually welcome. The proportion of the letter is, of course, an all-important point.

The modern designs of M. Roti show taste and judgment in the introduction of lettering very rare indeed in nineteenth-century design, and he, too, uses it in various ways, and not on one cut and dry system, as may be seen in the series of designs by him.

While the coins and medals are fresh in your minds I will show you some Italian majolica plaques in which also the design is planned to fit the circle. The first is a marriage plate. "My heart I bear to you," says the lady—and she does, proudly and uncompromisingly. A more decorative treatment is where the motto is inscribed on a label. Here it takes the line of the circle, and its curled up ends are made use of to furnish the space about the lady's shoulders. The circumscribing of the background by the label passing behind the head is a most useful device in composition. With the twisting of the label comes the question how the lettering upon it ought to run. It seems only logical to ask that it should be confined to one side of the label only. In that case care has to be taken lest part of it should be shown upside down. It is easier, as there, to ignore the difference between the front and back of the ribbon—I prefer more conscientiousness. You may assume, of course, that the label is first twisted and then inscribed. You must do so unless you are prepared to let great part of your inscription be lost, but in any case the label ought to be and ought to look, as it were, designed to take the lettering. In the example shown, all that ribbon was not wanted to bear one little word—it is flourished about obviously only to fill up.

The label on the Gubbio drug-vase shows the origin of the idea; it is clear that it takes the place of the strip of parchment on which the name of the drug would else have been written.

Great use was made of the label in stained-glass. It is often much more elaborate than in the lights exhibited from Ross, but there you have the typical treatment. The length to which inscription was carried in Gothic design is shown in a very curious carpet at South Kensington. You find there not only a double series of labels canoping the figures, but broad labels, parti-coloured, white and yellow throughout their length. Moreover, the lettering is not uniformly coloured. Red words alternate with blue, for example, each with its white initial, all on a gold coloured ground. Sometimes the variation of colour is not according to the words at all, but as the artist listed.

In the border to a late Flemish brass the label takes a meandering line, whilst in the side spaces are little figures bearing other inscribed labels. You see them at a disadvantage there—they appear to stand on their heads. The design was intended of course for a pavement brass.

Again, unusual is the device of two bands of lettering, interlacing to form a border, one of which always presents itself to the reader the wrong way about.

In the German needlework parts of an altar cloth—a real linen cloth, not one of those gorgeous arrangements in velvet and gold which seem to contradict the fundamental idea of the Lord's Supper—the bands of black letter steady the design and give variety.

Skilful but very reticent use of lettering is shown in a Portuguese cabinet at the Hôtel Cluny. Interlaid at intervals round the edge of it are the words "Audeo," "Spero."

A very simple box-front illustrates the way a word may be so distributed by the carver as to be in a way disguised, and yet plainly there. You do not at first realise that the letters spell the name Jakeline.

Much more elegantly designed letters occur in the box-top bearing the A of Anne of Brittany. The position of the letters on the box-top (a thing which has no right way up, but may be looked at from either side) justifies the reversing of the letter. As you see it there, you fancy the letters are A. V.

I come now to the subject of monograms.

Designers of monograms very often don't play fair—perhaps because they don't know the rules of the game. A monogram, as its name implies, is the union in one sign or compound letter of all the letters of a word (usually a proper name) or of the several initials of a person's name; the mere interlacing of letters complete in themselves, and independent one of the other, forms, not a monogram, but only a cypher. In a monogram there should be no letter which does not also form part of another.

The common practice is to interlace two independent letters. And even these cyphers are eked out by ornament which is no part of them, and where that is not so one of the letters is perhaps so extravagantly shaped as hardly to pass for what it represents. Very commonly one of them is unduly drawn out to make it loop with the other. Often letters of two quite different styles of design are incongruously harnessed together. Sometimes they don't properly interlace; one is just planted in front of the other. That may be permissible; but the other plan is preferable.

In monogram design naturally the letters you have to deal with, and your purpose, suggest the kind of letter you adopt; but the simpler are, as a rule, the more serviceable. The late Gothic capital form is about the least promising for a monogram—it is involved already.

You may think it hard lines to lay down the rule that each letter must form part of another, and no one of them be independent. Well, those are the rules of the game. You need not play it.

It may not be possible in every case to make a true monogram out of given letters; godfathers and godmothers, in baptism, do not take into account the difficult task they may be providing for the designer, when they bestow their awkwardly assorted names upon us.

I have tried there what I could do with the letters of the alphabet three by three as they occur. I give you them as they came. No doubt they could be bettered, but that is the best I could do right off. You will see I have managed to make true monograms of most of them.

It was a common practice not only to interlace letters but to reverse them—or one of them. By this turning over of the letters you get symmetry, but it is rather a cheap way of getting it.

In the severer cyphers on the Palissy plate, the C is reversed; the H also is sometimes doubled, without being merely turned over.

A masterpiece is the vigorous and individual design of Van Meckenhen, in which he makes a mystery of his own name.

Hidden away in the beautiful little ceiling of a window bay in the chamber of Isabella d'Este, at Mantua, are sundry cyphers and mottos, but the lettering is not of great importance in design.

In the embroidered cloth, on the other hand, the lettering is almost everything. And it shows how decorative even stiffly drawn devices may be. It only wants the artist, and he must feel that lettering is worth doing.

The cyphers on the key handles of the seventeenth and eighteenth centuries are not very clearly made out amidst the lines of scroll purposely designed to mingle with them. By means of the scrollery it would have been easy to balance the several compositions without doubling over the letters, as is usually done. But, take them for what they are, those are elegantly designed.

Never perhaps was the cypher turned to more dignified use than in the ceiling of the Salle de Diane at Fontainebleau. We are apt to associate monograms and cyphers with something rather small and finikin; but the breadth and dignity of that ceiling is unsurpassed.

Obviously it was not desired that the German letters next shown should be too easily read; they are embroidered in two colours so that the continuity of the latter is broken. In early Lombard and Saxon MSS. capitals were similarly parti-coloured. This is a device which may on occasion be of considerable value to the designer.

Gothic lettering makes nearly all the ornament in the fifteenth century lock there. The shape of the letters owes something to the necessity of chiselling them in iron. The design is interesting, but the smith has carried his work to a point of delicacy at which it was bound to suffer with rough usage—as you see it has.

Of modern lettering I have only time to show you a single specimen—just to remind you of the many ingenious and beautiful things Walter Crane has done in that way. This is from his "Book of Marriage Days," the stems of the dog-rose grow into the word "June."

Most characteristic is the use of lettering in the Visigothic crown preserved at the Cluny. It is a votive crown, you will remember, not meant to be worn on the head but to be hung up before a shrine. Hence the kind of fringe into which the letters are worked. It is barbaric, perhaps, but the barbaric is often ornamental, and this is work of the seventh or eighth century. One seems to trace in it some oriental influence—or imagines it, perhaps, remembering the Moors in Spain.

The people who succeeded above all others in making really decorative use of lettering were the Arabs. The laws of the Prophet forbidding them to picture things, the natural desire to tell something in design led to the profuse use of inscription, and natural ingenuity and ornamental instinct aiding, they accomplished marvels. Very probably they took liberties with the written character which we should not be allowed to take. Possibly we find the Arab lettering all the more ornamental because we don't understand it, and the words, therefore, don't shout at us, but anyway the end of art is gained.

There are two forms of Arabic alphabet, the "cufic" and "neskhi." The cufic is that stiff rectangular graven character shown in Alhambresque ornament, which you only suspect to be lettering because it would be difficult otherwise to account for the rather odd form of ornament—for ornament it is.

Designers will note how in such work the letters are

detached from the arabesque by the simple device of fretting the surface of the ornament, which else might compete with them. As it is, they keep their place.

The neskhi writing is the rounder and more elegant character, whose flowing, sweeping lines proclaim the pen. This is, in fact, the cursive hand, and has undergone considerable modification in various countries—as writing would.

The example on the screen is from some beautiful Damascus tiles—painted, of course, but retaining much of the pen character—the letters are in white against a background of blue on blue.

Compare the “cufic” character with the square form of the Chinese alphabet which, as I explained, was the monumental, as distinguished from the written character, which was brushwork. I think the Chinese characters make ornament.

To return to the Arabs. Naturally they made most use of the suaver neskhi character. This is very freely treated in the plaque of Persian faience, and there the character of the lettering tells pretty plainly the way it was done. That is clearly not carving; it is soft clay or slip, which is applied to the face of the tile and fused with it in the furnace; then it is decorated in colour and lustre.

The wall diaper from Tunis is the kind of thing familiar to us in the Alhambra. The words are, as it were, built into an all-over pattern of great richness. The Moors in Spain make that kind of raised plasterwork gorgeous with blue and red and gold enough to reconcile even crude colours.

Time fails in which to carry further this most interesting subject. I will end by saying that if only we modern Europeans were allowed to play with letters as the Arabs did, we might, with practice, arrive (even with our alphabet) at something like ornament.

That is the point to which all I have said is really directed, that artists should dare believe there are possibilities in lettering; it is only in that faith that art is possible.

ESSEX ARCHÆOLOGICAL SOCIETY.

A NUMBER of members of this Society made an excursion on the 12th inst. to Takeley, Great Canfield and Hatfield Broad Oak. The meeting place was Takeley railway station. Mr. G. Alan Lowndes, president, acted as conductor to the party, which first proceeded to Takeley Church. Mr. Lowndes described the edifice, which is of the Perpendicular period. On the north side of the nave were pointed out the original oak benches and pulpit. A Jacobean or Elizabethan wardrobe in the vestry, used for surplices, gave rise to some discussion as to its original use in the church. Monuments and brasses were examined and the exterior of the church was inspected, many interesting architectural features being pointed out by the Rev. J. W. Kenworthy, of Braintree, and others. Leaving Takeley, the party proceeded to Great Canfield, where a long stay was made because of the absorbing interest which the church and the mount command. The vicar, the Rev. G. M. Wilson, read an interesting paper written by Mr. J. G. Waller, on the inscription and symbols found on the pillars of the church porch. On the capitals of the pillars were pointed out some very rare designs of symbolic ornamentation, while on the left jamb was shown and explained an Oriental legend of great antiquity. In the chancel the Rev. G. M. Wilson read an article by Mr. Waller on the beautiful fresco paintings under the east window, which, after being whitewashed over and lost sight of for centuries, were accidentally discovered in 1876 when the church was restored. The late Bishop of Colchester was the authority for establishing the fact that the church was originally dedicated to the Virgin Mary, as shown by these paintings. The chancel arch was said to be Early Norman, and on it were seen some very ancient carvings, which lead to the supposition that the stonework formerly belonged to some other structure.

Canfield Mount was next visited, and on the top of this extraordinary earthwork of the ancients Mr. G. F. Beaumont, F.S.A., the hon. secretary, read a paper by Mr. E. A. Downman on this and similar mounds in the county. Various “finds” were made at a spot where some shallow excavations had previously taken place, comprising pieces of British pottery, worked flints, &c.

By the kindness of the President the company sat down to an enjoyable tea in the village schoolroom. After tea, on the proposition of Mr. E. A. Fitch, a hearty vote of thanks was passed to Mr. Lowndes for arranging and conducting the meeting, and also for his hospitality. Mr. Lowndes, in responding, proposed a vote of thanks to the Rev. F. W. Galpin for his paper. The rev. gentleman acknowledged the compliment, and invited the party to spend half an hour at the vicarage before leaving. Here he showed them a rare collection of musical instruments of every age and nation, and performed on many of them, to the great delight of the party.

The next move was to Barrington Hall, Hatfield Broad Oak, the residence of the President. Here the party was joined

by Lady Rookwood and others. Mr. Lowndes welcomed the guests to his beautiful home, and in the spacious drawing-room read an exhaustive and interesting paper dealing with the history of Hatfield Broad Oak and its manors. There are at Barrington Hall some of the most magnificent examples of stucco-work in the country. These were much admired, as also were several valuable historical paintings. A walk across the park brought the visitors to Hatfield Church, where they were met by the vicar, the Rev. F. W. Galpin. In honour of the visit a flag was hoisted on the tower. The Vicar, who has recently by excavation discovered the exact site and proportions of the old conventual church and monastic buildings, adjoining the present church, read a paper on the subject, and illustrated the ground plan of the ancient structures on a black-board.

ST. BOTOLPH, CARLTON-IN-CLEVELAND.

THE new church of St. Botolph, Carlton-in-Cleveland, was consecrated on the 15th inst. by His Grace the Archbishop of York. The church is situated on rising ground at the north end of the village, and is designed in the fourteenth-century style of English Gothic. It consists of a nave and chancel, with clerestory, under one unbroken roof; a west tower, which is only completed as far as the nave-roof level at present; north and south aisles and south porch. There is a fine east window of five lights with rich tracery. The interior is simple and striking, the proportion being very good; an unusual feature is the treatment of the lower part of the tower, which is vaulted over in stone, with a gallery above for the ringers. The chancel is spacious and dignified, the altar being raised three steps above the nave. The east end of the north aisle is screened off to form a vestry. The internal walls are of dressed local stone as well as the exterior, and the finish of the masonry is remarkably good.

The main roof is of barrel form, with a boarded and panelled ceiling of oak. The church has been designed by Mr. Temple Moore, and the contractor is Mr. R. P. Broton, of Bilsdale.

TESSERÆ.

Proportions of Windows.

THE proportions of window openings and interspaces of openings and their architraves are not to be set out invariably on the dicta of any men. The first especially must in practice materially depend upon necessity, and, moreover, it may be remarked that even where windows have only the same space as themselves between them, the same idea of breadth and strength which more than double their width between them gives may be gained by extra height between their heads and the cills of the next floor openings, and though we owe much to the investigators on proportion as to the effect of inter-widths, we have no data about inter-heights, which, for a noble appearance in a building, should be as great as is usually possible. As to the proportion of architraves being not less than a sixth or more than a fifth of the void, it is difficult to conceive on what ground it is asserted. Many most excellent openings, even in Italian architecture, are more; the gate of Ghiberti at Florence, for instance. In other styles it would be useless to particularise what should be the general rule. Not that from this it is to be inferred that in Classical art these rules of proportion can be harmlessly played with by everyone. Rules of whatever kind are most valuable when not meant to repress design, and as a starting-point from which we may see how we can effect improvement; indeed, though they have had the effect of making architecture a commonplace business, executed by commonplace men, yet to one who has been tossed about in the uncertainty of original design, they are like terra firma to his unsteady footing. These rules of proportion especially are most difficult and most valuable, and that they have been departed from at times with great success is no depreciation of their use for the ordinary practitioner; those deviations were effected by men of great genius guided by study.

Karl Schinkel.

Karl Friedrich Schinkel was born at Neuruppin, where his father was “superintendent,” March 13, 1781. On his father's death in 1787 he was left dependent upon his mother, who placed him in the gymnasium or public school of his native town until the age of fourteen, when the family removed to Berlin. Having manifested a taste for drawing and designing, he there became a pupil of the elder Gilly, the architect, and afterwards of the son, Professor Gilly, to whose instructions he was in no small degree indebted for the liberal views he afterwards entertained of his art, as one affording scope for the exercise of invention, fancy and taste. The younger Gilly, however, died within about two years, and the completion of several buildings was in consequence entrusted to Schinkel.

Not long after this period he began to apply himself more to designing and to the study of architectural composition; also to making designs for vases, bronzework, ornamental furniture and other things of the kind. At length he determined upon visiting Italy, and set out for that country in the spring of 1808, taking his route through Dresden, Prague, Vienna and Trieste. After examining the antiquities of Istria, he passed over to Venice, then proceeded to Florence and Rome, and in the following year to Naples and Sicily, returning through France, and reaching Berlin after an absence of two years. At that period the state of public affairs in Prussia was exceedingly unpropitious to his prospects in his profession, more especially in that higher department of it to which he aspired, and he therefore devoted himself for awhile to landscape-painting, partly views of some of the places he had visited and partly original compositions, which he generally made the vehicle of his architectural ideas, introducing into them studies and designs of his own. These productions earned for him no small reputation, and by so doing they probably opened for him the career in which he subsequently obtained celebrity. On the return of the royal family he was commissioned to make designs for some alterations in the palace, and in 1810 was appointed assessor of the *Baudeputation* or Board of Works and Buildings, his duty being to give his advice upon matters of taste. When the war with France was terminated, he received an order from the King of Prussia to prepare designs for a cathedral to be erected in Berlin as a memorial in honour of the military achievements of his subjects. But although all the plans and drawings for this *Pracht-bau* were finished, it was considered more advisable to postpone the work. Nevertheless, though he was doomed to disappointment in regard to the execution of that magnificent project, the restoration of peace was the epoch from which Schinkel's career as an architect may be dated. It was at that period his talents were first called into play, and important opportunities afforded them almost uninterruptedly for a series of years, during which he not only erected most of the finest of the public structures which now grace the capital of Prussia, but also many at Potsdam and various other places, besides numerous others for private individuals. To Schinkel, it has been observed, Berlin is indebted for a new physiognomy, one that imparts to it an original and peculiar character; and certainly his works, even the least successful of them, give evidence of geniality and of an inventive mind, less scrupulous as to following established precedents than ambitious of forming precedents for others and of extending the limits of the art. Among the earliest and certainly not the least successful of his works in the capital are the large Theatre, the Wachtgebaude and the Museum. To these succeeded the Werder Church, Bauschule, Observatory, &c. Of the buildings here mentioned, together with a great many others, the designs are given in his "Eutwürfe." Schinkel died in October 1841.

Scottish Fortresses.

Before the accession of James VI. to the throne of England the situation of Scotland was such that every baron's house was more or less fortified, according to the power or consequence of its lord or according to the situation of the castle. Near Edinburgh or Stirling, where the inhabitants were somewhat polished in their manners and overawed by the seat of government, no more was necessary than towers capable of resisting the cursory attacks of robbers and thieves, who never durst stop to make a regular investment, but plundered by surprise, and if repulsed, instantly fled. But when further removed, as in Perthshire, Inverness-shire or Aberdeenshire, then it was necessary to be better defended; and the aids of a peel or dungeon, with outer walls, moat, wet ditch and barnakin were added to enable the lord of the keep to resist the formidable attack of his powerful adversary. The history of Scotland, so late as the reign of the Stuart family, affords a number of melancholy instances of inveterate feuds among the greater and lesser barons of that period, when every mode of fortification then in use was seldom adequate to the defence of the castle against the storm or blockade of the enraged chieftain. The third kind of fortresses which we meet with in Scotland consists of those situated on the borders of England, or on the sea-coasts of the kingdom, and in the Western Isles and in very remote places. Many of the old castles in Scotland were situated on an island in a deep lake, or on a peninsula which, by a broad deep cut, was made an island. This kind of fortress was only accessible in a hard frost or by boats, which were not easily transported by a people destitute of good roads and wheel-carriages. In fact, they could only be taken by surprise or blockade, the first of which was difficult and the second tedious; so that before the use of artillery they might be deemed almost impregnable. On this account their situation was very desirable in the inland parts of Scotland. On the sea-coasts of Scotland we generally find the strongest and most ancient as well as the most impregnable castles, since these had to defend themselves from the invasion of the foreign enemy as well as

the attacks of the domestic foe. Thus the barons whose lands extended to the sea-coast perched, like the eagle, on the most inaccessible rocks that lay within their possessions.

Removal of Monoliths from Quarries.

Vitruvius mentions with approbation the following contrivance, which he says was invented by Metagenes, for conveying from the quarry the shafts of the columns and the stones intended to be employed for the architrave in the portico of the Temple of Diana, at Ephesus. The ground between the quarry and the temple being too soft to allow such masses of stone to be brought up by ordinary wheel-carriages, the architect or engineer covered each extremity of the block of stone with a frame of timber, from the middle of which projected a short axle of iron; this being received in a gudgeon at the centre of a broad cylinder or wheel placed at each end of the frame containing the stone, and oxen being harnessed to the frame, the stone was thus drawn up to the building. Vitruvius also describes an unsuccessful attempt which was made by an engineer named Paconius to bring from a quarry a mass of stone containing about 576 cubic feet. For this purpose two broad cylinders of wood, 15 feet in diameter, were constructed, and the stone, being raised from the ground, was made to rest between them, the line of its length being in a horizontal position in the direction of their common axis; then a rope being wound round the circumference of the united cylinders in the middle of the length of the latter, and one end of it being made fast to the harness of the oxen, it was intended that by the motion of the animals the cylinder should revolve on the ground and the stone be brought up to its place. The contrivance appears to have failed; but had the oxen been attached to the two ends of the cylinder instead of its middle, there is no reason to doubt that it would have succeeded.

Ancient Camps.

The Hebrew camp during the exodus was of a quadrangular form, surrounded with an enclosure of the height of ten hand-breadths. It formed a square of 12 miles in compass about the tabernacle, and within this was another called the Levites' camp. The Greek camps were fortified with gates and ditches. The Lacedæmonians formed their camps in a circular shape. Of other Grecian camps it may be observed that the most valiant soldiers were placed at the extremities. Thus in the Iliad, Achilles and Ajax were stationed at the extremities of the camp before Troy. The figure of the Roman camp (*castra*) was a square divided into two principal parts. In the upper part were the general's pavilion or *prætorium*, and the tents of the chief officers; in the lower were those of inferior degree. On one side of the *prætorium* stood the *quæstorium* or quarters of the treasurer of the army, and near this the forum, called also *quintana*, where things were sold and meetings held. On the other side of the *prætorium* were lodged the *legati*, and below it the tribunes had their quarters opposite to their respective legions. In this part of the camp also were the tents of the *præfecti* of the foreign troops, as well as those of the *evocati* and of the *extraordinarii* and *ablecti*, both horse and foot. The precise order in which they were arranged is unknown. Between the two divisions was a broad open space called *principia*, where the tribunal of the general was erected when he either administered justice or harangued the army, where punishments were inflicted and the principal standards, with the altars and images of the gods, were placed. The middle of the lower division was assigned to the Roman horse, next to them were quartered the *triarii*, then the *principes*, and close by them the *hastati*. The companies of foreign horse and foot were posted on the flanks and carefully kept apart to obviate the danger of a treacherous coalition. The Roman camp had four gates and was surrounded by a rampart termed *vallum*, and a ditch, *fossa*. The agger or mound of earth was secured by sudes or sharp wooden stakes. The camps were sometimes surrounded by walls built of hewn stone, and the soldiers' quarters were occasionally formed of the same materials.

Sensations of Colour.

The immediate effects of the combinations of the primitive colours on the sense of sight afford an illustration of some of the physiological characters of sensation in general. It is well known that a mixture of red and green light produces a simple sensation, perfectly identical with that which belongs to the minute portion of yellow light originally found in the spectrum, and that a mixture of green and violet makes a perfect blue. The blue colour of the flame of spirit of wine, for example, is derived entirely from a mixture of green and violet rays; while the blue light of the lower part of the flame of a candle is shown by the prism to consist of five different portions, belonging to different parts of the spectrum, nearly resembling those which would be distinguished if we looked through a prism at a small portion of a transparent plate of a certain minute thickness. It is obvious, therefore, that the eye has no immediate power of analysing such light; and if we seek for the

simplest arrangement, which would enable it to receive and discriminate the impressions of the different parts of the specimen, we may suppose three distinct sensations only to be excited by the rays of the three principal pure colours falling on any given point of the retina, the red, the green and the violet; while the rays occupying the intermediate spaces are capable of producing mixed sensations, the yellow those which belong to the red and green, and the blue those which belong to the green and violet; the mixed excitement producing in this case, as well as in that of mixed light, a simple idea only, although it must be observed that no homogeneous light can extend its action so far as to excite at once the sensations of the fibres belonging to the red and the violet, so that every crimson must necessarily be a compound colour. A mixture of red and blue light exhibits an effect which appears unintelligible upon the supposition that a compound light ought to produce a colour intermediate between those of its constituent parts; but this difficulty will vanish if we assume that the blue of the spectrum contains a greater proportion of violet than of green, so that the green is neutralised into a white by a mixture with the red and part of the violet, and the remaining violet gives its character to the whole, either alone, or with a mixture of red, according to the proportions employed.

Mediæval Heraldry.

To distinguish him in battle, as his face was hid by the helmet, the knight wore above his armour a surcoat, as it was called, like a herald's coat, on which his arms were emblazoned. Others had them painted on the shield, a small triangular buckler of light wood, covered with leather, and sometimes plated with steel, which, as best suited him, the knight could either wield on his left arm or suffer to hang down from his neck as an additional defence to his breast when the left hand was required for the management of the horse. The shape of these shields is preserved, being that on which heraldic coats are most frequently blazoned. But it is something remarkable that no one of these heater shields has been preserved in the Tower, or, so far as we know, in any English collection. The helmet was surmounted by a crest, which the knight adopted after his own fancy. There was deadly offence taken if one knight, without right, assumed the armorial bearings of another, and history is full of disputes on that head, some of which terminated fatally. The heralds were the persons appealed to on these occasions when the dispute was carried on in peace, and hence flowed the science, as it was called, of heraldry, with all its fantastic niceties. By degrees the crest and device became also hereditary, as well as the bearings on the shield. In addition to his armorial bearings, the knight distinguished himself in battle by shouting out his war-cry, which was echoed by his followers. It was usually the name of some favourite saint, united with that of his own family. If the knight had followers under his command they re-echoed his war-cry and rallied round his pennon or flag at the sound. The pennon differed from the penoncel or triangular streamer which the squire was entitled to display, being double the breadth, and indented at the end like the tail of a swallow. It presented the appearance of two penoncels united at the end next the staff, a consideration which was not perhaps out of view in determining its shape. Of course the reader will understand that those knights only displayed a pennon who had retainers to support and defend it, the mounting this ensign being a matter of privilege, not of obligation.

Metal Mirrors.

Homer, in describing Juno at her toilet, makes no mention of a speculum; but in Callimachus we see, though it suited not the majesty of Juno nor the wisdom of Pallas to use a speculum before they exhibited their persons to Paris, who was to determine the prize of beauty, that Venus, on the same occasion, had frequent recourse to one before she could adjust her locks to her own satisfaction. The most ancient account we have of the use of specula is that in Exodus xxxviii. 8:—"And he made the laver of brass [copper, or a mixture of copper and tin] and the foot of it of brass of the looking-glasses of the women." The English reader may wonder how a vessel of brass could be made out of looking-glasses; the Hebrew word might properly be rendered by specula or metallic mirrors. The Jewish women were, probably, presented with these mirrors, as they were with other articles of value by their Egyptian neighbours when they left the country, for it was the custom of the Egyptians when they went to their temples to carry a mirror in their left hand. It is remarkable that the Peruvians, who had so many customs in common with the Egyptians, were very fond also of mirrors, which they ordinarily formed of a sort of lava that bore a fine polish. Pliny says that the best specula were anciently made at Brundisium of copper and tin; that Praxiteles, in the time of Pompey the Great, was the first who made one of silver, but that silver ones were in his time become so common that they were used even by the maid-servants. The metallic mixture of tin and copper was known long before the age of Pliny; it is mentioned by Aristotle

incidentally when he is describing a method of rendering copper white, but not by tin, and from its great utility it will probably never fall into disuse. We have ceased, indeed, since the introduction of glass mirrors, to use it in the way the ancients did; but it is still of use amongst us, since the specula of reflecting telescopes are commonly made of it.

Greek Coins.

No estimation of the merits of the coinage of any place can be made from its reputation in the arts. Dodwell, speaking of the great reputation of Sicily at a very early period in sculpture and painting, says:—"I was surprised to find that amongst the great numbers of silver and copper coins which I procured at this place there was not one of fine execution. The same remark may be made of Athens at the time in which the fine arts had attained the highest pitch of excellence and perfection. The same was the case with Corinth and Argos, of which cities very few coins of fine style have been found. On the other hand, Epiros, Acarnania, the Locri Opuntii, and several places, in Arcadia, as Basilis, Stympthalos and Pheneos, which appear never to have been particularly famed for the knowledge of the fine arts, produced medals of the grandest style and in the most refined taste." Of course, these coins were not executed by natives. None of the ancient coins, says Payne Knight, are at all comparable in execution to the large silver coins of Syracuse, with a head of Ceres or Proserpine on the one side, and a chariot with four horses abreast driven by a Victory on the other, commonly called Syracusan medagions. Greek artists were usually employed on the Roman dies, but the ancients, having no puncheons or matrices were forced to engrave many dies for the same coin.

GENERAL.

The Paintings which were purchased from the Six collection, Amsterdam, by an English amateur, are a *View on the Merwede, near Dordrecht*, by A. Cuyt; a *Music Lesson*, by Von der Borch; and a *Young Woman at a Window*, by Gerard Dow. There is much indignation in Holland at the proposal to remove them.

The Earl of Northbrook has presented the Winchester Museum with a full-size copy of the colossal marble bust of *Jupiter Serapis*, a mongrel divinity that was derived from Egypt.

The Exhibition of the Société Nationale des Beaux-Arts is likely to be held next year in a building on the site of the Pavillon Chinois, in the Bois de Boulogne, as the Champ-de-Mars will be in the hands of the contractors for the International Exhibition of 1900.

Admiral Reveillière has proposed the transportation of the colossal menhir of Locmariaquer to Paris to form one of the attractions of the Exhibition of 1900. The people of Morbihan are opposed to the scheme.

The Mosaics of St. Paul and Dean Colet in the large hall of St. Paul's School, Hammersmith, will be unveiled on Monday next.

The Exhibition of the Society of Portrait Painters in the Grafton Galleries will be opened on the 23rd inst.

Mr. D. P. Sellar, chairman of the London Tramways Company, has offered to the Lord Mayor for the Guildhall Gallery about 200 paintings by Dutch, Italian and English masters. They are to be examined by Sir E. T. Poynter, P.R.A., on November 2.

Liège Cathedral was on Saturday last in a dangerous condition, as the timbers of the roof were burning, but although much damage was suffered the building is safe. It was erected between 1280 and 1340.

The Pope has had prepared for presentation to the rulers of various countries a series of photographic reproductions of the frescoes by Pinturicchio in the Borgia tower of the Vatican. The description is by Father Ehrle, S.J., and Mr. Stevenson, the director of the Museum of Coins.

Nineteen Antique Statues, more or less mutilated, have been unearthed in the excavations at Martres, Toulouse.

A Model of a colossal statue of *Liberty*—a woman brandishing a tree in one hand—has been erected in the Panthéon, Paris. It is the work of M. Falguière, and has not satisfied the critics.

The Directors of the London and Lancashire Fire Insurance Company have declared an interim dividend of 4s. per share (against 3s. per share last year), payable on November 3, 1897.

Messrs. Scamell & Colyer, consulting brewers' engineers and architects, of No. 18 Great George Street, Westminster, have removed their offices to 14 Victoria Street, Westminster, where all communications should in future be addressed.

The Architect.

THE WEEK.

THE spring exhibition in the Walker Art Gallery, Liverpool, will have interest for all our readers. As the Liverpool Architectural Society will attain its half century, there will be special rooms assigned to architectural drawings and designs for applied art. It is intended that the arts and crafts shall be exemplified as fully as possible, and also etchings, mezzotints, engravings, &c. In addition, photographic art and appliances will be represented. The exhibition will be open during February, March and April. All drawings and other objects for exhibition must be delivered between Monday, January 10, and Wednesday, January 12, 1898, both inclusive. Forms and other information can be obtained on application to the curator of the Walker Art Gallery, Mr. CHARLES DYALL.

THE Queen's Bench Division will on Tuesday next (assuming all the judges have not resigned by that time) consider a point which has interest for district surveyors as well as the owners of "dangerous structures." In one case the officers of the County Council were unable to discover the owner, and as the statutory notice could not be personally served it was affixed to the building. Section 196 of the Building Act of 1894 says:—"Where any consent is required to be given, any notice to be served, or any other thing to be done by, on, or to any owner in pursuance of this Act, if there is no owner, or if any such owner cannot be found, the Judge of the County Court may give such consent, or do, or cause to be done, such thing, on such terms and conditions as he may think fit, and may dispense with the service of any notice which would otherwise be required to be served." Mr. MEAD, the magistrate, however, considered that the notice must be served personally and dismissed the summons. If that view were right, it would be impossible to carry out the Act in all cases of dangerous structures where the owners could not be ascertained. The County Council accordingly have applied for a *mandamus* calling on the magistrate to show cause why he should not hear the case, and the rule is returnable on Tuesday next.

THE Housing of the Working Classes Act of 1890 was intended to promote sanitation, but it has had a contrary effect. Under the Act of 1868 local authorities had placed in their hands entirely the power of closing insanitary dwellings and ordering their demolition. The procedure under this Act was very simple and effective. But the Act of 1890 entrusted the making of the ultimate order for the closing of such houses to the hands of the justices. The ostensible reason for this was that the change of authority would tend to expedite the work and avoid the delays of giving notice and making reports. But under that Act the power was simply a power to close the condemned property and not to demolish it, and as a matter of practice it was found that this closing of property was made by the justices a question of vested interest. Before they would make an order they required that it should be shown that the property was of a poor character and low rental, and occupied by persons of limited means. It is hardly fair that the rights of the owner and the mortgagee should be swept away without compensation, and the Act offered no compensation. What is desirable is that the local authority should have a right of appeal in proceedings under section 32 of the Act, in which the justices decline to make a closing order, similar to the right of appeal by the owner of property against an order of the justices.

THE late FRANCIS TURNER PALGRAVE contributed several articles on art and literature to newspapers and periodicals. His reputation, however, was based on his compilation of the "Golden Treasury of English Songs." In 1862 he was probably the best abused writer in England. Mr. PALGRAVE was commissioned to write introductions to the different sections of the art catalogue of the International Exhibition. The articles were reprinted as a handbook and "sold within the building under the sanction of Her Majesty's Commissioners." There was plain speaking in it, but the praise as well as the blame was occasionally unmeasured. One of Mr.

PALGRAVE's favourites was Mr. WOOLNER, the sculptor. His busts were said, by force of the life that is in them, to carry us to other regions than art, and his *Constance and Arthur* was described as having a "harmony and charm of line which might have moved the envy of RAPHAEL or LEONARDO." It was discovered that Mr. PALGRAVE lived in Mr. WOOLNER's house, and his criticism of the sculptor's work was treated as if it were a puff which served instead of rent. The Commissioners were compelled to withdraw their sanction of the obnoxious handbook, and most people at the time approved of their action. Anyone who will read the handbook now will wonder at the outcry which was inspired by one of those epidemics of severe virtue to which English people are liable.

THE allotment of space in the Paris International Exhibition of 1900 is unsatisfactory for other countries besides Great Britain. The United States claimed 100,000 square metres and has had to be content with 13,000 metres, an area which is said to nearly correspond with that offered to Germany as well as Great Britain. Germany applied for 100,000 metres; Russia requires 120,000 metres. It is now manifest that the ground which is to be occupied by exhibition buildings is too circumscribed. It is not easy to discover sites which can be added. The visitors have also to be considered, and as at present planned the exhibition of 1900 will impose a strain on all who care to examine all the stalls.

IT is risky for an architect to meddle with promotion business unless he has a guarantee in writing from somebody that his expenses are to be paid. The case *BROWN v. PONTING*, which was heard on Wednesday before Mr. Justice BIGHAM, suggests that the common belief has found its way into the Courts, and every one who is connected with 'the floating of a company' is supposed to be a speculator. Kensington is now undergoing transformation, and a long line of shops will soon supplant the private houses in High Street. The plaintiff was engaged in one of the projects, and he sought to recover 400*l.* for drawing plans for the extension of the defendant's premises; 100*l.* for plans for rebuilding the defendant's premises; 105*l.* for work done for the defendant in respect of negotiations for the purchase of certain vacant land belonging to the Midland Railway Company in Wright's Lane, at the back of the defendant's premises; 105*l.* for work done on behalf of the defendant in connection with the promotion of a company which was to be formed for the purpose of acquiring the defendant's business and the adjacent vacant land. Sir A. W. BLOMFIELD, A.R.A., testified that the charges for plans were reasonable. The question however was, under what circumstances were they prepared? Mr. BROWN said he was introduced to the defendant by a man who is no longer living and was asked to aid him in finding a company to take over defendant's business. It was proposed to build flats on the ground in Wright's Lane, the lower part of the building being arranged as an extension of defendant's shop. But when it was found that the profits were less than was anticipated, the project fell through. The defendant said he had no thought of selling his business until he met plaintiff, and that he informed plaintiff he was not to be held responsible for any expenses. The Judge accepted defendant's version and held that Mr. BROWN did his work in expectation of payment from the promoters. Judgment was accordingly given for defendant. There might be doubt about the liability for plaintiff's services as a negotiator, but as it is not usual for men in that capacity to prepare architectural designs, it would perhaps have been more equitable if plaintiff were paid his claim for plans.

THE cost of the Technical School and Free Library at Widnes has exceeded the estimate by 2,700*l.* The amount which will have to be paid from rates is over 14,000*l.* It was to be anticipated that much grumbling would follow, but happily there will be no occasion. A letter was read at the meeting of the Town Council on Wednesday from the manager of one of the banks, announcing that he was instructed to pay the difference between the estimate and the outlay. It is hardly necessary to say that the Council agreed. There are not many towns where anonymous liberality takes the form of delivering a building committee from a scrape.

PUBLIC WORKS IN IRELAND.

IF the Irish Commissioners of Public Works were to advertise for pupils who should have "the run" of all the works which are directed from Beresford Place, Dublin, they would find many applicants and receive liberal fees. The outlay is not remarkable. In the year 1896-97 it was only 349,617*l.*, and there are contractors' offices in Westminster where a year's work is represented by at least three times that amount. But a course of public works in Ireland would possess a variety which is unattainable in England. Here we are mainly specialists, and a contractor likes to confine himself to railways or harbours, water supply or big bridges. But in construction, as in other things, Irishmen aim at versatility, and it is difficult to say what class of construction does not come under the control of the Commissioners. In their report we find mention not only of railways, harbours, waterworks, but of inland navigation, arterial drainage, post roads, parks, public buildings, fisheries, working-men's houses, schools, colleges, land improvement, tramways, ancient monuments, libraries, lunatic asylums and what not. The Commissioners do not carry out all the classes of works we have mentioned. They have workmen who find employment throughout the year, but in many cases contracts are let, and it is not certain they give less trouble to the authorities than those which are conducted under the immediate direction of the Commissioners' officers.

Apparently we ought to be grateful to the Irish people for expending the money which Parliament has voted, and to be able to circulate 349,617*l.* in the course of a year is, therefore, creditable to the Commissioners' diplomacy. In Ireland leisure is a force and must be respected. Great trouble has had to be taken, according to the report, "for the purpose of securing that when grants for the erection of schools have been sanctioned and works authorised, expenditure should not be unduly postponed by delay on the part of managers to commence building." The Commissioners congratulate themselves and the public because this year the educationalists did condescend to accept money as if it could be useful, for they announce:—"We have been able to issue to managers the entire amount, 40,000*l.*, voted by Parliament for the year 1896-97." Another example is afforded by the Queenstown Custom House. The Commissioners record their fears and hopes as follows:—"The vote for this building was not expended during the year because of the difficulty of obtaining a reasonable tender, owing to a strike amongst the carpenters in Cork, which lasted for about six months. Tenders were first called for in the early part of the financial year without producing any response from the locality. A second was almost equally unsuccessful. Ultimately, but not before the close of March, it became possible to effect a satisfactory contract, a tender was obtained, and under existing arrangements, which we have no doubt will be carried out, the works will be completed and the buildings occupied before winter." A pupil of the Commissioners would therefore have, among other advantages, opportunities in acquiring skill in diplomacy if he were allowed to negotiate with school managers and workmen.

But while we sympathise with the Commissioners in their endeavours to have work executed, it is impossible not to feel dissatisfaction when we find they have the hardihood to undertake decoration. The report announces, for instance, that "for the first time since its completion by GANDON in 1796 the great hall of the Four Courts has been redecorated, the original tints being reproduced as far as possible." What must have been the state of the hall with a century's dust adhering to the walls and dome we can imagine, but we doubt if its appearance suffered more from the official neglect than from the official adornment. The throne-room in Dublin Castle has also been "decorated" by the Commissioners, and in the old Royal Hospital, Kilmainham, which is the Dublin Horse Guards, "the coved plaster ceiling of the chapel, an elaborate work in high relief, has been repaired and decorated." In all such cases it should be incumbent on the Commissioners to obtain a certificate from a Dublin architect that the money expended on decoration was not wasted.

Although a large sum has been expended on building works, it cannot be said that any one of them is of archi-

tectural importance. A parcels post-office was commenced about a year ago in Belfast, which is supported on 240 piles, having an average depth of 33 feet 9 inches. But the most interesting building is one which is out of place in the Commissioners' report, for not a penny of public money was spent in its erection. We refer to the building of the Students' Union, attached to Queen's College, Belfast. It cost 8,000*l.*, which was obtained from past and present students and their friends.

Two thousand years have rolled over the cabin of the Irish peasant without bringing any change, said TOM MOORE, the poet. But since he lived it has been recognised that it is not an advantage for a country when human beings are treated like swine. The Commissioners can lend money at 3½ per cent. to boards of guardians and 3¼ to landowners and tenant-farmers who wish to erect labourers' cottages. It is also possible to obtain money for housing the working-classes in towns at a nearly similar rate of interest. The loans sanctioned on the security of the undertakings in thirty years amount to 790,949*l.*, those on the security of the land amount to 357,079*l.*, while the loans secured on rates amount to 1,636,222*l.*, or, according to another statement, 1,855,299*l.* We give the figures with some hesitation, for the abstracts of accounts are not as well adapted for reference as those relating to English offices. It is evident, however, that enough money was expended to make a sensible difference in the character of the labourers' cottages.

The number of "castles" in Ireland would appear to be countless. The majority of them would not, however, give much trouble to besiegers. In order to enable owners to put those habitations into decent repair Acts were passed in the years 1870, 1871, 1882 and 1890. But it was contemplated that the loans should be obtained from private sources. But as the charge under those Acts does not take priority over mortgages or other encumbrances affecting the land and already existing, there is not apparently much work for builders created by the Limited Owners' Residences Acts.

One of the reasons advanced in support of a separate legislature for Ireland is the heavy expenditure which is necessary to obtain an Act in London authorising a railway to be constructed. By the Railways (Ireland) Act of last year a more economical procedure is authorised in the case of poor districts. All that is henceforth necessary is a certificate from the Lord-Lieutenant stating that the proposed line is necessary for the development of the district through which it passes. The Treasury is, moreover, empowered to give aid towards the cost of construction provided some existing railway company agrees to construct, work and maintain the proposed line, or to work and maintain it after construction. It is expected that the land required has been given without cost. The Commissioners of Public Works are to examine the plans, and in "congested districts" can undertake the construction of the line if a railway company is not available. An extension of the Act, in order to make it applicable to various classes of works, would be advantageous to Ireland, although there might be an interference with the privileges of the Parliamentary Bar.

The Commissioners have had several ancient monuments under their protection and several others are being acquired. Sir THOMAS DEANE, R.H.A., who has charge as superintendent of the ruins, supplies the following report of the year's work:—

Castledermott, co. Kildare.—This abbey was founded by St. Diermitt within the first century after the introduction of Christianity into Ireland. Nothing remains of the ancient structure. The building of which the remains exist was erected about 1260 A.D. The style is Early Decorated and includes a long nave transept with three side chapels. The tracery of the transept window has fallen and the remains have disappeared. There are traces of an aisle between the transept and the western end. Repairs which substantially secure the ruin from decay were executed during the year, and some further work will probably be considered desirable at a future time.

Askeaton Castle, co. Limerick.—This monument, which was the great seat of the Desmonds, is situated on the river Deel. There are considerable remains of the banqueting hall, including traceried windows at either side. The keep is of great height, but much dilapidated. The embattled wall of the castle is almost perfect. Works of a preservative character have been carried out and the ruin is now in a safe condition.

Askeaton Abbey, co. Limerick.—This ruin is situated also on the banks of the Deel. Perhaps it is one of the most

interesting abbeys in Ireland, having still complete cloisters, conventual buildings, refectory, &c. There is a fine eastern window, with remains of sedilia, and the arcading of the eastern wall is preserved. This arcading is of the same character as that in Ennis Abbey, and its features would lead to the conclusion that the same hands worked at it. James, the seventh Earl of Desmond, founded the abbey, A.D. 1420, for Conventual Franciscans. It was reformed for Observantine Friars in 1490. The works necessary for preservation were carried out during the year.

Ruins on Devenish Island, co. Fermanagh.—These monuments were vested in the Board in 1880 and works of preservation executed. In the course of the year the abbey and round tower were struck by lightning, which led to the necessity of considerable outlay on repairs. The superintendent of national monuments availed himself of a scaffolding to the tower which was erected in connection with the repairs, to have casts taken of some curious carved bands which surround the top. The casts have been deposited in the Science and Art Museum.

Dunbrody, co. Wexford.—Some work, in addition to that carried out in 1895-96, was carried out during the year under report. There still remain some few items to be dealt with, and it is proposed that these shall be attended to during the present year.

Slane Abbey, co. Meath.—The works here, which were commenced in 1895-96, have been completed satisfactorily.

Clare Island, co. Mayo.—Certain minor works of maintenance have been executed.

New Grange, co. Meath.—It has been found necessary to expend a small sum on the maintenance of this monument during the year.

Roscommon Castle, co. Roscommon.—Considerable repairs have been carried out on this important monument.

There is much else in the report which deserves attention, for in variety it surpasses any document issued by that monopolising body, the London County Council. But enough has been said to suggest that Ireland is receiving attention and aid from the Imperial Government, and if improvements are not realised the cause must not be ascribed to official neglect.

THE ARCHITECTURAL ASSOCIATION.

A MEETING of this Association was held on Friday evening last, Mr. Hampden W. Pratt, president, in the chair.

The following gentlemen were elected members:—Messrs. C. E. Abercrombie, S. J. Tatchell, H. W. Fitchett, H. M. Nisbett, J. H. Cammack, G. Trotman, C. H. B. Pinchard, W. H. Collin, P. B. Dannatt, A. G. Dorrell, L. de Senna Fernandes, E. M. Thomas, H. C. Fread, S. H. Goodwin, O. O. Harrison, H. J. Ingram, C. M. Inman, B. J. McAdam, C. E. Okely, A. W. Papworth, F. E. Ravenscroft, A. H. Rowe, H. Y. Smallwood, W. F. Wilkie, E. L. Wratten, M. D. Barton, A. R. Conder, R. G. Ell, A. Foxley, G. J. F. Hookway, Max Judge, A. R. Keighley, A. V. Kislingbury, W. M. Settle, W. A. Jeckells, P. J. Westwood, L. I. Wood, E. M. Joseph, R. Hosking, H. Macintosh, C. H. Reilly, G. Church, H. E. Rider, D. J. Fyfe, J. A. Swan and H. S. de B. Lopez.

The Chairman announced that the first stonework demonstration would be held on November 2 in the Regent Street Polytechnic. These demonstrations had been arranged by the Technical Education Board, and were free to all members of the class of design.

Mr. Edwin O. Sachs then read his paper on

Lessons from the Paris Charity Bazaar Fire.

The author began with a description of the terrible fire in the Rue Jean Goujon on May 4. Although there were about 124 deaths in forty-eight hours, say three days at the utmost, the fire was forgotten, exactly as was the case with the Vienna "Ring" Theatre fire of 1881, with its 450 fatalities; with the Opéra-Comique fire in 1887, with a death-roll of 115, and other great catastrophes. Even when the Exeter theatre was burnt down in 1887, and 160 lives were lost not many miles from this Metropolis, the country forgot all about it within a week. The paper was prepared because it was believed that the architect, the surveyor, often assisted by the civil engineer, can do far more in minimising the loss of life than any law or regulation. But the theatre architect, when fighting against some long list of requisitions, is proud when he can point out to the lessee, "I have saved you that exit; I have saved you that reduction of seats," and maybe he also thinks of the extra fee, but certainly he never—any more than the architect with the factory case—gives a thought to the lives of those who enter the building on which he has advised. The client very seldom wishes to oppose the legitimate requirements of the authorities, or at least not until the architect has told him of all the savings

he will try to effect by avoiding the regulations and requirements. Every factory owner knows what a fire would mean for his business, no matter how well insured he may be; every theatre owner and manager knows his responsibility well and knows that the audience of to-day wishes to feel safe when taking their amusement. The opposition of 1897 mainly emanates from the architect. Mr. Sachs next considered the arrangements of the Charity Bazaar.

The plan of the building shows a long gallery constructed of a series of framed trusses, the whole of the work being in timber. All the walls were match-lined on both sides. The roof was partly covered with tarred felt and partly with glass. The total cost of the structure was about 12,000 francs, or about 480*l.*, of which sum nearly half was spent on the materials employed. The contractor carried out the work with particular regard to economy; and hence, perhaps, the lightness of the materials. So far as the contractor was concerned, the building appears to have been considered of a private character, little or no supervision apparently being exercised

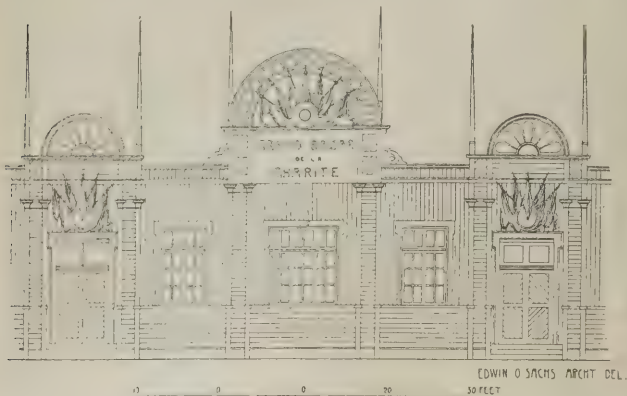


by any of the local authorities. The principal entry was through two doors placed centrally, No. 1 and No. 2, and the visitors passed through a small vestibule and inner lobby in each case. There were four additional exits at the back, Nos. 3, 4, 5 and 6, of which No. 3 alone seems to have been well known, owing to its forming the approach to the cinematographe annexe. There was another exit, No. 7, used for service purposes, with which only the management and the stall-holders were acquainted, and there was also a small door from the refreshment annexe, No. 8, into the open. In the front of the building there were several windows to the office, the ladies' room, &c.

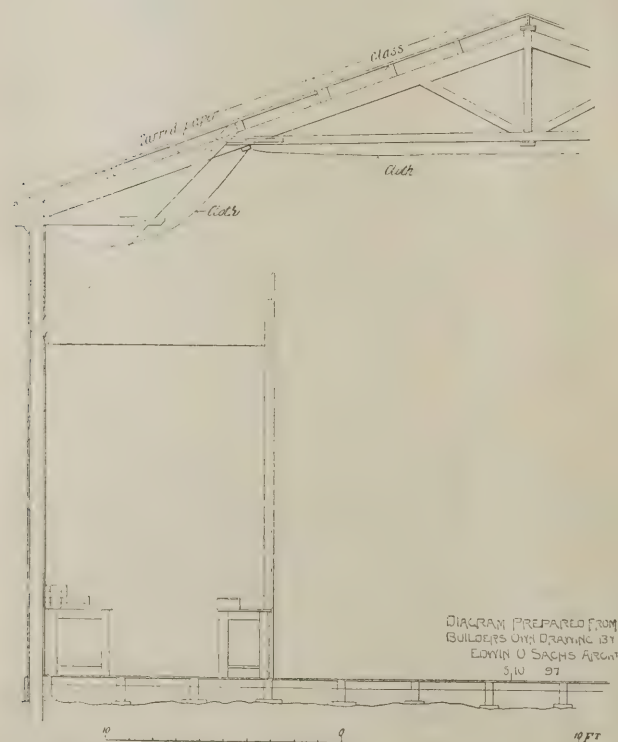
On both sides of the gallery there were rows of stalls, and the construction of these, together with the section of the building, is shown in the diagram I have had specially prepared from the working drawings in the hands of the contractor. The frontages of these stalls were faced with scenery, whilst the top of the hall was closed in by a velum of canvas. The decorations were elaborate, and, I must again add, particularly inflammable, whilst the articles for sale on the stalls were, of course, of a similarly dangerous character. Perhaps I should also mention that the decorations to the stalls were old, worn and very dry. The floor was of wood, resting on timber sleepers. On the exteriors the only attempt at decoration had been in the central feature.

There is no doubt that the fire originated in the cinematographe annexe, and the actual cause was due to carelessness in using the special lamp employed, but I will not go into detail

on the point of the actual cause of the outbreak, as this would not teach us much and only afford another instance of the criminal recklessness with which mineral oils and explosives are handled. It appears that the flames at once broke through to the gallery, and were drawn immediately across the hall to entrance No. 1. It will be seen from the drawings that the glass at the top of the building must have been broken



almost immediately through the enormous velum becoming a sheet of fire. Further, it is evident that the velum must have broken away from the points at which it was hung, falling on those beneath it. The tar on the roof also dropped in a molten or burning state. The plan will explain how those farthest away from the centre on the cinematographe side of the building must have been cut off directly the flames took a hold of the doors No. 3 and No. 1. It was further natural that there should then be a general stampede towards entrance No. 2, and to that part of the hall farthest from the cinematographe. The extra doors, No. 5 and No. 6, were apparently so little known that they were not used, and it appears that many of the visitors were caught at the entrance to the store annexe, which I have already stated was then serving as a cloak-room, and hence well known to many of the ladies, who, in the excitement of the moment must have associated it with an exit.



It is not my purpose to discuss the plan in detail, but there is one thing certain, and that is that at first sight the number of exits, eight in all, would appear sufficient for a substantially built structure which has its floor on ground level. I would even go so far as to say that there are not many galleries of the same dimensions, standing under the control of a public authority in this country, that have a larger number of exits; but here it should not be forgotten that in the planning of places of public entertainment precautions are not based on the assumption that flames will spread with such rapidity as was the case among the decorations, fittings and general appliances of this fatal structure. In a well-planned theatre of the most modern type there is always the supposition that some four or five minutes' time will be given to the audience to leave their seats in the auditorium proper. There is one unfortunate

feature of the planning of the Paris Bazaar I cannot, however, help noticing, and that is the manner in which the lobbies to entrances Nos. 1 and 2 were set out with the view of excluding draughts. I am unable to get reliable information if the wings to these doors swung outwards. As to the doors Nos. 3, 4, 5, 6, however, I know that they opened inwards and that one of them was blocked or bolted at the time of the catastrophe. The author then treated the subject of

Fire Prevention of To-day.

He said:—Now, gentlemen, if I may be allowed to classify, the Paris Charity Bazaar was a semi-public entertainment held in a provisional building. As you know, our entertainments are either of a private character, of a semi-public or of a public character, whilst the buildings utilised are either permanent structures specially erected for a specific purpose, permanent structures temporarily adapted for some such purpose, or they are provisional buildings.

Safety at Public Entertainments.

As far as public entertainments in buildings specially erected for the purpose are concerned, nearly every country has already inaugurated some policy for preventing catastrophes. I here speak of the theatre, the music-hall, the assembly-room, &c. Europe has, in fact, every kind of legislation conceivable for the protection of the public in this class of structure. There have been hysterical panic legislation, ponderous regulations in which every detail is defined by law, also codes which leave practically everything at the discretion of an executive of experts, and regulations which are merely so by name and are a farce because they cannot be put into force. There is no uniformity in the preventative legislation of the world, even in its elementary principles. If we study the regulations of different countries consecutively with an idea of discovering what is really necessary, the result is most confusing. Now, I am not going into detail. Don't be afraid; I shall not quote clauses. But for all that, I will say broadly that some countries seem to consider that good construction is the essence of safety, whilst clear planning, watching and inspection are forgotten. Other countries give all attention to endless regular inspection and omit the watching; others, again, require inspection only; whilst others, perhaps, insist on good planning, construction and ample inspection, but disregard the watching. It is time for some representative body of experts to decide what they consider necessary in the interests of the public. I am not going to raise the many questions as to the proper executive for locally determining or enforcing the requirements, nor shall I enter into the merits of individual regulations. I will simply call your attention to the want of uniformity in the main and elementary principles for obtaining safety where we have to deal with buildings erected for specific purposes and where specific forms of entertainment are given.

Personally, I hold that for a theatre or music-hall clear planning is of greater importance to the audience than clever forms of construction, or the employment of materials having considerable power of fire resistance; and further, I contend that in such buildings the regular attendance of fire watches day and night, and more especially during performances, is more essential than any amount of regular or even surprise inspection. But remember this is only a personal opinion. There are no definite conclusions as yet arrived at by any body of experts representing the conflicting interests which play such a prominent rôle where our public entertainments are concerned.

In expressing my opinion on the matter, I should, perhaps, say at once that I consider it the duty of the authorities to attend to the protection of life in the first place, and to the protection of property in the second. As we all know how easily a panic occurs without any fire, and how dangerous the rush of a frightened audience can be, the clear exit of ample dimensions and most direct route will be the greatest safeguard against loss of life, and perfect symmetry of plan of very great value. The prevention of a cause for panic is best guarded against by the constant presence of experienced and responsible firemen, who will on the one side recognise the possibilities of danger in time to prevent a fire, and on the other be able to act smartly in case of an outbreak. I do not wish to disparage good construction, or regular and surprise inspections; but I consider the most careful regulations as to construction and materials are of little practical value, so far as the safety of the audience is concerned, if at the same time the planning is not straightforward; and responsible firemen are not regularly in attendance. To take an extreme case, wood stairs will take the audience quite as quickly into the open as stone ones, and stone stairs with many winders and a complicated plan will be far more dangerous than wooden ones of straight flights of, say, fourteen steps each. Don't let me be misunderstood; of course good construction and fire-resisting materials lessen the risk of an outbreak of fire, and I shall always advocate such construction and materials. But I have inspected many theatres, built of slow combustion materials, and yet have found them dangerous in the extreme through bad planning, and I wish to

point out that a building erected entirely of fire-resisting materials is not necessarily the safest. It is also on account of my acquaintance with the fact that many important cities, though equipped with modern regulations for the erection of theatres, have no powers to enforce the presence of an official fire-watch during the performances, that I am anxious to lay stress on the necessity of watching, and not only inspecting, the theatre and music-hall of to-day.

Preventative Means at Semi-public and Private Functions.

All that I have said so far refers to the permanent building erected for a specific public entertainment, and even here, with given facts, I have to tender personal opinion because we have not yet arrived at definite conclusions on the subject. What, may I ask, is the state of affairs as to semi-public and private entertainments in buildings, halls or rooms temporarily utilised for gatherings of this description? Why, so far nothing whatever scarcely has been essayed, let alone decided. Legislation on the subject in this country is as non-existent as it is on the Continent. Why, we have not even as yet any practical definition as to what a private or a semi-private entertainment is. The whole subject is so delicate that even such despotic police administrations as those of Prussia and Russia have not yet felt their way. Where do the privileges of private entertainment cease, and when does an entertainment assume a public character, not only as such, but more especially in respect to public safety? Cannot every man do exactly what he pleases on his own property so far as entertainment is concerned, and as long as the general public is not admitted by payment? But is not a Foreign Office reception on Her Majesty's birthday in reality, to all intents and purposes, a public entertainment, and similarly the ladies' political drawing-room meeting in Park Lane? Is not a bazaar held in a tent, say, at the Botanical Gardens, and to which only members of the society with their friends are admitted, a public entertainment? How many bazaars, let me ask, are held without payment for admission on private property which are essentially of a public character? Think of the many meetings, so-called private theatricals, subscription balls and other fêtes. How is classification to be attempted? How are we to define our entertainments? But is it necessary to classify at all? Is it essential to make limitations as to the different classes of our entertainments? I think not. Whilst most of our legislators at home and abroad are trying to define our entertainments and then to frame certain requirements for the safety of the public, why not let the character of the entertainment take care of itself? Let us look on every room over a given size as a place in which we may or may not congregate, with or without payment, to dance, to sing, to let others sing and dance, just as the case may be. Let the superficial area of any given room and its position alone govern our requirements for safety; not the fact that it is a private dwelling house, a saloon at an inn, a schoolroom or a board-room.

If the Building Act of to-day defines the thickness of a party wall and its height above the roof, quite independent of the fact of a man giving a party, or lending his house for a drawing-room meeting, having a chemical laboratory in the place, dancing classes, or a school, why should there not be such planning compulsory as to prevent any room over a given size, be it a ball-room or a studio, being used without risk to life? Why should not every large drawing-room on the first floor have sufficient exit and staircase accommodation to deal with the maximum number of people who press into that drawing-room? And let the same hold good for every class of structure, if a public house, a schoolroom, or a chapel. Do we not all know the bazaars held in houses kindly lent by charitable owners? I have a house in mind in Carlton Terrace where the first floor drawing-rooms are at times simply packed, and the staircases so crowded that it takes a full half-hour to get from one floor to another. The function was essentially a semi-public character, and as dangerous a one as I can remember. You all know the entertainment in the parish schoolroom, given ostensibly by the schoolmaster to the friends of the pupils. Well, again, don't let us bother too much as to the exact purpose of any gathering, but let us build our larger rooms so as to allow for assemblies of any description, with safe and speedy exit in case of need.

But how are we to assure ourselves that even if any one room or hall fulfils the ordinary requirements of safety as far as plan and construction are concerned, that the variations in the interior arrangement, in the decoration, &c., do not more than annul what the architect has done? Of course a building, a room, or a temporary structure should be used for what it is designed and for no other purpose. But in reality we must consider the possible purposes to which a room may be put, in fact, the dangers of any decorations or paraphernalia necessary for the fulfilment of various objects must be considered at the time of construction. A hall which is used as a ball-room and which is perfectly safe as such, may be a veritable mouse-trap when used for theatrical entertainments. A hall designed only for banquets, public dinners, &c., may become dangerous

when utilised for bazaars, with all the temporary stalls and side shows. The building must be designed to fulfil conditions of the greatest possible danger. Of course many hold that we cannot limit ourselves to controlling the erection of buildings, but we must seek to obtain control over the employment and the manner in which they are equipped for its different purposes. No doubt it is just the ordinary drawing-room, the ordinary assembly-room, the schoolroom, &c., which is used for so many purposes for which it is never intended, and that there are many dangers incurred on that account. Such control has been attempted in some continental countries. But I think such control would be very hateful in these freer isles. We would, I am sure, rather build our houses and halls at once in such a manner as to be prepared for all risks rather than be constantly worried by inspections and the like. What may be good for a continental country is not suitable for us. We all abominate anything like perpetual grandmotherly interference. Hence, I say, rather let us at once build suitably for all emergencies. If we do that we need not be constantly worried. Perhaps even improvement of plan and construction at the outset in a new building appears a very serious matter to you, but think, what does it really mean in nine cases out of ten? A few extra doors, and these so hung as to swing outwards; staircases perhaps somewhat broader and not of a dangerous hanging type; handrails perhaps on both sides; a few safety bolts or latches. Surely this would not even interfere with a great art-architect's design, his colour scheme or details, and would this not save us endless worries of control over all private and semi-public entertainments?

Unsuitable Provisional Buildings.

And now comes the question of provisional buildings erected for some specific purpose, such as a bazaar, and often allowed to remain in position for some indefinite period. Again we find nothing has so far been done or decided so as to minimise danger in these structures—in fact, the meaning of a temporary structure has scarcely been defined. Is the large tent built in the garden of a private residence or on some verandah a temporary structure or not in the meaning of the Act, and if so, why are such tents erected with impunity for all manner of social functions throughout the London "season"? To my mind the less temporary structures are encouraged the better, and this no matter what their character or purpose. But when erected, let the same importance as to planning and watching be accorded to the provisional building as is essential for a permanent structure. Let us also remember the Charity Bazaar fire, and let us consistently avoid the flimsy and dangerous materials used for its construction. Why, we can even have temporary iron buildings at a very reasonable expense. But above all, planning and watching should be kept strictly in mind. I am not going into details this evening, but if you wish to have some valuable information as to what can be done and what the architect should bear in mind when associated with a temporary building, I cannot do better than refer you to an article by an old friend of the Association, Mr. H. Heathcote Statham, and published in the *Engineering Magazine* of July last.

Dangerous Decorations.

It is not my object, as I have said, here to deal with details, neither in regard to the construction of our permanent theatres or public halls, our private drawing-rooms and our temporary buildings. The diagrams of the temporary structure at Paris, to repeat what I have said, serve as sufficient warning as to what must be avoided in this direction. It is likewise not my wish to enter into details on the question of equipment, for here again the diagrams will show everything that is to be condemned. There is so far, I am aware, little or no regulation as regards such equipment of to-day. The matter has, in fact, scarcely ever been discussed, though an all-important one as far as safety of life is concerned. I do not wish to air personal opinions on the subject of equipment, for it would take a long time to explain the possibilities, probabilities, &c., of the question. If I may be allowed to call attention to any one thing, it is, however, to the fact that whatever the architect may do in any class of building used for entertainment, his efforts can so easily be annulled by flimsy decorations, appointments, equipment, &c.; it is just this so-called decoration combined with carelessness on the part of the individual that is the actual cause of most fires. Apart from facilitating the escape of the individual, the architect's efforts are to a great extent limited, as far as the actual fire is concerned, first, to avoiding the possibility of an outbreak occurring in connection with the structure proper, and, secondly, seeing that should an outbreak occur his structure does not facilitate its spread. The architect cannot prevent a drawing-room or a schoolroom, being decorated with bunting, Liberty silk or paper rosettes, and, as I have said, control in these matters would probably not be advisable in England. He cannot prevent the smoker "lighting up" at his smoking concert or prevent the use of open lights, and official interference in such matters would be unacceptable to the average English-

man. We can no doubt prevent many dangers in the usage of buildings erected for public entertainments. We could and should prohibit the wood stage of the theatre, we can prevent muslin hangings being used in the auditorium, and allow smoking only in specified rooms. But such restrictions would be intolerable and extreme if applied to rooms used for private and semi-public gatherings. It would not be practicable. Thus again, remember, we have to deal with certain well-known possibilities of fire with certain given facts, and for these facts you have to provide. The actual disuse of those Liberty silks, open lights, muslin, paper roses in our private and semi-public entertainments rests entirely with the good sense of the general public. Until the general public boycott them, you will have to take them into account when you are at your drawing-board or superintending your jobs.

Conclusion.

And now what is to be the remedy for the present state of affairs regarding safety of life at entertainments and gatherings of different descriptions?

The first and principal remedy to my mind, as I have already indicated, lies in your hands, as representatives of the architectural profession. It will be the architect mainly to whom we shall have to look for safety—we have to rely on the spirit with which he designs his structure, no matter what the regulations may be. At present, I am afraid safety of life is about the last thing that the designer thinks of. Safe planning and fire-resisting construction will have to become subjects in the student's curriculum, and the practitioner of to-day must have his attention called to these matters.

Secondly, we must depend largely for improved protection on the general public, who will to a great extent sooner or later have to take upon themselves the rôle of being their own guardians. At present there is not the slightest interest in this country in the question of protection from fire, whether it be in connection with our entertainments, or with the fire losses generally. That interest will have to be awakened. The public will have to call for protection, and will have to give protection from fire the same amount of attention which is accorded to safety in travelling, safety of health through sanitation, and safety from social disturbance through police supervision. Whilst the architects on the one hand will be acting as experts and giving the British public safer buildings, that British public will in time see that these buildings are employed for what they were originally intended, and that no unsuitable decoration or equipment is permitted. Such gross mistakes as are now being constantly made will, if I may say so, some day be instinctively avoided.

Thirdly, architects and public opinion will have to be supported, their hands strengthened or governed as the case may be by further legislation, giving the necessary powers to those in authority to intervene where necessary, and laying down the principles that have to be followed; and with new legislation, we should also remember that we shall require more officials who will in every way be capable of carrying out its administration, and the execution of any specific code with tact, knowledge and sound common sense. Legislation on building matters always requires a certain power of discretion for the officials. We do not want the red-tape automaton so conspicuous in some of the continental countries.

But how are these remedies to be brought about? Of course there is always a considerable literature forthcoming on a subject of this description after every catastrophe. We have had literature enough after former fires, but unfortunately, except for the steps already taken as to theatres and licensed premises both at home and abroad, it has been literature alone. There has been much writing, but very little action. It is now time to take action. We do not wish London to be the scene of a calamity similar to that by which Paris has been recently visited.

How are we to get the architect in practice to take a little interest in fire protection, not only in its general aspect, but specially in connection with our entertainments? How is the student to be encouraged to take the matter up? How, again, is the general public not only to be interested but educated? How are our authorities to be assisted in arriving at practical conclusions and regulations, and our officials kept in touch with what is going on in these matters?

It is a big question, gentlemen, for I go so far as to say that in regard to the general public we should even let the Board school "standard reader" have pretty fables dealing with the dangers of fire rather than some of the useless stories that appear to-day. Don't think I am proposing anything new. Sweden has long utilised its "standard reader" for impressing matters of importance on the rising generation. We all remember our fables. Surely they would impress on our minds such things as the danger of throwing matches about? I go further still and say that the public press, that great educational factor of to-day, might be induced to give us something more instructive about fires than mere reports of conflagrations, the

efforts of our gallant firemen and the exact number of feet of hose that are taken to a large fire. We might hear more of the origin of fires and the possibilities of prevention.

How are we to attain these improvements? Well, gentlemen, to my mind the right note has been struck at Paris. It has said:—"Call together your leading architects and surveyors, your civil and mechanical engineers, your experts in chemical and other sciences. Call together your leading officials, the leading Government and municipal workers and others seriously and scientifically interested in the technical and economical problems of to-day. Don't forget the leading fire-brigade officers nor the owners of warehouses, theatres and other dangerous property. Combine the many conflicting interests. Don't be afraid of compromise. Avoid one-sidedness. Examine what has so far been done at home and elsewhere. Find out what proposals are stowed away in men's minds. Confer. Then act, and act soon. But mind, no one-sidedness or petty prejudices." That is the advice from Paris, where it is being acted upon. Other countries will act on it, too, and I hope Great Britain will be foremost among them. A small start has, in fact, already been made. At the initiative from Paris a small committee has been formed which is taking up this matter of fire-prevention. This is scarcely the place to mention names, but perhaps I may say there are among the members men whom you know and admire. That committee, made up of representatives of the different interests will soon find a way to help the architect, to see that the general public does not forget the lessons of the Paris fire, and that our legislators have sound independent assistance when required. Well, gentlemen, I hope some of the prominent members of the Association will be among the first to join and help this committee, and thus show that the opposition I first spoke of is not favoured by the leaders of our profession. It is fire-prevention, mind you—preventing fires—that we have most to-day to think of—not putting the fire out when it is there. Let our gallant firemen look after the fire-fighting when the fire fiend is actually among us, but let us see that our firemen have as little work to do as possible, and that they are not handicapped to the extent they are at present.

A discussion followed, the speakers being Mr. Richard Roberts, vice-chairman of the theatres committee of the London County Council; Mr. S. G. Gamble, of the Metropolitan Fire Brigade; Major Fox, of the London Salvage Corps; Mr. T. Blashill; Captain Dyson, of the Windsor Fire Brigade; Mr. H. Lovegrove and Mr. Max. Clarke, and Mr. William Archer.

Plans and photographs were exhibited on screens.

THE OLD LIBRARY, BIRMINGHAM.

THE Birmingham Library, known better as the Old Library, seems to be in a fair way of losing its time-honoured habitation. The dingy but cosy building in Union Street, the beloved haunt of four generations and more of students and literary loungers, is threatened with destruction by the scheme for a new arcade. In these circumstances a paper on the history of the institution, read by the librarian (Mr. C. E. Scarse) at the meeting of the Library Association in London on October 22, is especially interesting. The small beginning of the library is recalled in the statement of Hutton, that "the whole stock (of books) might have been laid in a handkerchief." The institution, however, as Mr. Scarse says, has become almost part and parcel of the town, and, although it has passed through many trials and troubles, it is now at the ripe age of 118 years hale and hearty, and likely to survive the great uprooting which it is expected will take place in the spring of 1899. It was feared that when the Free Library was established in Birmingham this library would eventually become extinguished. At that date there were about nine hundred subscribers, to-day the number is considerably over two thousand. The last quarter of the eighteenth century was a period of great intellectual activity in Birmingham, and the ambition of the townsmen was for the establishment of a permanent library, in which the books that were purchased should remain, and by continued accretions ultimately grow into an important public library worthy of the town. The Birmingham Library was founded and opened in November, 1779, by nineteen subscribers. The first printed catalogue was issued in 1781 in thirty-two pages, of which fifteen were filled by the laws, twelve by the titles of books, and the rest by the names of subscribers, who had increased from nineteen to twenty-four within two years. The laws provided that every subscriber should pay a guinea entrance fee, should receive a printed ticket, numbered and signed by the president; should also pay 6s. in advance towards the expenses of the current year. Every subscriber was to have the power of transferring his share, but not of lending his ticket, or any of the books, to any person out of his own house under the

penalty of half a crown. The committee was to consist of twenty members, "each member giving the president a list, unseen by the rest, of those persons of whom he would have it (the committee) consist." . . . "Whatever expenses they shall choose to be at shall be defrayed by themselves, and not by the society." The locality of the library in 1781 is shown by the following note:—"The books are to be had of Mr. John Lee, jun., Snow Hill, the present steward and treasurer, every Monday, Wednesday and Friday morning in each week, from nine till ten o'clock, until the room which is engaged shall be ready for them, of which notice will be given in the newspapers." Mr. John Lee, jun., was a merchant and button-maker. The library two years afterwards was removed to the premises of Messrs. Pearson & Rollason, in the Swan Yard, High Street. Dr. Priestley, on his arrival in Birmingham at the end of 1780, took a great interest in the prosperity and progress of the library, and the early advertisements were written by him. For instance, *Aris's Gazette* of June 11, 1781, has the following:—

"Birmingham Library.—A general meeting of subscribers to this institution is appointed to be held on Wednesday, June 13, 1781, at the Castle Inn, in High Street, at three o'clock in the afternoon, when every subscriber is desired to attend, to consider some of the laws relative to the government of the society. This library is formed upon the plan of one that was first established at Liverpool, and which has been adopted at Manchester, Leeds and many other considerable towns in this kingdom. The books are never to be sold or distributed; and, from the nature of the institution, the library must increase till it contains all the most valuable publications in the English language; and from the easy terms of admission—viz. one guinea for entrance and six shillings annually—it will be a treasure of knowledge both to the present and succeeding ages. As all books are bought by a committee of persons annually chosen by a majority of the subscribers, and every vote is by ballot, this institution can never answer the purpose of any party, civil or religious, but on the contrary may be expected to promote a spirit of liberality and friendship among all classes of men without distinction. The library in this town is at present in its very infancy, but it already contains a valuable collection of books, catalogues of which may be always seen at Messrs. Pearson & Rollason's; and when the library room (which is already engaged in the most central part of the town) shall be opened for the reception of it, and the constant accommodation of all the subscribers, the advantages arising from the institution will be greatly increased."

The management of the library did not always exhibit that spirit of liberality and friendship which the learned doctor had anticipated, for a bitter controversy sprang up between the representatives of the Evangelical Church party and Dr. Priestley, and it is not improbable that the first of the seeds which germinated into the Birmingham riots were sown within the library walls. The librarian (Mr. William Horne), it was announced, would attend "to deliver the books every day (Sunday excepted) from two o'clock in the afternoon to five." For this duty he was paid 10*l.* a year. It was further announced that "within those hours any subscriber may see the books, read and make extracts, &c., at his pleasure. A fire will be kept in the room, and the last reviews will always lie on the table." In 1784 the reported number of volumes in the library was 900. This increased to 1,200 in 1785, and to 1,600 in 1786, when it was announced that the library was too small for its requirements. At the close of 1789 the books had increased to 3,400 volumes, and in the following year the library was removed to larger premises in the Upper Priory. The tontine system was then highly popular, and it was proposed to lease a plot of land and to erect a building on the tontine plan, a sort of lottery in which the latest survivors came into possession as the rest of those named in the deed died off. The following preliminary advertisement was issued in 1789:—

"Birmingham Library.—A subscription is opened in the library for 200 names to raise 1,000 guineas for the purpose of building a new and complete library, to be let to the society at 25*l.* per annum, on the tontine plan. Those gentlemen who wish to subscribe for one or more shares, not exceeding ten, are desired to send their names to the librarian immediately. Any person having a freehold spot of land in a central situation to dispose of is requested to send his terms in writing to Mr. Horne at the library, and any builders wishing to undertake the building may send their plan and estimate to the same. The land must be at least 200 and from that to 300 square yards."

The tontine deed was subsequently printed. It gives the names of 138 "parties" to the deed, and a list of persons nominated under each of the 181 shares. An indenture, made March 25, 1798, recites an indenture of lease made on or about June 15, 1797, between William Withering (the famous doctor and botanist) of the one part, and Thomas Cooper, Charles Twigg, James Timmins, Joseph Gibbs and John Petty Dearman of the other part; whereby "all that piece or parcel of ground of the said William Withering, situate and lying in

Birmingham aforesaid, near to a street there called Cherry Street, and then lately used as a bowling green, formerly called Corbett's Bowling Green. . . . And also that building then erecting upon the said piece or parcel of ground, and which was designed by the said parties to be used for the purpose of a public library," is leased to the said Thomas Cooper and others "for and during and unto the full end and term of 120 years, to be computed from the 24th day of June, 1793, at and under the yearly rent of 11*l.* 15*s.*, payable as is therein mentioned." The recital also mentions that the building (designed by William Hollins) cost 905*l.*, and that it shall be let to the subscribers "at the clear yearly rental of 22*l.* 12*s.* 6*d.* only, but subject, nevertheless, to the payment of the ground rent," and all other rents, taxes, repairs, &c. In 1840 the building was enlarged, the original plan being preserved and continued in the front elevation. In this year the London Library applied for information as to the constitution, laws, rules, stock and general arrangement in the Birmingham Library. In 1860 the committee's report contained the announcement that in the October previous the arrangements for the amalgamation of the new library with the Birmingham Library had been completed with most satisfactory results. The proposal to amalgamate the two institutions arose from a sudden loss of forty members, in consequence, it was believed, of the proposed adoption of the Free Libraries Act in Birmingham. The affairs of the library continued fairly satisfactory for the next sixteen years, and on March 24, 1876, the present librarian entered upon his duties. In 1877 the laws of the library were, at the suggestion of the librarian, altered so as to more clearly define the privileges of the proprietors and subscribers, and readers' tickets were issued to other members of subscribers' families at five shillings each. The overcrowding of the library by persons who had no right to enter had rendered the issue of tickets necessary, and by this method the difficulty was removed. The following year the committee reported that "the librarian had rendered a valuable service to the members by rearranging the books on a classified system, which offered great facilities for consulting the various departments of the library."

The alteration of the laws was the means of placing a value on proprietors' shares, which before then it was difficult to get accepted as gifts, and from 1878 until the present time upwards of 1,200*l.* have been received on the sale of shares which have lapsed to the library. In 1888 the laws were again altered, and additional premises were taken for an extension of the library buildings. Two large reading-rooms were added for the exclusive use of proprietors. The one for gentlemen was made a smoke-room, and for the ladies a comfortably furnished parlour was provided. The additional rent was in a very short time more than met by the additional subscriptions. At the close of 1893 the subscription list amounted to upwards of 2,000*l.* In August 1894 the electric light was installed. The possibility of an economical disposition of the lights has brought the cost down to a little below that of gas, while the saving in the matter of cleaning and painting and in the bindings of the books is very considerable. An extract from the minute book, dated December 22, 1797, will be interesting. A new "lamp iron and lamp were to be put in a convenient part to light the front of the library." Until the introduction of gas in 1832 the interior of the library was lighted by candles, and for several years after this date wax candles were used in some of the rooms.

GLASGOW ARCHITECTURAL ASSOCIATION.

THE usual monthly meeting was held in the rooms, 187 Pitt Street, on Tuesday evening, the 19th inst., at eight o'clock, when Mr. Richard Ferris read a paper entitled "Modelling in relation to Sculpture and Decoration." The lecturer began by characterising modelling as the beginning of all things, for by it the ideas were gradually developed in a tangible form, changeable at will. The model in clay or other plastic material was a necessity for anything of importance to be executed in relief, representing work as it would appear when finished, and had been employed for such different subjects as statuary, silversmith-work, and even a cake of chocolate. The essayist then touched on the many points of connection between the model and the replica in the different materials, finishing up with a selection of lantern views of models and the works executed therefrom.

The Next Ordinary Meeting of the Institution of Civil Engineers will be held on Tuesday, November 2, when a short address will be given by Sir John Wolfe Barry, K.C.B., LL.D., F.R.S., the president, and the presentation of medals and prizes awarded by the council will take place. A reception will be held by the President in the library after the meeting.

NOTES AND COMMENTS.

It has been generally supposed in this country that American architects were martyrs to their love of art, for, according to all accounts, they were not appreciated by the authorities, and private clients were not over-confident in them. Probably the condition of affairs as described owed something to American imaginativeness; but, in any case, those evil days have vanished. According to Mr. Post, who presided at the convention of American architects just held in Detroit:—"The States containing the great business centres have been so thoroughly imbued by artistic influence that in them architecture has received its proper recognition as the most exact, exacting and comprehensive of the arts, and the architect has become the accepted arbiter in all questions relating to building or decorative work. Elsewhere throughout the land, hand in hand with its material improvement, the architect advances in consideration, until it is safe to predict that the period is not far distant when north, south, east and west alike will recognise the fact that without the intervention of the skilled and thoroughly educated architect no building can be artistically successful or economic in construction; that truly artistic construction is always economic; that the payment of the ordinary fees of the accomplished architect is the most true economy." The Board of Directors in their report also congratulate architects not only because the probable increased demand for their professional services is near at hand, but also because the year now closing has brought with it many things to encourage the profession in the belief that it has obtained a firmer hold upon the confidence and respect of the national, state and municipal governments, and also of the people of the country. The intelligence will be received with satisfaction in this country, and it may have the effect of attracting some emigrants from the ranks of English architects.

A REPORT was presented to the convention on the subject of licensing architects. It appears that in five of the States Bills have been introduced in the Legislatures proposing tests for all those who were desirous to practise as architects. In Illinois alone a Bill has become law, and is now in operation, so far at least as organising the board of examiners. The general consensus of opinion as expressed by the replies of all the architectural chapters is in favour of some legislative enactment restricting the practice of architecture to those who have the ability to design strong and safe buildings. As regards the relation which the examination for license should bear to examination for membership in the American Institute of Architects, there is not such a strongly pronounced majority. The opinion generally prevails that the standard of professional skill and ability should be higher for fellowship in the Institute than is necessary for a State examination and the granting of a diploma, certificate or license. An analogous question, whether membership of the Institute should be more dependent upon professional skill and practice than at present, has received an almost unanimous answer in the affirmative. From the nature of the correspondence, the committee feel justified in recommending to the convention the adoption of a standard of examination that, while not inconsistent with the by-laws, would demand higher professional standards than have hitherto obtained.

VESTA as the goddess of fire and the domestic fireside was worshipped by Greeks and Romans. The latter also as part of her worship introduced the vestal virgins who were to keep the sacred fire alight. Any neglect of the duty was severely punished. She was generally represented as veiled, with a lamp in one hand, but according to Ovid there were statuettes of the goddess in which she appeared as covering her face with both hands. It is possible that the type was familiar to the Romans before they experienced Greek influence, and the old wooden statue in the Forum was probably of that class. It is remarkable that at the present time there is in a park at Savigny-sous-Beaune an old Roman altar on which appears the twelve gods, which seem to be reproductions of the statues in the Forum. Upon it VESTA is shown with her hands over her

face. So singular a gesture for a goddess was novel to the Romans, for the majority of figures represented the goddess as covered with a veil. At the last meeting of the Académie des Inscriptions M. SALOMON REINACH explained so peculiar an attitude by saying that it suggested the functions of VESTA and her endeavour to preserve her face and eyes from the effect of smoke. If he should be right, the French altar becomes of great importance in archaeology, for it is assumed to be the only example of the Roman VESTA which exists.

WE are glad to see that in Scotland there is what we hope is the beginning of opposition to the iniquitous system of picking architect's brains without paying for the operation. The work involved is not important, but the principle could be exemplified in a more trivial case. It appears that the trustees of Carnoustie *quoad sacra* parish church resolved to alter that building at a cost not exceeding 1,700*l.* The Trustees accordingly invited three or four architects to express their opinions as to the best way in which the work could be carried out. The architects, however, did not fall in with the arrangement, and nothing came of it. The Session then decided to ask competitive plans from architects in the neighbourhood and also from Edinburgh, Glasgow and Aberdeen, and in order that those who wished to compete might have an idea of what was wanted, they were invited to meet at the church when all necessary explanations would be given. Several of the Trustees attended at the hour fixed, but no architects responded to the invitation. Until there is a definite proposal with respect to finance, we hope the northern architects will hold aloof from the Trustees of Carnoustie.

AFTER several years' earnest efforts in sanitation the name of Dr. G. V. POORE is too closely associated with it to need any recommendation for his new book "The Dwelling House" (LONGMANS, GREEN & Co.). It is only a small book, and the advice may not be novel, but the authority of the writer gives importance to the contents. Dr. POORE advocates independent ventilation for all the channels of communication in a house, for he believes that in many large London houses they facilitate the exchange of foul air instead of serving for the supply of fresh air. For living rooms he considers a height of 10 feet is adequate, and 9 feet for bedrooms. The average hotel bedroom he believes to be unsurpassed for unwholesomeness and discomfort, while on board ship there is economy and comfort. "The besetting sin of modern hospital architects is," he says, "the giving of an extravagant excess of space in places where it is not needed," and Dr. POORE finds examples of a similar weakness in other buildings. A part of the book treats of the sanitation of the isolated dwelling, and therefore the sewage problem cannot be evaded. Dr. POORE has tried an experiment on a tolerably extensive scale at Andover, where he has a pleasure with luxurious herbage and flowers, apples, pears, peaches and nectarines manured with human ordure alone. There is much else in the book which is derived from the author's experiments, and "The Dwelling House" should be considered as one of the few modern books on sanitation which is not a compilation. Architects are not spared, but they can appreciate plain speaking in so important a cause.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: THE BAPTISTERY.

DOCTORS' CONSULTING ROOMS AND RESIDENCES, NEWHALL STREET AND CORNWALL STREET, BIRMINGHAM.

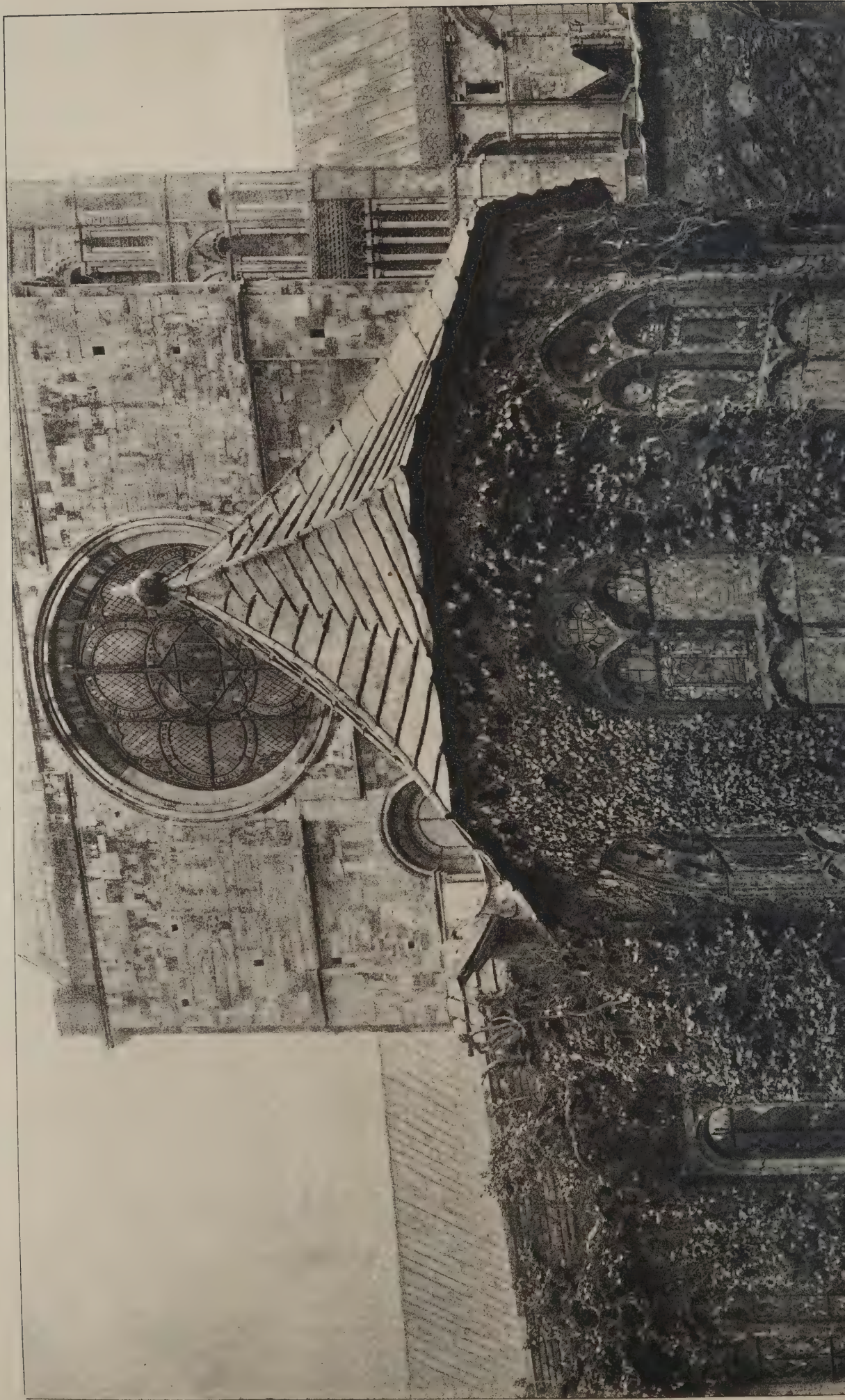
THESE premises have recently been erected for Dr. E. MALINS, from the designs of Messrs. ESSEX, NICOL & GOODMAN, of Birmingham, by Messrs. THOS. LOWE & SONS, builders, Burton-on-Trent. The elevations are carried out in red brick and buff terra-cotta, with red tiled roofs.

TOWER BRIDGE HOTEL, TOOLEY STREET, S.E.

PREMISES, LIONEL STREET, BIRMINGHAM.

SURREY COUNTY HALL, SURBITON.

The Architect, Oct. 29th 1897.





PHOTOGRAPHED BY S. B. BOLAS & C^Y 11, LUDGATE HILL, E.C.

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CATHEDRAL SERIES, No. 84.—CANTERBURY: THE BAPTISTRY.



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INK-PHOTO, SPRAGUE & CO 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

TOWER BRIDGE HOTEL, TOOLEY STREET, S.E.

L. A. WITHALL, Architect



DOCTORS' CONSULTING
NEWHALL STREET AND O

Oct: 29th 1897



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ROOMS AND RESIDENCES,
WALL STREET, BIRMINGHAM.



PHOTOGRAPHED BY BEDFORD LEMERE & CO

INK PHOTO SPRAGUE & CO 4 & 5, EAST HANDING STREET, FETTER LANE, E.C.

PREMISES: LIONEL STREET, BIRMINGHAM.

Messrs. CROUCH & BUTLER, Architects.



PHOTOGRAPHED BY G. B. BOLAS & CO



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ECCLESIOLOGIA GERMANICA.

By T. FRANCIS BUMPUS.

(Continued from last week.)

Notes on some Westphalian Steeple Groups.

SEVERAL of the larger Westphalian churches have two, sometimes three, steeples; but they are not so elegantly contoured, nor do they group themselves with the grace which characterises Cologne, Andernach, Limburg, Worms, Gelnhausen and others of the Rhineland.

The Late Gothic façade of Münster Cathedral, which has, I am convinced, usurped the place of the old apsidal "western choir," is flanked by a pair of well-proportioned steeples of Transitional character—a rather misleading name by the way for that style in Germany, as it did not, like our Transition of Canterbury and the Temple Church, lead to the perfected Pointed of Salisbury and Worcester. These steeples of

a light *fleche* at the junction of the eastern pair of transepts with the nave and choir, which helps to carry off much of the building's square heaviness.

Besides the cathedral, two other of Münster's churches display a triplet of steeples. One is St. Lüdger's, where a tall Flamboyant octagon,* raised upon a Romanesque one of the same shape, lifts its graceful head from the centre of the church, while the western façade is flanked by a pair of modern Romanesque towers which, showing two depressed gables on each face, and crowned by low pyramidal cappings, are presumably modelled on the steeples occupying a similar position at St. Gereon's, Cologne. The other tower group is at St. Mauritius', a large church situated in a suburb some little distance to the east of the city boundaries—a suburb which, in grim ghastliness, may vie with some of our English ones, where paved walks, gas-lamps and policemen have not yet penetrated. Here we have three Romanesque steeples, one at the west end—a huge uncouth-looking mass, capped with a fantastic slate dome—and a pair of slim ones with quadrilateral spires of the

Southwell type, flanking the commencement of a lantern-like aisleless apsidal choir, which an architect of the Late Pointed epoch has grafted upon the nave. This last is a peculiar, and not wholly pleasing specimen of Romanesque, exhibiting, as it does, several very disagreeable localisms, as, for instance, an ugly roll-moulding to the arches of the clerestory windows, the aisle windows and the nave arcade, in which, at the head of the arch, a species of keystone is introduced. St. Mauritius' was sumptuously restored forty years ago, and its interior lavishly adorned with stained-glass and frescoes. In lieu of a triforium arcade there is a series of pictures *en fresco* in the naturalistic style, setting forth scenes from the Life of Christ and His Apostles. With one of these, representing the aged Evangelist, St. John, being led to his chair, I was especially struck. Below it was the legend, "Kindlein, lebet euch einander" ("Little children, love one another"), too obvious a one to need elucidation here. Another Westphalian church similarly "steepled," if I may use such an expression, is the Marien Kirche at Lipstadt. Fortunately this edifice, although in the heart of the town, is surrounded with fine trees—fortunately, I say, as it is one of the ugliest, clumsiest German churches of my acquaintance. Indeed, were it not for these embowerments, which serve to mitigate some of its uncouth outline, the structure would simply appear a gigantic deformity. It consists of a Transitional nave and aisles, covered by one enormous expanse of roofing, transepts of the same epoch, and an apsidal choir of the Flamboyant age. Like the western tower of St. Mauritius at Münster, this of the Marien Kirche at Lipstadt is of great bulk. Each side is divided into three compartments by vertical strips of plain masonry, the intervening rough portions being pierced with small Romanesque windows in two tiers, surmounted by that wavy species of corbel-table peculiar to German Romanesque work. A somewhat similar example of this type of tower is presented by



CHURCH OF ST. MARTIN AT HALBERSTADT, SHOWING THE WESTERN SCREEN FAÇADE BETWEEN THE STEEPLES.

Münster Cathedral are capped with low pyramids of metal, and immediately in their rear is that pair of western transepts which lend such invaluable aid not only in procuring elegance of external outline for a building which, without them, would appear heavy and clumsy in a degree, but in imparting an air of great spaciousness to the interior. Here they form a huge unbenched narthex, the utility of which is recognisable by those who have attended such crowded Sunday offices in this cathedral as the "Sing Amt" (People's Sung Mass) at midday, and equally popular "Zeigt" (Benediction) at five o'clock. Peeping over the roof of the south-western transept, which is lighted by a huge plate-traceried rose window on its south and east faces, these western towers of Münster Cathedral assist in composing a very pleasing group. In addition to them there is

the neighbouring church at Erwitte, another ponderous mass, but it has each of its sides gabled, and is thus relieved of some of its heaviness. The roofs of these four gables, meeting in a picturesque pseudo-Classical spire, this steeple of Erwitte would, I suppose, be called a cruciform saddleback. It certainly bears some similarity in its outline to those in the neighbourhood of Paderborn, though less prepossessing.

But to return to the Marien Kirche at Lipstadt, wherein the angle formed by each transept and the choir a slim tower of Romanesque work with a square spire is located. The clumsy Late Pointed choir, with its ponderous roofing—a

* An illustration of this elegant lantern tower appeared in *The Architect* of October 2, 1896.

choir of such hideous proportions that no one but a German could have conceived—well nigh stifles these towers. The fact is, this choir of the Marien Kirche at Lipstadt is one of that class to which allusion was made in the second series of our papers, viz. the "hall" class equipped with aisles and a procession path. The apse in this instance is a three-sided one, and each absurdly long side, as well as those of the choir, which it terminates, is pierced with a couple of tall windows of three lights apiece, and flamboyantly traceried. The ungainly mass of roofing that such an arrangement has entailed may be more easily imagined than described. A double-storeyed, and prettily fenestrated sacristy abuts on the north side, somewhat mitigating the general air of clumsiness which pervades the church, besides helping, with the angle tower and the transept, to compose a not unpleasing group.

Osnabrück Cathedral is another instance of a Westphalian trio of steeples. In this instance we have a severely simple western front, in which a lean, hungry-looking Flamboyant doorway and rose window have been rudely inserted, flanked on the north by an equally simple Romanesque tower devoid of buttresses or string-courses and rather slim in aspect, and on the other by a much broader tower, Romanesque in its lower stage, but decorated in its two upper ones. The first stage is quite devoid of doorway, or relief in the shape of arcading, of any kind; the latter are subdivided into two compartments by those strips of smooth masonry—in this instance horizontal as well as vertical—which form such a conspicuous feature in the Lipstadt, Erwitte and Münster examples; indeed, were it not for the presence of the small two-light Middle Pointed windows with which those portions of the tower comprised within these strips are pierced, the whole might, at a little distance, be mistaken for much earlier work. The Middle Pointed towers of St. Mary's, St. Catherine's, and St. John's churches here* group pleasingly with those of the cathedral, whose central steeple, I should have said, is an octagon gabled like Sinzig on each side, and capped with a stunted metal spire.

It is singular that not one of these Osnabrück towers is buttressed nor crowned by a stone spire; that feature to which Englishmen of the Nene Valley and the Holland of Lincolnshire can point with such pride being almost entirely absent from the architecture of Germany and the Low Countries. Instead of it, we have the fantastical leaden spire, the low, pyramidal slate capping, or the incongruous cupola; in no instance can the steeple be described as adequately terminated. In fact, German steeples are on the whole disappointingly monotonous.

I must confess that I decidedly liked Osnabrück, about whose cheerful streets on a bright summer's morning, after a night of steady rain, it was very pleasant to find oneself wandering. St. John's was particularly delightful. Here the lover of picturesque entourage, and such Mediæval furniture as richly carved choir stalls, tryptichal reredoses and *Sakraments Häuslein* will have his tastes gratified. Nor will the admirer of that solemn mingling of Romanesque and Pointed work peculiar to Teutoland think an hour amid the aisles of Osnabrück's Cathedral misspent—aisles which have of late emerged gorgeous from the palette of the fresco-painter, who, to judge from the portentous scaffolding now concealing the square-ended choir, is extending his operations to that most sacred portion of the building. Personally, I prefer to see the church in its simple, unadorned state, particularly as the polychromatic decoration now disclosed to view in the nave aisles lacks that delicacy and refinement which, it is pleasing to observe, is the leading characteristic of such work undertaken in our own churches. As an example, I may draw the attention of my readers to the work of Mr. Daniel Bell in Butterfield's church of St. Matthias, Stoke Newington. Without interfering with the characteristic features of that noblest of London church interiors, the work, as far as it has gone, has mitigated some of that dignified severity† which those who know St. Matthias will recollect constitutes its most striking feature. The church steeples passed on the line of railway between Osnabrück and Hildesheim do not present any very strikingly-marked localisms. The general type, however, seemed to be that in which a short spire of lead or slate, tapering at its summit, spreads itself out at the base to meet a broad tower, somewhat after the fashion of such Surrey and Sussex examples as Tangmere, Pevensey, Merstham and Shiere. Steeples of this kind surmount Hildesheim's two noble basilicas of St. Godehard and St. Michael, structures whose internal beauty resides chiefly in the arcades of their naves, where the rich carving of the pier-caps and the elevation generally recalls

the rich Byzantine Romanesque of the south. The illustration given of St. Godehard's in the first series of these papers renders any further description of that church unnecessary. I have therefore borrowed a slight notice of St. Michael's from the pages of Fergusson's "Ancient and Mediæval Architecture"—one of those fascinating volumes which, like Petit's "Architectural Studies in France," and the same writer's "Illustrations of Church Architecture," can only be laid aside with reluctance when once in hand.

"The church of St. Michael at Hildesheim," observes the critic above alluded to, "is among the earliest and most interesting of those remaining in sufficient purity to enable us to judge correctly of their original appearance. The plan consists of nave and aisles, an eastern and western transept both projecting beyond the aisles and flanked by octagonal towers with staircases in them. The west choir of one bay and apse is flanked by two vestries with a low aisle round the apse and entered only from it. At the east end there were originally a central and two side apses, but in the twelfth century the central apse was replaced by one of equal length to that at the west end. The entrances are, as usual, on each side of the nave and none at the west end. Though the proportions appear short with reference to the breadth, considerable additional effect is given by the screens which shut off both arms of the eastern transept, so as not to allow the perspective effect to be broken. Hence the continuous view of the central aisle, being six times as long as it is broad, gives the appearance of far greater length to the church than could be supposed possible from its lineal dimensions."

The Rectangular Screen Façades of Goslar and its Neighbourhood.

Although I had seen those unaccountable doorless, turret-flanked and rectangular screen-like western façades in such churches of the Low Countries as Notre Dame at Maastricht and its locality, as well as in the great abbey of Corvey about a mile from Höxter on the eastern confines of Westphalia, I was none the less interested in the examples which sundry towns in the Harz district, notably Goslar, Gernrode and Halberstadt, presented to the notice. St. Blasius at Brunswick,* a long, low, cruciform, triapsal Romanesque structure, has such a façade, flanked by turrets, pierced with a Middle Pointed window and rising high above the nave roof. Several other churches in the same city, notably St. Catherine and St. Martin, are dignified by this same anomalous feature, which does not seem to have been confined to the Romanesque style alone, but to have become popular through all the epochs of Pointed. Strasburg Cathedral offers a splendid example of this treatment, and the Dom at Meissen a humbler but very elegant one. But perhaps the finest and most imposing early examples of this peculiar type of western façade, to which such great rectangular belfries as one sees in the neighbourhood of Toulouse, at Montgiscard and Ville Franche bear a curious affinity, are those attached to the Neuwerks and Jacobi Kirchen at Goslar, which, from their contiguity to the railway station, I was enabled to inspect with tolerable leisure. Paucity of time and the unfavourable weather precluded me from prosecuting my ecclesiological studies any further in this most fascinating old town—the remains of its cathedral and the curious double-storeyed chapel of St. Ulrich, attached to the Kaiserhaus, remaining perforce unvisited.

The Neuwerks Kirche, now in the hands of the Protestants, is a very splendid specimen of the Romanesque prevalent in this district of Germany, its apse, with the arches spanning its windows, being carried on twisted shafts detached from the wall, almost rivalling the celebrated eastern terminations of the Rhine churches in richness. Unlike Gernrode, Hecklingen, Wechselburg, and other churches of the Harz, this one at Goslar is vaulted throughout, but it has several provincial localisms, such as the nave arcades, of which there are two to each vaulting bay, carried on square piers with a slender shaft niched in each angle, canted off, as at Hecklingen and Wechselburg, to receive it. One of the vaulting shafts was twisted in the most curious serpentine fashion. The church being, as I have said, in Protestant hands, has a cold, lifeless appearance, but the walls and conch of the apse have been most gorgeously frescoed, the latter, I was surprised to see, with a representation of the Coronation of the Virgin. Presumably all these are restorations. The western screen façade of this church, with its flanking octagonal turrets, is very imposing.

(To be continued.)

The Next Ordinary Meeting of the Society of Engineers will be held at the Royal United Service Institution, Whitehall, on Monday, November 1, when a paper will be read, entitled "Sea Defences," by Mr. Richard F. Grantham.

* Erroneously styled a cathedral in some handbooks to North Germany, a distinction to which it never at any time could lay claim.

* All these churches are typical Westphalian ones of the Decorated period. St. Mary's, it will be remembered, was alluded to in our list of churches having a clerestoried choir whose apse is provided with a processional aisle and radiating chapels—a rarity in this part of Europe.

† In this church there is a large wall space left above each arch of the tower which forms the chancel on the ground plan. The Crucifixion has been portrayed above the western, and the Adoration of the Elders above the eastern arch, with fine effect.

THE PURCHASE OF "MERLIN AND NIMUE."

THE following evidence was given by Sir John Gorst before the select committee on Museums of the Science and Art Department:—

The Chairman: You are Vice-president of the Committee of Council on Education?—Yes, and I attend by the direction of the Lord President of the Council to give the committee an account of the circumstances under which the Burne-Jones water-colour, *Merlin and Nimue*, was purchased.

You will be good enough to make a statement?—I will make a statement about it. This picture was part of a collection of the late Mr. Liebhart, of Newcastle; it had been seen by the officers of the Science and Art Department and by Lord Carlisle, who is one of the referees, as long ago as 1884, and in April of last year it came into the market. The Museum had long been anxious to obtain a specimen of Burne-Jones's water-colours for the historical water-colour collection, and Mr. Armstrong, the art director, recommended that the opportunity should be taken of acquiring this particular picture. The purchase was officially recommended by Mr. Armstrong in a memorandum of April 6, 1896. The amount of the note out of which the purchase had to be made was 700*l*. The price asked for the picture was 800*l*., and it was therefore necessary to transfer 100*l*. from one of the other sub-heads in order to have a sufficient amount to make the purchase. Dr. Middleton was consulted upon this transfer, as it was practically transferring money from the sub-heads over which he had control to a sub-head immediately under the art director. It was no part of Dr. Middleton's official duty to approve of the purchase, but he did so far approve of the purchase that he recommended and acquiesced in the transfer of 100*l*. from the Museum vote to this vote.

This was a transaction which took place before Dr. Middleton's death, when the purchase was being considered?—Yes, when the purchase was being considered. There was also brought to my notice in the matter a letter dated April 28, 1896, from Mr. Edward Clifford. This is the letter. It was addressed, I think, to Mr. Armstrong. "Dear Sir,—I have heard that there is a possibility of your buying for the nation Burne-Jones's water-colour of *Merlin and Nimue*, belonging to the late Mr. Liebhart. I should much like to know if this is true, for I had been rather thinking of buying it jointly with some friends of mine; but I would far rather that it belonged to the nation, and should be delighted to hear that it is true. I have for many years considered it the most beautiful and the most characteristic of all Burne-Jones's water-colours, and almost the finest piece of colour in the world. I know nearly all his work, and possess a good many of his water-colours, one of which I may probably leave to the nation. If you would send me a few lines respecting the matter I should be much obliged, as if the nation should not buy it I should like to be moving in the matter.—Sincerely yours, Edward Clifford." There was also a letter from Lord Carlisle, dated May 6, 1896. "Dear Armstrong,—I understand that the pictures of the late Mr. Liebhart, of Gateshead, are shortly to be sold. I had always hoped that the Museum might be able to acquire the picture of *The Merciful Knight*, by Burne-Jones, which seems to me to be the finest work of that painter. But as I am told that 200*l*. is being asked for that picture, I fear that with the reduced grant this purchase may be impossible. In that case I hope that you may be able to get another picture by Burne-Jones of *Merlin*. This picture is perhaps the finest specimen of Burne-Jones's earlier manner, which is so entirely distinct from the work that he does at present that the acquisition of a picture of this date, about fifty years old, is really equivalent to the purchase of a work of a deceased master. As the Government has considered that Sir Edward Burne-Jones's reputation was worthy of especial honour, I think that the acquisition of a picture of his for a public gallery can only be considered natural and suitable. I am certain that admirers of Burne-Jones's work would consider that the *Merlin* was a proper example of his earlier style." Well, this matter being brought officially before me by Mr. Armstrong, and supported by these two letters which I have read, I thought that as the transaction was a little out of the common, because special arrangements had to be made in order to provide the money necessary for its purpose, I thought it ought to be referred specially to the Lord President; and I accordingly referred it especially to the Lord President, with the observation that he might perhaps have opportunities of obtaining an outside judgment on the value of the picture and the expediency of purchasing it which I did not possess. The matter then passed into the Lord President's hands; that was on May 11 that I referred the matter to him, and on May 22 he officially stated that, having made such inquiries as he had been able, he thought that the purchase ought to be approved, and it was accordingly approved, and the picture was bought for the sum of 800*l*.. I am able to state to the committee, by permission of the Lord President, the particular views which he held upon the matter, and also the person whom

he consulted. He thought that sooner or later it would be necessary for the Museum to acquire a picture by Burne-Jones to make the historical collection of water-colours complete; that the works of this particular artist were not very numerous; that they were mostly in private collections or in permanent galleries; that he was not a very young man, and therefore the prospect of acquiring one of his pictures was one that ought not to be lost. The Lord President, knowing that the particular merit of this particular artist was a subject of very heated controversy in the artistic world, thought it desirable to obtain the advice, not of persons of whom it could be predicted beforehand that they would take one side or the other in the artistic controversy, but to get some entirely independent authority on whom he could rely; and he consulted Mr. Varley, believing that Mr. Varley would carefully consider the expert advice that was open to him, and believing that the expert advice of Mr. Varley was as good as could be obtained. Mr. Varley took some time to consider the matter. He gave it as his opinion, after consideration, that it was desirable to acquire a picture of this kind for the national collection; that the price asked for the picture was as low a price as you could expect to obtain it for; that the picture, in fact, could not be bought for less than the 800*l*. which was asked, and that there was not any reasonable prospect of obtaining an example of Sir Edward Burne-Jones's work at a less price. Having received this advice from Mr. Varley, the Lord President thought it his duty to sanction the purchase, and the purchase was accordingly sanctioned.

Sir Henry Howorth: The only question I should like to ask is this. I understand that a portion of the purchase money in this case was obtained from the ordinary Museum vote by the sanction of Dr. Middleton, and was transferred to the fund for the purchase of water-colours; is that so?—Yes; not exactly by the sanction of Dr. Middleton, because it could have been done without his sanction. The President or the Vice-president of the Council has the power, under the Treasury regulations, of transferring from this sub-head F; he can transfer at his pleasure from one item of sub-head F to another, so long as the whole item, however, is not exceeded; and therefore the thing could have been done even if Dr. Middleton had objected, but it was thought courteous to discuss it with Dr. Middleton, and to obtain his assent to the proposed transfer before it was actually made.

Then the two votes are not actually substantive votes, but you can make drafts from the one for the assistance of the other?—There is a vote F, and F has several sub-heads; and it is from one sub-head of F to another that you can make transfers.

Can the Vice-president at any moment transfer the whole vote?—Yes; the sub-head F is treated as a whole, and although, for the information of Parliament, it is divided into a number of sub-heads—F 1, F 2, F 3, and so on—yet the Treasury allow the Department to treat this vote as a whole, and as long as they do not exceed the whole vote they may spend it on whichever item they like. I find that now the vote is actually taken as one, and there is no division; but in the year when this purchase was made it was, as I have explained, F 1, science collections, including science library; F 2, art collections; F 3, reproductions of works of art; F 4, hire of specimens, &c.; F 5, photographs of particular art objects, preparation and circulation of chromo-lithographs and etchings; F 6 (this was the particular head), historical collection of oil and water-colour paintings; F 7, exchange of works for specimens of corresponding value received from abroad; F 8, art library books, printing, drawings, &c., and deposit loan of books to schools of art; F 9, preparation, illustration and painting of catalogues, inventories, handbooks and guides, &c.; F 10, carriage, materials for packing, mounting and repairs. The amount of the whole of the F vote was 14,360*l*., and of this particular item F 6 was 700*l*.. In the present estimates it is put into four divisions, F 1, F 2, F 3 and F 4; and F 2 is art collections, including art library, &c., grant in aid of purchases, 11,260*l*.

The point I was rather driving at was this: that that vote is a vote nine-tenths of which is really for the South Kensington Museum proper as an art teaching institution, and the other tenth is an entirely distinct vote for the purpose of creating an historical collection of water-colour paintings?—No, the historical collection of water-colour paintings is now amalgamated in the bulk of the vote; it is not separated, the only things separated are the science collections, the preparation of catalogues and the carriage and materials for packing.

How long has that been the case, because I understood that the vote for the pictures was kept an entirely different matter from the vote for the South Kensington Museum?—I do not think the vote was kept as a distinct matter; but the officer who had the responsibility for the recommendation of pictures for purchase was a different officer from the one who recommended the purchases made out of the other part of the vote.

Would it be possible, if the Vice-president thought right and good, virtually to absorb the whole of the vote granted by

Parliament for the purpose of this Museum, in addition to the water-colour collection?—It would be possible now under the present form of the vote, certainly. I suppose it would be possible. I do not know that it would be reasonable or consistent with the duty of any official, but as a matter of actual financial possibility the whole 11,260*l.* which is going to be voted this year could all be spent on one picture.

And if, as a matter of fact, under the present conditions of the vote being very greatly reduced for the Museum you should have a very desirable, a most desirable water-colour picture offered for purchase, it would be possible in the purchase of such a picture to further starve and dwarf the resources of the Museum proper?—Yes, quite possible, if you had a very foolish man for Vice-president; I mean he could do it, but I do not think it would be possible as long as any reasonable and rational person was at the head of the business.

Lord Balcarras: Would you please tell us from whom the picture was bought?—It was bought from Messieurs Boussod, Valadon & Co., of the Goupil Gallery.

From a dealer?—I do not know what he is. I have no doubt he is, but it is the Goupil Gallery, 5 Regent Street. I have no doubt it is a dealer, but I do not know it of my own knowledge.

Can you tell the committee how the price was determined?—It was offered at 800*l.*

How was the value determined?—It was determined, I suppose, ultimately by the advice of Mr. Varley. That was the price that was named; it was offered for that sum, and the question was whether it should be bought for that sum. It was not a question of putting a value at large on a picture. An offer was made, I believe, of 700*l.*, but it was refused.

The dealer refused 700*l.* for it?—I believe so.

Was not other outside expert advice taken besides that of Mr. Varley?—No, I think not.

You said, I think, in part of your evidence that it was no part of Dr. Middleton's province to be consulted on the purchase of pictures?—That is so; the purchase of pictures was not in his department. I think that has been explained several times in the evidence.

You told us that 100*l.* was transferred from some other sub-head to sub-head F 6; will you tell the committee from what sub-head it came?—It was not transferred from any other item, but it was spent out of the general savings of the sub-head; the savings out of other items of the sub-head.

I do not understand.—Sub-head F consists, as I explained to the committee just now, of ten different sub-heads, and on some of those there were savings, and it was out of these savings that the picture was bought.

This picture was bought in the month of May, was it not?—Yes.

Quite at the beginning of the financial year; how can you say that the sum was taken from savings?—Because you can very early in the financial year estimate that there will be savings; that is nearly six months after the estimates are really made. The estimates are made about November or December practically, and in May you can see that you are going to make savings.

This purchase was not foreseen; is it not quite possible that corresponding purchases for the art library, or ceramics, or the Museum generally, which are not foreseen, might arise?—It is quite possible. What I mean is, there was no actual transfer from any other sub-head to this particular sub-head to provide the funds; the sub-head F 6 was overspent to the extent of 100*l.*, and the Department ventured to overspend to the extent of 100*l.* because they saw that on other sub-heads there would be savings.

The point I wish to raise is, How did the Department know that there would be savings after three months or two months of the year had gone by?—It is two months of the year, but a very long time since the estimates are made. The estimates for the year are made, as I said, about December, and May is five months after. Although the estimates are produced to Parliament in February or March, they are actually made in the Department itself in December, and five months after the time when the estimate is made you are able from your expenditure to see, or to estimate, that you will be able to make savings.

That is to say, the expert officials of the Department are able to anticipate a couple of months after the beginning of the financial year that no objects of a great and important character may be brought to them unexpectedly?—No, they are able to estimate two months after the beginning of the financial year that upon the total vote of about 14,000*l.* there would be 100*l.* of saving.

Was the President of the Royal Academy consulted; I understood from question 110 that when there is an important purchase of pictures he is almost always consulted?—He was not consulted on this occasion.

And the director of the Art Museum was not consulted either as to the desirability of the purchase?—Do you mean Dr. Middleton?

Yes.—I understand he was.

I understood he was not.—Not officially; he would not be officially consulted, but I understand Dr. Middleton approved of the purchase. It was no part of his official duty to give advice.

And it was considered by the Department that there was no chance of getting a water-colour by Burne-Jones of importance under 800*l.*?—Yes, suitable to the historical collection.

Can you tell us when this picture was painted?—It says in the advice that it was painted fifty years ago; that is all I can tell you.

I think Sir Edward is in his sixty-third year, is he not?—Well, then, I suppose he would hardly paint it at thirteen. I am afraid I cannot tell you the exact details about the private history of artists. It certainly says it was painted about fifty years ago.

Does it say "about," or fifty years ago?—I read it to you; I think it is Lord Carlisle who said, "The acquisition of a picture of this date about fifty years old." I must say that the writing is so bad that it might be either fifty or thirty. I probably have misread Lord Carlisle's letter; it is probably meant for thirty there.

It was merely because I was surprised—no doubt owing to the mistake that the expert consulted should have said the picture was fifty years old, whereas it is about thirty-six years old?—That is not an expert; it is Lord Carlisle.

Is he not one of the expert advisers of the Department?—He is not one of the expert advisers, but he is one of the referees.

You said something just now about a picture being suitable; if it was suitable you could make those transfers from one vote to another. The suitability of such a picture, I suppose, depends upon its being representative of the artist, does it not?—I think so.

Can you tell the committee how many other water-colour paintings you have got by Sir Edward Burne-Jones?—I do not think we have got one; I think this is the only one. I understand we have no others.

And you consider this representative of the master?—I do not presume to consider it myself; I am told by experts that it is. I would not venture to express an opinion of my own on the subject.

We understood that you chose to give evidence upon this particular point because the Parliamentary, rather than the artistic, advisers of the Department were responsible?—Certainly.

Is there anything in the evidence you have given to the committee which would be at variance with the evidence which you would have given as to the purchase of any picture for the Department during the last fifteen years?—Well, only that in this particular case special care seems to have been taken, very special care in the purchase. It seems to have been a purchase made after a good deal of deliberation and consideration. If you are purchasing a small thing from Christie's, or something of that kind, you do not perhaps have so much discussion about it and so many people asked.

What I really want to know is this: I want to know what differentiated this to such an extent that the Parliamentary heads of the Department should think it necessary to give evidence?—I understood the propriety of this purchase was questioned.

This was bought on the ordinary system of purchase and is in no way different from the general practice pursued in buying for the historical collection?—This is a very fair example of the mode in which purchases are made.

Did the money, the 800*l.* spent upon this picture, preclude your being able to buy any other picture during the year?—I think so; I do not think any other picture was bought.

Dr. Farquharson: Do you consider it an advantage when a special object turns up that you want to buy, to be able to deflect funds from some other source?—Certainly; and it is in consequence of that advantage that the Treasury has now altered the form of the vote, so that there is no question about it; it is a vote in aid for the purchase of these objects, and we can apply it as we like.

And you found on this occasion the practical advantage of being able to transfer it?—Yes.

Have you given evidence about this picture because it is a typical instance of the methods by which purchases are made?—Yes; I consider it a typical instance.

Has there been any controversy outside as to the merits of this particular picture?—I suppose there must have been; I suppose there must have been a great deal of controversy.

I am rather in ignorance of why this particular picture has been picked out for special examination before this committee. You are not prepared to give any individual opinion as to the merits of this picture?—No.

You use the words "National" Collection of Water-Colours; that means, I suppose, that you wish to have at least one example of every prominent British water-colour painter?—Yes, I think so; there is an historical series of water-colours

which contains examples of every celebrated British water-colour artist.

And I think I also understood you to say that at that time there was no specimen of Burne-Jones?—None.

Do you consider, from your knowledge of the position Burne-Jones holds in the art world, that 800*l.* was an excessive price for the water-colour?—That is a question I could not answer.

What was the size of it?—I do not know that.

I suppose you do not wish to give an opinion as to whether Burne-Jones has a separate reputation as an oil-painter?—No, I should get myself into very hot water if I were to express my opinion on such a subject.

At all events, in the opinion of Mr. Varley—who, I suppose, is a man of knowledge—this was a representative work of the master?—It was.

And therefore it was considered worth the money paid for it?—Yes.

Mr. Bartley: I suppose there is a great difference of opinion as to all these works of art, is there not?—I suppose so, I believe so.

Do I understand that in this particular purchase there was, first of all, the recommendation of the art director, and also the director of the Museum?—No; there was no official recommendation by the director of the Museum.

No; but still he was aware of the fact, and made no objection?—Yes.

Sir, Henry Howorth: But he was not responsible?—No; he was not responsible. There was no official recommendation by Dr. Middleton, but there was this statement by Mr. Armstrong:—"I have consulted Dr. Middleton, who agrees to the transfer of 100*l.*, if necessary, from the Museum Purchase Vote, and he knows the drawing and values it as highly as I do."

Mr. Bartley: You had this recommendation from these two authorities in the Museum; but when it came before you as Vice-president you thought it sufficiently important to go before the Lord President?—I did; chiefly because of the manipulation of the vote, I mean the way the money was taken. It exceeded the vote, and I did not think I was authorised in exceeding the vote without the Lord President's sanction.

And the Lord President, in order to get the best opinion he can, calls in Mr. Varley; is that so?—Yes.

And therefore all this was taken in order to be quite sure that the purchase was a wise one?—Yes.

Because you and the Lord President, I suppose, do not make any opinion yourselves, you entirely rely on expert opinion from outside?—Entirely.

And everything was done in this particular purchase to secure the best advice that could be obtained?—Yes.

Whether you agreed with it or not, as an individual?—That is so.

And you consider that is the right way in which such a purchase as this should be made?—Yes, I think so.

Could you suggest any plan by which greater care could be taken to secure proper purchases?—No; what I think the Lord President or the Vice-president are responsible for is securing really good expert advice. I think if they were to make an important purchase of a picture of an artist about whom there was any controversy without that sort of advice they might be very much to blame.

If they can cover themselves by the best expert advice, you think that is all they should do?—Yes.

And that was done in this case?—Yes.

THE ARCHÆOLOGY OF NORWICH.

A JOINT meeting of the Norwich and Great Yarmouth branches of the local Archæological Society was held last week in the city, and considering that the objects of antiquarian interest included in the day's sight-seeing must already have been familiar to very many of the party, the attendance, says the *Norwich Mercury*, must be regarded as very satisfactory. The perambulation was made under the guidance of the genial secretary, Mr. L. G. Bolingbroke. A start was made at eleven o'clock from Thorpe Station yard, and the party proceeded down the riverside in the direction of the Devil's Tower. Here and there along the way a halt was made while objects of interest on the further side of the river were pointed out and commented upon by Mr. Bolingbroke from notes sent him by the Rev. W. Hudson. Messrs. Ransom's timber yard was stated by Mr. Hudson to be on the site of the old pleasure gardens, known as the Spring Gardens. The riverside of those days must have been truly a pleasant resort if, as it appears was the case, its river bank for nearly the whole of the stretch from the present bridge to the city walls was lined with leafy trees and flowering gardens, with glimpses in the distance of fine old mansions fronting what now is King Street. In this respect, times have changed for the worse indeed. In the wall of a timber build-

ing, of decidedly utilitarian aspect, now bearing on it the name of Mr. George Base, oil merchant, the outline of an old water-gate was pointed out, constructed, it was stated, by the Austin Friars. Through this, it was thought, one of the "cockies" of the city discharged its waters. Near by once stood the chapel known as St. Ann's Chapel; St. Ann's Lane and St. Ann's Wharf in the vicinity still testify, in name, to its existence. Mr. Hotblack observed that a famous and original picture of the water-gate, by Crome, was included in the Norwich Society's collection of pictures in the Museum. Arrived at the Devil's Tower, a further halt was made while Mr. Bolingbroke read notes as to the raising of the city walls in general, and of the four towers which, at this spot, stand within a stone's throw of each other. This particular tower, whose remains are yet a pretty solid piece of flint masonry, was, the party learnt, the gift to the city of one Richard Spinks, who also furnished a massive chain-boom to keep out intruders by the water, and the necessary apparatus, affixed to the western tower, to draw it up when needful. Crossing Carrow Bridge, the ancient Conisford, rich with its memories of bygone days, was entered. The site of the old gateway was observed, and further on the ruins of the church of St. Peter Southgate, which was demolished in 1882. On the site of the Albion Mills, opposite, stood a chapel, called St. Olave's Chapel, which was demolished somewhere about 1345, and the parish united to St. Peter's Southgate. Close by, the Hildebrand Hospital exercised its charitable functions as a habitation for certain poor parishioners. A stone in the wall still recalls the name by which it was sometimes called, Ivy Hall. At the Dissolution, the site of the hospital was granted to the Mayor and Commonalty of the city. At the present time a number of quaint tumble-down cottages, built evidently out of the ruined structure of the hospital, occupy the site. Continuing the tour citywards, Dr. Bensly, at a halt close by St. Julian's Church, called attention, by an interesting paper, to two historical houses, Sir Robert de Salle's house, at the bottom of what is now Mariner's Lane, and, a little further on, the famous Music House, or Jew's House. Sir Robert observes Froissart, in his *Chronicles*, in a passage narrating his death at the hands of a mob, was "the handsomest and strongest man in England," and the lamentation at his death was widespread. At the Music House, once the residence of the wealthy and much-persecuted Isaac of Norwich, the visitors examined with interest the crypt, now about on a level with the street outside, and used for the storage of casks, and the lofty dining-hall above it. The latter has been divided into two apartments by a flooring, once substantial enough, but now decidedly shaky. The timber-work of the roof is still in excellent condition. Papers were also contributed dealing with the histories of St. Etheldred (St. Audrey) Church and St. Peter Permounter-gate Church. At the former some of the fine old communion plate was on view.

After a brief interval for luncheon, the tour was resumed with a visit to St. Andrew's Hall, Blackfriars' Hall and the Middle School, where Mr. Jas. Mottram discoursed upon the objects of interest. Recent excavations in front of the Guildhall having brought to light an interesting archæological find, the members listened with some interest to a communication on the subject from Mr. Arthur Collins, the city engineer:—"Whilst making excavations for the purpose of laying electric light cables an extensive settlement was discovered at the east end of the Guildhall. On opening out the ground for the purpose of seeing the cause of this settlement, an arched opening was discovered in a flint wall standing immediately in front of the Guildhall wall proper. The top of the arched opening in question is about 8 feet under the level of the roadway. The wall through which it is pierced is about 2 feet 6 inches thick. Within this arched opening there is a cavity in the wall of the Guildhall proper, this cavity having a length from north to south of about 4 feet 6 inches and a width from east to west of about 1 foot 6 inches. The bottom of the arched opening and cavity is 3 feet 6 inches below the level of floor of crypt. On examining the east wall of crypt beneath Guildhall from within the lines of two quoins are distinctly visible. The survey which has been made does not show these quoins to correspond with the ends of cavity in wall. It may be noted that the ends of cavity in wall are rough and irregular. The cavity is not arched over, but the wall of Guildhall proper appears to have been corbelled over approximately flat to cover it. The arch over opening is built in flints and bricks. Originally it was bricked about 4½ inches thick, but all but one of these bricks have disappeared, leaving the rough flint arch above. The excavations also disclosed a disused well having an internal diameter of about 6 feet, which was sunk to a depth of 50 feet from the surface of the road. There was no water in the well, and a lamp which was lowered to the bottom showed that portions of the sides had fallen to the bottom so that the original depth could not be ascertained. This well is arched in brick, the springing level of the arch being 6 feet below the surface of the road. The well is bricked to a depth of 16 feet

beneath the surface of the road, below which the chalk through which the well is sunk is not supported. The natural level of the chalk appears to be about 6 feet below the surface of the road." A visit to St. Andrew's Church, where Mr. F. R. Beecheno read an interesting paper, describing the brasses and monuments in the church, ended the day's journeyings.

In the evening Dr. Bensly presided at a dinner given by the Society in honour of the Yarmouth members at the Maid's Head Hotel. An opportune paper was contributed by Mr. Hudson, based upon extracts from the registers of St. Peter Permouthergate parish. They are entertaining specimens of the local echoes of national feeling:—"October 19, 1798, form of prayer on the victory obtained by Admiral Sir Horatio Nelson over the French Fleet off the Nile, August 1, 6d.;" "November 12, form of prayer for general thanksgiving on November 29, 1s.;" "November 29, paid the ringers, thanksgiving day, evening illuminated, 10s. 6d." The peace of Amiens was welcomed with a delight which shows how heavily the burden of a prolonged war had been weighing on the people. Even in October 1801, the ringers were paid "for two days on account of signing preliminaries of peace 17. 1s." On March 31, 1802, they were paid 10s. 6d. "for peace being proclaimed," and a copy of the proclamation, a form of prayer, and a notice cost 1s. 6d. The war, however, broke out again. In 1804 England was trembling with the fears of invasion, and all the hopes of the nation seemed to rest on the fleet, and especially the popular hero, Nelson. On May 25, 1804, a "form of prayer and proclamation for a general fast" were paid for, and the same again on February 20, 1805. Then later in the same year the relief came. We read:—"December 5: Paid for a form of prayer and proclamation on account of the late glorious victory obtained over the combined fleets of France and Spain, by Lord Viscount Nelson, off Cape Trafalgar, on October 21, 1s." No bells were rung in the great admiral's own county, for the glory of the victory was overshadowed by his death; and then we read:—"1806, January 9: Paid Church (the sexton) for tolling the bell two hours, being the day of Lord Viscount Nelson's funeral, 4s." Still the war went on, but no notice is taken of the Peninsular victories. When, however, in 1814 Buonaparte was driven to abdicate, the churchwardens of St. Peter Permouthergate seem to have quite lost their heads. They enter, April 12, 1814, "Putting flag upon the steeple on Buonaparte's overthrow, beer, ditto, 7s. 6d." There is a delightful vagueness about the comparative cost of the flag and the beer. Then again, "Ringers and beer, illumination day, 7s." If we may suggest that in the former entry the flag cost 6d. and the beer 7s., then it would seem that on this occasion, under the influence of 7s. worth of beer, the ringers forgot to ask for their usual 10s. 6d. Everybody was evidently very happy at "Buonaparte's overthrow," for that same year was paid "Parr & Co., cloth for sexton's coat, 3l. 4s., and making sexton's coat, gold lace, &c., 3l. 14s. 6d." They meant to keep up their dignity when they had overthrown Buonaparte. But alas! for their satisfaction, Buonaparte was only half overthrown; he escaped from Elba, and was soon again a terror to Europe. Now churchwardens were only human, and victories and beer were all very well now and then, but you might have too much of them. A "general fast" only cost 6d., but here was a fearful prospect of endless repetitions of "ringers and beer." So they apparently determined to have no more to do with such things. If England expected every man to do his duty their duty was to see after the parish, and they couldn't be upset with these disturbing elements. So even when they were officially enjoined to be thankful for the crowning victory of Waterloo they only grumpily put down "Prayer and letter for Waterloo business, (!) 2s."

THE PREHISTORIC LAKE VILLAGE AT GLASTONBURY.

A CORRESPONDENT of the *Times* says that the site of the prehistoric Celtic lake village, near Glastonbury, has been further excavated since July last under the superintendence of the discoverer, Mr. Arthur Bulleid. The sites of the dwellings are marked by mounds. One of these contained the greatest depth of clay yet found, no less than 9 feet; the accumulation of successive hearths which were found necessary as the weight of the clay gradually compressed the peat beneath. This mound contained 600 tons of clay, all of which must have been brought in their boats by the inhabitants from the neighbouring hills. Under the mound was found the framework of a loom with brushwood and wattlework to form the foundation. That the inhabitants were much engaged in spinning is clear from the fact that, in addition to other things connected with the craft, no fewer than forty horn and bone carding combs have been unearthed. Strangely enough, no two of these are exactly of the same pattern. As in previous seasons a large number of bone articles have been discovered. The number of broken bone needles and splinters of bone found in one mound seem to indicate that

it was utilised as a needle factory. Another mound was very rich in fragments of pottery and other evidences of the manufacture of hardware. No fewer than ten bronze *fibulae* were found, these being fashioned almost exactly like the modern safety pin. Two bronze studs, probably a part of harness or for fastening clothing, were also found, together with other small bronze articles. A neatly cut iron file about 8 inches long was found. As usual, very few human remains were discovered, part of the skeleton of a very young child being all that was brought to light this summer. With the exception of the cracked skulls of a few unfortunate warriors, the remains of very young children have chiefly been found in past years, Mr. Bulleid being of the opinion that these primitive people conveyed their dead to the neighbouring hills for interment. Parts of three broken millstones were unearthed, and in one mound a clay oven, measuring 2 feet by 9 inches. One glass article only was brought to light this year, a blue glass bead with a wavy line of dark blue running round it. Altogether the season's work has proved very interesting, and the British Association is so well satisfied with the discoveries made from time to time that at their Toronto meetings they renewed their grant towards the excavation fund.

SCULPTURE OF GLASGOW ART GALLERIES.

THE following report has been presented to the New Art Gallery committee by Mr. George Frampton, A.R.A., master sculptor, and Messrs. Simpson and Milner Allan, joint architects:—

We beg to submit, for the approval and consideration of the committee, the following outline of the scheme proposed for the sculpture and carved work of the structure:—

1. North porch.—The important group of three figures under the central arch of entrance will represent "St. Mungo as the Patron of Art and Music," the keystone of the great arch bearing the arms of the city of Glasgow. The spandrels of this arch and its two fellow arches to the east and west will be filled with groups of figures in low relief representing instrumental and vocal music. The three pedimental compositions on the east, north and west faces of the first upper stage will be formed of cartouches supported by amorini, and containing heads in full relief representing the great trio of Greek art—Ictinus, the "Architect;" Phidias, the "Sculptor;" and Apelles, the "Painter." The dome of the porch will be crowned by a winged bronze figure of "Victory," with attributes of "Success," palms and wreaths.

2. The tympana of the thirty arches over the windows of ground floor will each contain decorative carving, of which the centre piece will be a cartouche and scroll bearing the names of the great artists of the Renaissance period, surmounted by the arms of their native city or country, *e.g.*:—England—Joshua Reynolds, Christopher Wren, Inigo Jones, &c. Scotland—Robert Adam, James Gibbs, &c. Germany—Albrecht Dürer, &c. France—Claude Lorraine, Antonio Watteau, Perrault, Jean Goujon, &c. Holland and Belgium—Rembrandt, Holbein, Rubens, Vandyke, &c. Italy—Raphael d'Urbino, Vignola, Palladio, Michel Angelo, Donatella, Benvenuto Cellini, Bramante, Sansovino, &c. Spain—Velasquez, Murillo, &c.

3. The thirty-six piers dividing these windows are terminated by festooned cartouches. These will each bear a "clan" name, the north, south, east and west fronts being apportioned according to the relative geographical position of the clan countries, *e.g.* Campbell to the west front, Sutherland to the north, &c.

4. The centre of each of the pavilions is terminated by a seated figure—composition—eight in all. Their subjects will be symbolical of "Music," "Architecture," "Painting," "Sculpture," "Science," "Literature," "Religion" and "Commerce."

5. The two north towers each have terminal winged figures in bronze, the one of "Fame" and the other of "Immortality."

6. On each of the internal main piers of the central hall will be groups of figures with attributes of the various arts, crafts and trades of Glasgow, each surmounted by a mural crown. Thus one will form a trophy of engineering implements; others of wrights, masons and so forth. In the spandrels of the first-floor arches will be decorated tablets bearing the names of the great musicians—Mozart, Beethoven, Handel, &c.

7. The similar spandrels in the east and west courts will bear the names of historically famous men of Scotland—"Scott," "Wallace," "Bruce," "Burns," "Duncan," and the like—with the dates of their birth and death.

8. The four tower entrances on the east and west fronts will be surrounded with decorative carving in relief emblematical of "Naval and Mercantile Shipping," the centre pieces being formed by the prows of ships and galleons.

In suggesting the foregoing subjects we have desired to indicate a wide recognition of the art work of all countries, and at the same time to keep, so to speak, a thread of national

feeling constantly in view, so that it may be distinctly a Scottish monument. We think the committee will agree with us that, while it should not be stamped as local (in the narrow sense of the word) by the selection of subjects, it is yet right and fitting that Glasgow should be the city commemorated thereby, and it is accordingly in her industries and interests that we have sought our emblems.

Before leaving the descriptive section of this report, we desire to draw attention to the essentially structural nature of the sculpture and carved work in this building. It is no mere filling of panels with ornament which may be left blank or unfinished without interfering with its form or design, but is in every case an integral part of the design, marking points deliberately selected as necessary for enrichment, in order to complete an outline or enforce the simplicity and mass of the adjoining parts. The method of procedure in execution will be as follows:—The master sculptor will undertake the preparation of the clay and plaster models for all parts of the work, and will supervise their execution in stone. He will personally execute the principal group in the arch of the north porch, and (with the assistance of such of the carvers as he may select) the eight chief figures on the pavilions. Six chief carvers will be appointed, who will each, with their own craftsmen, undertake a section of the building, being supplied with models as aforesaid.

Since the appointment of the master sculptor he has personally visited and examined the executed work of the principal carvers of the Glasgow and Edinburgh districts. We think it right to express our gratification at the alacrity with which the principal firms have come forward to work under your master sculptor without jealousy or difficulty. Their desire is evidently not so much to profit pecuniarily as to have some share in the completion of a great municipal undertaking. With such a spirit manifested, the Corporation may be confident that their efforts will result in really fine work. After careful consideration we have chosen for recommendation the following chief carvers. They were selected solely on their merits, and chance to be all of Glasgow:—

1. North façade—William Shireffs, 287 West Campbell Street.
2. South façade—J. C. Young, 187 Dumbarton Road.
3. East and west façades—William Vickers, 221 West Regent Street.
4. The bronze figures on towers and north porch—A. M'F. Shannon, 7 Scott Street, Garnet Hill.
5. Central hall—B. A. M'Gilvray & Ferris, 129 West Regent Street.
6. East and west courts—James M. Sherriff, 20 Canning Place.

We suggest that the chief carvers should each enter into a contract, to be drawn by the town clerk, binding themselves to perform the allotted work at the estimated price, and to complete it within a stipulated time, to the satisfaction of the architects and master sculptor. The latter will, of course, have his own agreement with the Corporation.

The following estimates have been obtained for the work. A competitive system was adopted in tendering, and the rates allowed are, in each case, those of the lowest offerer, the remainder having been adjusted thereto:—

1. Clay and plaster models, and drawings and superintendence (Frampton)	£1,600	0	0
2. Eight figure compositions on pavilions, each 450/. (Frampton)	3,600	0	0
3. Group under central arch of north porch (Frampton)	2,000	0	0
4. Six low-relief spandrels in north porch arches, each 300/. (Frampton)	1,800	0	0
5. North façade (Shireffs)	1,808	1	0
6. South façade (Young)	950	0	0
7. East and west façades (Vickers)	1,090	8	0
8. The bronze figures on towers and porch (Shannon)	850	0	0
9. Central hall (M'Gilvray & Ferris)	825	15	0
10. East and west courts (Sherriff)	370	2	0
To the foregoing amounts should be added a provisional sum for temporary scaffoldings, shelters and sheds for the craftsmen and their models, say 250/., and it would be prudent to allocate a moderate sum for contingencies, say 500/.			
750 0 0			
Total	£15,644	6	0

There is a provisional sum of 5,000/. included in existing contracts, which is, of course, available towards the expenditure proposed.

It should be borne in mind in considering these estimates that cost is entirely a matter of quality in such work. It can undoubtedly be done far more cheaply, and if the committee does not see fit to sanction the proposed expenditure there are two courses open—first, to have the work executed by inferior craftsmen; second, to carry out a portion only, and leave the building unfinished. The first alternative will not, we believe, recommend itself to the committee. The building will be visited and criticised by the artists and cognoscenti of all nations, and

the work must be such as we can show them without fearing its comparison with their own productions. The second raises a purely financial question, which we are not competent to discuss. We can, however, affirm that full value will be obtained for the money spent, and that the work proposed is required for the completion of the buildings. In any case, it is necessary that a commencement should be made without delay, so that the galleries may be completed by the appointed date.

The above report was submitted to the New Art Gallery committee at a meeting on Friday. Before coming to a decision the committee remitted the report to Mr. Waterhouse for consideration.

ARCHITECTURAL ASSOCIATION OF IRELAND.

THE opening meeting for the winter term of this Association was held in the Grosvenor Hotel, Westland Row, on the 26th inst. Mr. R. Caulfield Orpen occupied the chair.

Amongst those present were Messrs. Thomas Drew, president Royal Institute of Architects; W. M. Mitchell, George Ross, M.A., J. H. Pentland (lecturer), J. J. O'Callaghan, C. J. M'Carthy (city architect), T. Slevin, G. M. Ross, M. J. Buckley, T. R. Scott, George Sheridan, G. Sheridan, R. Butler (hon. sec.) and A. E. Murray.

The Chairman announced that the Maguire prize of 10/. for a drawing of a building of style prior to the eighteenth century was awarded by the judges, Messrs. G. C. Ashlin and T. M. Deane, M.A., to Mr. J. Delany. Three sets of designs for a suburban villa were sent in competition for the Ashlin prize of 10/., but the prize was not awarded, on the ground that the plans sent in could not be carried into effect for the sum indicated in the terms of the competition, 2,000/. The prize for the essay on "The Influence of Climate and Material on National Domestic Architecture" was awarded to Mr. R. Butler, 12 Dawson Street.

Mr. J. Howard Pentland, R.H.A., then proceeded to deliver the inaugural lecture on the subject of "Open Roofs." He dealt in great detail with the various forms of roof construction from the earliest ages, illustrating his remarks by sketches drawn, for the greater part, as the lecture proceeded. The term "open roof" he defined as a roof the structure of which was not concealed by a ceiling or other covering. It was used generally in respect to timber and stone materials, but was equally applicable to stone.

On the motion of Mr. J. J. O'Callaghan, seconded by Mr. Geoghegan and supported by Mr. Drew, a hearty vote of thanks was passed to Mr. Pentland.

The building construction class in connection with the Association will recommence on Thursday, November 4, at 22 Clare Street. The architecture and design classes will recommence on November 1. Members who intend to join the classes are recommended to meet on these dates for the purpose of discussing the work for the session.

The Saturday afternoon visits to buildings in course of construction recommenced on Saturday last, when a large number of members visited, on invitation, the Empire Palace Theatre, which has been rebuilt on the site of the Star Theatre of Varieties, Dame Street. They were received by their professional colleague, Mr. Brunton, the architect of the building, and also of many other places of amusement in the three kingdoms. The building is now closely approaching completion under the direction of the well-known and experienced contractor and builder, Mr. Dalton.

TESSERÆ.

A Legend of Cologne.

THE legend concerning the plan of Cologne Cathedral may not be known to every one. It is related of the designer (Heinrich Sunere or Gerhard von Riel) that in despair of finding any plan sufficiently great, he was walking one day by the river, sketching with his stick upon the sand, when he finally hit on one which pleased him so much that he exclaimed, "This shall be the plan." "I will show you a better one than that," said a voice suddenly behind him, and a certain black gentleman, who figures in many German legends, stood by him and pulled from his pocket a roll containing the present plan of the cathedral. The architect, amazed at its grandeur, asked an explanation of every part. As he knew his soul was to be the price of it, he occupied himself, while the devil was explaining, in committing its proportions carefully to memory. Having done this, he remarked that it did not please him and he would not take it. The devil, seeing through the cheat, exclaimed in his rage, "You may build your cathedral according to this plan, but you shall never finish it." This prediction long seemed likely to be verified, for though the building was commenced in 1248, and continued for 250 years, only the choir and the nave and one tower to half its proposed height were finished. The towers were not completed until 1883.

Buildings in Chile.

The cities and towns of Chile, with the exception of Valparaiso, are generally built upon the same plan. The most striking peculiarity is that they are divided into squares of equal size, the sides of which are about 137 English yards in length, and enclose an area of about four acres. Within each of these quadras there are parallel rows of broad and well-paved streets, intersecting each other at right angles. The houses are also built in the form of a square, enclosing one or more courts, into which the various apartments look, and in consequence of the continued dread of earthquakes, they are massive and spacious. Few are erected with a second storey. They are generally built of timber and large bricks formed of mud mixed with chopped straw and dried in the sun. The unoccupied spaces are in most cases laid out in gardens, and adorned with fruit-trees and flowers. In the larger cities considerable taste and elegance are displayed in the internal decoration of the houses of the wealthy, especially of the apartments destined for the reception of visitors. The most splendid public edifice in Chile is the mint, which was built of hewn stone, at a cost of L.165,000, and contains the apartments of the President of the Republic. In ecclesiastical architecture Chile is greatly inferior to most Roman Catholic countries. The majority of the churches are very plain, and the internal decorations, paintings and images are for the most part of a very paltry description. The cathedral of Serena is small, but much admired for the style of its architecture, which, with the light magnesian limestone used in its erection, is well calculated to resist the dangers arising from the frequency of earthquakes.

Unity of Art.

Art, considered under the just recognition of its origin and end, and viewed in its various phases of progress and decay—at one period passing in its strength over one portion of civilised society, it may be in connection with mythic doctrine, as in the poetry of India and the architecture of Egypt, or in elevating the heroic to the divine, as in the sculpture of Greece—presents one great whole, dependent in its several parts upon one bond of connection. But in the face of this, its ubiquity, in one form or another, in defiance of the constantly recurring and ever-living repetition of its effects in different times and modes, in opposition to its indestructibility and the continual exemplification of its reanimated influence; a singular solecism has frequently taken the place of an imperative judgment regarding it; which, although too mistaken to be generally entertained on particular occasions in various degrees and under different modifications, has served to impede the full admission of its influence, and that not merely in connection with notions promulgated under speculative systems of economy, political or moral, which are alone fitted to meet certain data, to run, like fused brass, into their destined mould, and there stiffen into rigid immobility. It has been deemed contingent and unnecessary; its various branches have been separately denied, or even held to be detrimental; one muse after another has been banished from the codes of fanciful moralists and legislators. But life does not acknowledge rules of mental monasticism, and the sisters are often seen whispering in the ears of their repudiators. Happily, man's self-denial of his own faculties and powers does not negative their existence, otherwise his extinction, intellectually, morally and physically, would have been a short process.

Paris Houses.

Practically, at Paris, where from the nature of the subsoil it is expensive to form cellars, and where the bulk of the houses are built upon the ground without deep foundations, where the land is all freehold, building leases are unknown, and consequently where the interest of the proprietors is evidently to obtain the greatest number of dwellings upon the least possible surface, and the houses, therefore, are generally from six to seven storeys high, the lower parts of the houses are built of the roche stone towards the street and up to the first floor, from thence two storeys are carried up in *la pierre franche*, and the remainder is executed in lambourde. The party walls are mostly executed of moellon or small coursed stones, of similar natures to the corresponding parts of the façade. The back walls and partitions are of wood, filled in with light rubble and plastered. Such construction is about as bad as can be; the front wall, built of carefully squared ashlar, sinks very little; the party walls, of rubble and plaster, not only sink more than the front, but from the fact that the plaster in setting expands, it becomes necessary to build these walls totally independent of one another. The back walls, of wood framework, shrink still more. It is therefore almost impossible, in the new quarters of Paris where this style prevails, to find a house which is not disfigured in all directions with cracks and settlements of every kind and size imaginable. The mode of using the stone is, however, logical, and merits imitation. The harder and less hygrometric stones are placed at the bottom as being the most fit to resist the crushing weight and the capillary action of the stone upon the humidity of the soil. The finer grained stones

are employed at the heights destined usually to be ornamented; the lighter and more perishable stones are used above, where they load the foundations less than the others would do, and where they meet with the atmospheric conditions the most adapted to their own preservation.



Aspect of Buildings.

SIR,—May I ask your various readers whether they can give me any advice in the following matter? It is desired to build new workshops for a firm of carvers, and, secondly, joiners and carpenters. What is the correct "aspect" for (1) a carver's workshop, and (2) a carpenter's and joiner's workshop, and can your readers tell me of any modern premises as an example, or of any book published on the subject?—Yours truly,
October 25, 1897. PROVINCIAL ARCHITECT.

GENERAL.

The Rev. William Finch-Hatton has given a fine stained window to the church of Weldon in Northamptonshire. The window belonged to Lord Nelson, and was given by him to Sir William Hamilton, then ambassador at Naples, through whom it descended to Mr. Finch-Hatton. The subject of the window is the Adoration of the Magi.

The Sum of 28,000*l.* has been paid or promised towards the Church Building and Debt Extinction Fund of the Presbyterian Church of England. It is proposed to raise 50,000*l.* in the course of five years.

An Exhibition of lithographs has been opened in the Rue Grange-Bateliere, Paris, by the Minister of Fine Arts. It will be closed on November 6.

M. Alfred Sisley, the French Impressionist, has returned to Paris, bringing with him several views which he has painted in Wales.

The Exterior of the Château of Malmaison has been restored under the direction of M. Humbert, architect, and at the expense of M. Osiris. The more difficult work of restoring the interior is about to be undertaken.

Mr. Thomas Blashill has consented to act as superintending architect to the London County Council for another year, as his retirement would cause inconvenience.

Mr. W. Alexander, of Dundee, has prepared plans for a new theatre which is to be erected in High Street, Aberdeen.

A New Military Hospital, in place of the building for so many years occupied in Portsea, is, it is stated, to be erected on Portsdown Hill, on a site hereafter to be selected.

The Contract for the new water supply of Paris will be let in the course of the coming month. The first section is estimated at about 450,000*l.*

Long Lane, Southwark, is to be widened and Tabard Street continued into Borough High Street, at a cost of 207,400*l.*

An Excursion Meeting of the Northern Architectural Association will be held on Saturday next, October 30, when the new Y.M.C.A. buildings in course of construction will be inspected. The opening meeting of the winter session will take place on November 17.

The Second Ordinary Meeting of the Liverpool Architectural Society will be held at the Law Library, Union Court, on Monday, November 1, at 6 P.M., when a paper will be read by Mr. Huon A. Matear, F.R.I.B.A., on "The Birth and Development of Architecture," illustrated by limelight views.

A Conversazione of the Dundee Institute of Architecture, Science and Art will be held in University College, Dundee, to-morrow (Saturday).

The First Evening Meeting of the Auctioneers' Institute of the United Kingdom for the session will be held in the lecture hall of the Institute, 57 and 58 Chancery Lane, on Tuesday, November 2, at 7.45 P.M., when the president, Mr. James F. Field, will deliver his inaugural address.

The Metropolitan Asylums Board have decided that Mr. Edwin T. Hall, the architect for the new chief office, be paid a commission of 5 per cent. upon the total cost of the works, it being understood that in no case shall this commission exceed the sum of 2,500*l.*

A New Reredos which has been erected in St. Mark's parish church, Shelton, was last week unveiled in the presence of a large gathering.

The Architect.

THE WEEK.

ON Tuesday the question to which we referred last week, whether a summons under section 107 of the London Building Act was legally served when it was merely affixed to the premises to which it related, was considered in the Queen's Bench Division. Mr. MEAD, the magistrate who had declined to recognise such a summons in his court, had made an affidavit in which he said that on September 22 the London County Council applied for a summons under section 107 of the London Building Act 1894. The summons was returnable before him on October 1. It was addressed "To the Owner" (of the premises) merely. The owner was called upon to appear, but there was no response. The complainant (the London County Council) proposed to proceed in his absence on proof that a copy of the summons had been affixed to the premises. It was stated by the complainant that the owner was unknown, but no evidence was given that any steps had been taken to discover him. There was no evidence that the valuation list or rate had been examined, or the rate collector interrogated, or other obvious means taken to discover who the owner was. The complainant contended that the service was sufficient under section 188 (1) of the Act of 1894. The magistrate, however, thought that the service of any summons, even if anonymously addressed—*i.e.* "To the Owner"—was a "notice" the service of which is provided for by the Summary Jurisdiction Acts, and must therefore be served, under section 1 of the 11 & 12 Vict. c. 43, personally or at the last known place of abode. He also thought that even if a summons addressed "To the Owner" in a case where the owner could not be found was not "provided for by the Summary Jurisdiction Acts," there should be evidence before him that reasonable diligence had been exercised by the complainant to discover the owner of the property. He therefore refused to hold that there had been valid service of the summons. Counsel for the magistrate argued that the Council should have endeavoured to discover the owner before Section 188 was applied. Mr. Justice WRIGHT considered there was not a sufficient inquiry after the owner to entitle the Council to act under Section 188. It was necessary to prove the inquiry, then failure to ascertain who was the owner and, thirdly, that the premises were empty before Section 188 was applicable. Mr. Justice KENNEDY concurred. The application for a mandamus accordingly failed.

A SPECIAL sitting of the Eastbourne County Court was held on Tuesday for the trial of an action brought by a local surgeon against Messrs. B. COOKE & Co., contractors, Westminster, for the recovery of 50*l.* as damages for loss sustained by plaintiff. It was alleged that while constructing an extension of the parade the defendants' agents negligently placed certain machinery (a steam crane) adjoining or near to the public road without properly or sufficiently fencing in the same, or taking other and sufficient precautions against accident, by reason whereof the plaintiff's horse took fright and became unmanageable, and thereby occasioned injury to the horse and trap of the plaintiff. For the plaintiff it was stated that the horse was scared by the noise of the crane, but defendants' foreman said that the crane was not working until after the time when the accident occurred, and his evidence was corroborated. The jury found for defendants. It appeared that the contractors had suggested the closing of the road, as it was very narrow, and the borough surveyor admitted they had carried out all that he had asked them. There was also a doubt expressed whether the crane when not in motion was not an object that would frighten a horse unless it was led, especially if travelling quickly, but the responsibility in that case would probably rest on the Corporation of Eastbourne.

A MOST interesting collection of historical documents, autograph letters and manuscripts is now on view in one of the rooms of the Fine Art Society in New Bond Street. It covers over three centuries, and includes specimens of holographs and signatures from the pens of all the

influential royalties, statesmen, warriors, authors, actors, painters, ecclesiastics and musicians of that time. Some of the letters are of vast political importance—a few of them revolutionised the world and changed the complexion of society for ever; others give rare glimpses of the hidden home life, while many reveal the writers in a way that narrowly escapes a breach of confidence. To whom the exhibits belong is not generally known. It only concerns the public to bear in mind that they are for sale, and that particulars of the prices of one, many, or all are to be had for the asking. Order being "Heaven's first law," it seems somewhat of a pity that a more definite system of classification was not adhered to in the arrangement of this unique collection.

AN elaborate paper upon "Sea Defences" was read by Mr. R. F. GRANTHAM before the Society of Engineers on Monday. It did not relate to the preparation of ships or other aids to warfare, but to embankments, upright stone or concrete walls and groynes of timber, stone or concrete. Mr. GRANTHAM was rather pessimistic or rather concluded that England is not wealthy enough to resist wave power. According to him, "The great hindrance to the adoption of any kind of effectual protection against the encroachment of the sea, except for residential property, is the cost. No frontage of agricultural land, except where a considerable area is below the level of high water, can bear the cost of any substantial form of defence hitherto devised. It is cheaper to sacrifice the land." But, as it is a national belief that Britannia rules the waves, something ought to be done by Government to obviate the necessity of so often removing coastguards' stations owing to the encroachment of the sea. Mr. GRANTHAM desired special attention should be given to the following considerations:—1. The protection of the coast line is in most cases dependent on the sand and shingle that can be arrested and retained in front of it. 2. Groynes, unless there is a foundation of rock, are in most exposed places indispensable, whether there is a sea wall or not. 3. Where there is a sufficient supply of drift along any part of the coast, groynes alone, if properly planned, will prevent further encroachment without a sea wall or breastwork. As sand and shingle are the most important elements in the protection of the coast, their removal in large quantities weakens the natural defence of the coast line, and ought in all cases to be stopped. West of Selsea Bill Mr. GRANTHAM found that shingle was being taken for repairing the parish roads, and that barges were removing 100 tons of shingle per week from the Spit at the mouth of Chichester Harbour. On his advice the lords of the manor prohibited the practice. A similar custom prevailed on the Yorkshire coast, and the trade in shingle was largely developed by the opening of the Hull and Holderness Railway. The Board of Trade put a stop to it, the late Sir JOHN COODE's evidence being that "if the shingle continued to be removed the port of Hull would be endangered, and that materially so."

THERE is hope for Mexico, for it has not only given a chance to all the world to compete for the legislative building, but it has decided to preserve the archaeological remains which are a puzzle to foreigners as to natives. By a recent decree of the Mexican Government all antiquities, manuscripts, idols, amulets and other objects or chattels which may be found of interest for the study of the civilisation and history of the aborigines and ancient settlers of America, and especially of Mexico, cannot be exported without legal authority. Under the head of archaeological monuments will be comprised ruins of cities, casas grandes, troglodyte habitations, fortifications, palaces, temples, pyramids, sculptured rocks or those with inscriptions, and, in general, all edifices which under any circumstances may be of interest in the study of the civilisation and history of the ancient inhabitants of Mexico. The destruction or injury of a monument is also constituted an offence against the law. Hitherto Mexican antiquities could hardly be considered as subjects for serious study by archaeologists in general, for those who attempted to trace the origin of the remains only increased the mystery. Now that prehistoric archaeology is placed on a more firm basis, it is possible that a systematic investigation of the Mexican monuments would lead to more satisfactory results.

ARCHITECTURAL ASSESSORSHIP IN AMERICA.

AS our readers already know, no more than a few weeks have elapsed since the competition for the Philadelphia Capitol, which so many American architects believed was to inaugurate a new era for the profession, ended in a fiasco. But in the States all things move quickly; law itself can have no delays, and short as has been the time since the competitors were disappointed it has sufficed to enable all the circumstances to be investigated in the law courts, for a judge to consider them at his leisure, and for an elaborate judgment to be prepared and delivered. The affair has interest of its own to all architects who take part in competitions, but especially for English architects, since the manner of arriving at judicial conclusions in the United States is derived from English practice, and it would not be considered irregular in the Queen's Bench Division if one of the judges were to refer to an American decision in support of his own views.

It may be as well, in order to make the judgment clearer, to state the case briefly. The Commissioners for the Capitol, having special powers under an Act passed in April, 1897, invited architects to send in designs for the building. They announced that six experts were to be appointed as assessors to examine the designs. The experts were to select eight designs which appeared most suitable, and to distinguish them in the order of their merit. After a consideration of the report and recommendations of the experts, the Commissioners were to select that one design among the eight which they considered most satisfactory, and to award to the author "the prize of the competition by designating and appointing him as the architect of the legislative building." To the authors of the designs placed second and third in the competition medals were to be given. Designs came in, were submitted to the experts, and the report and recommendations were duly prepared. But, as we announced, the Commissioners could not screw up their courage to the selecting point. However, they performed a more hazardous act, for they cancelled and annulled their own programme, and in that way fixed a stigma on American government.

In all countries honest men are supposed to hold to the obligations on which they enter. If judged by ethical principles, there can be no question that the Commissioners are guilty of discreditable conduct, for they have inflicted serious loss upon a number of their countrymen. There is rothing in the American constitution, so far as we know, which allows architects to be chosen as the victims of men in office who are weak or callous. But when architects happen to be victimised, is there any power in the Courts to redress their wrongs? Two firms of competitors, viz. Messrs. COPE & STEWARDSON, of Philadelphia, and Messrs. ALDEN & HARLOW, of Pittsburg, resolved to test that question. Accordingly, they appealed to the Court of Common Pleas. They submitted statements explaining the great and irreparable injury they sustained, and their losses in preparing designs. They asked the Court to compel the Commissioners to carry out obligations which were solemnly incurred.

There were originally five Commissioners, but one of them—his name should be recorded, it is DANIEL H. HASTINGS, and he is the Governor of the State—could not stoop to trickery and withdrew. It was, therefore, a dauntless four who had the hardihood to plead in demurrer that the Court of Common Pleas had no jurisdiction in the case, that the plaintiffs had no grounds to entitle them to relief, that they, the four Commissioners, formed a deliberative body invested with the power of selecting an architect, and that their discretion could not be reviewed or controlled as a consequence of any application on the part of the plaintiffs. In other words, every puny authority in America is so constituted as to be incapable of doing wrong, although much suffering may be caused by its acts.

The case came before Judge SIMONTON on October 2, and it was agreed by the parties that he should be able to consider the report of the experts and other documents relating to the Commission. After a consideration of arguments of counsel and the documents, the Judge has issued a very elaborate decision.

It is pointed out, in the first place, that the Act of April 1897, which gave rise to the proceedings, is to some extent mandatory. The site of the building is designated,

the style of architecture is prescribed, and a limit is fixed to the expenditure. Among the matters left to the discretion and judgment of the Commissioners are the size and form of the Capitol, the employment of an architect or architects and the adoption of plans for the construction of the building. That discretion, said the Judge, must be exercised by them alone, and cannot be committed to any other board or person, for as was declared in *LYON v. JEROME*, which is the ruling American case:—"From an early period of our law this rule has been laid down as to powers given by will or deed to executors, trustees and attorneys to sell land, make leases, &c.; and modern decisions have extended the principle to the less formal appointments of factors, brokers and other lawful agents. How much more strongly, therefore, must the rule apply to the delegation of authority by the State to its high public officers made with the solemnity of a legislative act?"

In spite of the solemnity of their constitution, there can be no doubt, if words are to be trusted, that the Commissioners had decided on a delegation of their authority. When, in the conditions of the competition, it was stated that some one of the eight designs selected by the experts was to be adopted and that the commission to design and supervise the erection of the building was to be given to the author, that was a delegation of authority. The Judge, in fact, has to admit that the provisions in the programme "certainly tend to give weight to the argument that the primary purpose of the competition was to procure plans for the Capitol buildings, coupled with the provision that the author of the plans accepted should be employed as the architect to carry them into execution."

At the same time, Judge SIMONTON considers that the principle involved in competitions is not sound. "We do not believe," he says, "that any business man of ordinary discretion about to expend the sum of 550,000 dols. immediately, and perhaps twice that amount prospectively, would select and employ an architect to prepare plans and supervise the erection of buildings to cost that amount without ever having seen him, without any knowledge whatever of his character, his habits, his executive ability, or his pecuniary responsibility, or any other knowledge of his fitness, except that to be acquired from inspecting a plan for the buildings drawn by him." But the contingency of the successful designer being ineligible was foreseen, for in the conditions it was provided that in such a case the prize-winner was to 'associate with himself in the performance of his duties an architect who shall be acceptable to the Commissioners. And such associated architect shall be paid a portion of the fee provided herein to be paid to such appointed architect, such portion to be as agreed upon by both architects, or in the event of their failure to agree, then as fixed by the Board of Experts."

The Judge may be right in holding that it was unfortunate that such a scheme was adopted, but an agreement is an agreement, and should be invincible.

The argument of the Attorney-General was that the Commissioners did not abdicate nor delegate the powers vested in them. But Judge SIMONTON could not close his eyes to the fact that "if it be their duty to select one of eight nominated by the Board of Experts, they have certainly precluded themselves from exercising an independent judgment and from giving only the weight to the opinion of the experts to which, in the exercise of their sound judgment and discretion, they may think it entitled." The Commissioners also were lax in their action when they confined themselves to the nomination of one out of the six members of the Board of Experts. Here again the Judge acknowledges that he is unable to see how it can be even plausibly argued that a delegation or surrender of discretion was not implied.

It is evident that Judge SIMONTON considers that whatever may be done in the way of delegation by the individual members, the Commissioners as a body could not delegate their discretion. Various precedents were cited in proof. In one case where canal commissioners were authorised to take possession of lands required, it was held that the engineer could not enter on the land of an individual except by express direction, although the construction of the canal was confided to him. How American works can be executed with despatch with such obstacles is against an Englishman cannot understand. Fancy railway directors

having to formally enter on every field through which their line is to pass before a sod could be turned. In another case where a common council by resolution directed a superintendent of streets to have certain sidewalks formed, one of the inhabitants refused to allow the work to be done in front of his premises, and brought an action to assert his right. The Court upheld him on the ground that the power conferred must be exercised by the council alone, and could not be delegated. If municipal authorities have to superintend every detail of the works in towns, it is no wonder they try to make illicit profits to compensate them for their labours. The Commissioners of the Philadelphia Capitol through the agency of a Board of Experts inflicted wrong on architects; but as the Act had no clause relating to experts, and, moreover, according to the common law, discretionary power cannot be delegated, therefore the Commissioners are completely innocent. If we say they were not impartial, and were seeking their own ends, the words do not apply to them even in a Pickwickian sense. They are not absolved, for as Commissioners they could not offend.

There was no other course open to Judge SIMONTON than to play the familiar game of see saw. As individuals the Commissioners did not fulfil the duties entrusted to them, but being infallible as a Commission they were above all lapses. A judge was therefore bound to approve of all the license and irregularities which the law confers on public bodies. "We are concerned with the legal questions only," says the Judge in coming to an end, "and have nothing to do with, and express no opinion upon, the propriety of the action, professional or other, of either or any of the parties to this controversy." The Judge could not declare the demurrer to be sustained and mulct the complainants in costs, without suggesting there was little difference between plaintiffs and defendants. We suppose Judge SIMONTON had been studying some of the remarks of English judges about the professional practice of architects. On both sides of the Atlantic justice, in dealing with architects, is not entirely exempt from prejudice. But nothing which a judge can do is so much of "a delusion, a mockery and a snare" as assessorship in the United States.

THE SENAMS OF TRIPOLI.*

A REPRESENTATIVE of Tripoli or the Barbary States who visited London in the last century described a sort of Pompeii in his country, in which all the former inhabitants and the animals were to be seen standing as petrifications, just as they appeared at the moment of the visitation. There was nobody in England, not even any of the men who were once in the hands of the pirates, who was competent to cast doubt on the story. Travellers in those days did not venture beyond the coast of Tripoli, and in our time so few care to run the risks of a journey in the interior, it was hardly necessary to prohibit explorations by Europeans. It is therefore still possible to talk about the wondrous petrified city of Rassem with as much confidence as was shown by the Tripoline. He might be imposed on by a fiction, for probably he was as little acquainted with the whole of his country as any Londoner, but it is as likely he was only giving a misinterpretation of a spectacle which, if seen from a distance and under certain atmospheric conditions, would appear to be intended to deceive the senses. The petrifications may have been no more than a group of limestone senams resembling those which Mr. COWPER has the credit of describing correctly for the first time.

What is a senam? The word is supposed to signify an idol, but it may be only a modern Arabic term. The object generally consists of two standing stones, from 6 to 15 feet high, with a lintel on top. If monoliths were not obtainable, then the uprights were formed of a few large stones. In most places there is evidence that the trilithic unit or element was part of a series which formed the boundary or enclosure of a space that was commonly rectangular. If the stones on Salisbury Plain were not subjected to the

wear and tear of our insular climate, and preserved their arrises as they left the quarry or the hands of the primitive workmen, there would be some analogy between them and the senams. As they appear in the reproduction of Mr. COWPER's photographs, the senams can hardly be considered as "rude stone monuments," for they suggest that



SENAM TERRIGURT.

Roman masons, who were undoubtedly employed in the interior of Tripoli in days when it was not all a desert, must have aided and abetted in giving more regularity to the Tripoline enclosures than is found in the stone circles of Western Europe. Yet it is not unlikely that the senams existed for many a century before Roman power was exercised in the region. The first impression, however, which a view of one them gives is that the system is the creation of a carpenter rather than of a mason. The post and lintel arrangement has much to do with such a conclusion, but what appears to add to the certainty are the square-cut holes which so often appear in the upright stones, and suggest mortising. If the senams formed a fence, there were horizontal as well as vertical obstacles to escape from the area enclosed.

If we assume we have a fence, for what purpose was the part used which it surrounded? It would be absurd to believe that so much stone and labour could be employed to form a pen for cattle. Almost instinctively, archaeologists of all countries and dispositions conclude that enclosures like those of Sardinia, Brittany and Wiltshire were constructed to aid in carrying out religious rites. Tripoli was not beyond an influence which is inherent in the human race. If it did not form a part of the possessions of Carthage, it could hardly escape from the propagandism of the city. But it was always easy to find a creed to excite terror of the unknown. People of the Semitic race, who wished to have enduring memorials or symbols of their belief, and were incompetent to carve figures of men or inferior animals, found it was necessary to make the best of plain stone. A single monolith set up sometimes served, but there is no reason why two or three should not also be as effectual and more impressive. A series of senams could, therefore, become a series of idols, and at the same time guard or girdle some sacred spot of earth. But let us hear what Mr. COWPER says:—

When I first suggested, before the Anthropological Section of the British Association, that in the trilithonic senams of Tripoli we see symbolic structures, if not identical, at any rate nearly akin to the mysterious *Asherim* of the Baal worshippers, I did so with much diffidence. But subsequent consideration, and a second visit to the country and to numerous other sites, have not shown any reason to withdraw the suggestion. That the "Asherah" symbol, which was an idolatrous emblem of Ashtoreth, the nature goddess, "the abomination of the Sidonians," by whom all sensual desire was kindled, shou

* *The Hill of the Graces: a Record of Investigation among the Trilithons and Megalithic Sites of Tripoli.* By H. S. Cowper, F.S.A. With ninety-eight illustrations and a map. London: Methuen & Co.

take such a form as we see in the senams and in the Babylonian seals, is surely probable enough; and its position upon the latter in juxtaposition with the cone-topped column, which is unquestionably phallic, is alone suggestive as to its significance. That the "Asherah" was of wood, and not of stone, only renders more significant the fact that the senams themselves seem copied from wooden types.

If yet a little more theorising may be excused, it may be pointed out that the angle-cut holes on the altar side of the senams are well adapted for erecting a wooden structure, such as appears to be indicated on the Babylonian seals, and joining it to an enclosure in which might be enacted some of the terrible rites of the faith of Molech. If the passage between the senam jambs was that by which the victims were passed by the priests, and the lateral holes contained bars which could then be shot, signifying that the world was left behind, we may imagine a terrible explanation of the mystery. The passage through the jambs would thus signify regeneration or new birth, which was to be followed by either sacrifice or by the purifying rite of passage through the fire; for although the passages are so narrow that they could not be used as ordinary gates, they were wide enough for this purpose, for the sacrificial victims were always youthful.



SENAM EL-KHAB (M'SALATA).

In connection with this, the world-wide custom of squeezing between clefts in rocks, between the columns of mosques, or through holed stones for the cure of ailments, should be noticed. All these were originally symbolical of regeneration, and such was probably a part of the "Asherah" ritual, and, if there be anything in the above suggestions, of the senams as well. In the case of a purificatory rite by fire, there would probably be room between the senam and the altar for two fires side by side. . . . Glancing at all the evidence before us, it is impossible to resist the conclusion that whether appropriated to any form of Baal cult or not, such a strange combination of rude megalithic forms, advanced knowledge of masonry, and evidence of an organised ritual must have been the outcome of contact between some barbarous or semi-barbarous tribal population and some highly cultured race. That it was the Libyan races, who we know occupied this territory which constituted the first element, there is every reason to believe; and that the other influence was the result of the Sidonian and Phœnician colonies which at an early date were formed for mercantile purposes upon this coast, there seems from the above mass of evidence, at any rate, a strong presumption. It may have come from Egypt by some earlier and unrecorded migration, but at present the evidence at hand does not point to this; but at any rate we have in these monuments a most remarkable link between the great stone building age and ancient Eastern civilisation.

It is a pity GUSTAVE FLAUBERT was not acquainted with Mr. COWPER's discoveries, for then we should have incidents introduced in "Salammbô" that were suggested by

the senams, or it may be some of the details would be modified. For example, if MATHÔ had to run the gauntlet along a screen of senams prior to receiving the *coup de grâce* from the sacrificial knife, the openings would allow of spear thrusts from the excited crowd, but in such a way as to lengthen the spectacle afforded by the torture of the victim.

Mr. COWPER was enabled to visit seventy-six sites and, as he says, "a very large proportion contained features of the senam type." In the Tarhuna plateau they were most numerous, but the most remarkable were found in the Wadis Doga and Terr'gurt. There is variety among them, but likewise general characteristics. According to Mr. COWPER they show some or all of the following features:—(1) Rectangular enclosures of good ashlar masonry, often of large size and subdivided; (2) a subdivision of this enclosure by square columns; (3) megalithic gate-like erections, always placed in or close to the walls of the enclosure; (4) altars; (5) stones of obscure use; (6) Roman work; (7) sculptures; (8) graffiti; (9) castle-like buildings; (10) detached enclosures.

The appearance of the senams amidst the desolation of the desert must have a startling effect, but they are not the only remains of antiquity. Mr. COWPER also gives illustrations and descriptions of Roman work over which time cannot prevail. It is in such cases the greatness of architecture is manifest, for the buildings seem to have conquered fate. At Lebda (Leptis Magna) a ruin is seen which in the doorways at least suggests Greek influence. Occasionally examples of sculpture are found which are treated ignominiously. A copy of the *Venus of PRAXITELES* was among the victims. At Tarhuna a marble relief was discovered which Mr. COWPER was able to secure. The treatment is not common, although not unique, and suggests some of the playfulness which inspired the Tanagra statuettes. The relief measures 28 inches by 36 inches, but



MARBLE RELIEF FOUND IN TARHUNA.

it may be only part of a frieze. The subject is supposed to be the Graces.

There is much else in the book which will have novel interest for the architect and the archaeologist. Tripoli is at present beyond the tourist's world, and apparently has not the least importance to an English politician, although it may one day become the battle-field of rival European States. Mr. COWPER has excited interest in the country, and it is not likely until the Sultan is evicted that another traveller will be able to add much to the information he has imparted in a most agreeable form.

The Congregation of the Wharton Presbyterian church, Little Hulton, one of the oldest Nonconformist churches in Lancashire, have decided to erect another place of worship, in consequence of the undermining of the present structure by the coal mines in the vicinity. The church at Wharton was established in 1662, and the present building was erected in 1723, since which time it has frequently been repaired and altered.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE first general meeting of the Institute of Architects for the session 1897-98 took place on Monday evening last, Professor Aitchison, A.R.A., president, in the chair.

The President congratulated Sir John Taylor on having received the honour of K.C.B., and then delivered the following opening address:—

The President's Address.

When I had the honour of addressing you last year, I chose a subject with which I felt sure you would all agree, as it was the recounting of some of the architectural triumphs of the past and the pointing out of some of the services architecture has done for those nations where it flourished. These services include the usefulness of the monuments at the time they were built, the adorning of the country and the keeping of a record of that nation's greatness, of its peculiar characteristics and of its position in civilisation. I thought that the first utterances of a new president should be as free as possible from controversial matter; but, after a year of office, the president becomes conversant with the wants and possibilities of the society. I now propose that we should consider how the Institute can, with a reasonable hope of success, improve the art it was specially created to cherish and advance.

The unravelling of the great problems of humanity and the extraction of the lessons they teach are beset with difficulties, and some of these difficulties are apparently insuperable on account of our ignorance of the factors. Sometimes the glimmerings of light that the most perspicacious can see turn out to be not those of the dawn, but of mere will-o'-the-wisps, as in the case of Macchiavelli's works. Macchiavelli saw exactly what men did, and was not led astray by what they ought to do, and in the problems he set he saw the solution wanted, but misled by the ruthlessness of nature, he overlooked the supreme importance of how the end was attained; so that the old adage, "Let justice be done though everything perish" is a more useful maxim for mankind to follow than to attain its object by wickedness.

We cannot suppose that among the two parties who alternately govern us, and help to mould our minds, to direct our aims, and to modify our desires, there are not on both sides upright and devoted men, whose views are as the poles asunder; and it is only by long experience that the value of the measures carried can be judged of.

At the time of the discussion of such measures the partisans of the scheme are as sure of its excellent results as their opponents are of its pernicious effects, and as the clashing of the opposing views causes heated, angry and acrimonious debates, so I fear that suggestions of improvement may have the same effect amongst us.

In considering architecture, as in considering every other transcendental pursuit, we must take the existence of two things into account, namely, the set of the public mind and the occurrence of genius; and though we most urgently want genius in every branch of skill and knowledge, we have not the faintest notion of the causes of its production. The utmost we can do is to offer it ample opportunities of learning what it wants to learn, and to bestow our thanks and admiration upon its possessor and his works.

The other cause of excellence is the set of the public mind in a certain direction; but why it sets in that direction is at present unfathomable, though we may roughly indicate that its set is always towards those pursuits that promise power, wealth and delight. We may, however, say with certainty that in this age it does not set in the direction of architecture. If the genius of all the great architects that ever lived were combined in one, and that one had the chance of showing it, the architecture that he would produce would have little or no effect on the public, for the public now gets more, in that direction, than it either desires or deserves almost for nothing, and is perfectly ungrateful. The set of the public mind is so important a factor that we can hardly overestimate its importance. Men whose turn of mind is in the line of that of the public generally decry all attempts at systematic teaching, and proclaim that all schools and universities are mere shoddy-making factories that turn out a colourable imitation from waste.

When in the past there has been a sudden demand by a city or a nation for some kind of knowledge or skill of which there was a deficient supply, the head of that nation or city had no better remedy to offer than the creation of schools, academies and universities, where the requisite knowledge and skill should be taught or tested, and where it was hoped they might be learned. This was the method adopted by Constantine the Great when he chose Byzantium for the capital of the Roman Empire, and caused to be built there copies of the senators' houses in Rome, and of their villas in other parts of Italy. We know that in his time the art of sculpture had so declined that the statues and bas-reliefs had to be taken from Trajan's Forum to form the adornments of his own triumphal arch, and that the sense of propriety had so decayed that there

was no outcry against such folly; and though there was then a large influx of architects and skilled workmen into Byzantium, the work was so hastily and so unskillfully done that eighty domes are said to have fallen during his lifetime, and many buildings had to be pulled down in the time of his successors. So apparent was the want of competent architects and skilled workmen, that he offered a premium to those who would have their sons brought up as architects, and to skilled workmen who would bring up their sons to their own trades. With this object he started schools in Italy and North Africa. May we not say that Santa Sophia, one of the masterpieces of the world, was the outcome of this teaching?

After the irruption of the barbarians in the West there was a great want of both architects and skilled workmen, and the ecclesiastical authorities endeavoured to supply that want by founding schools in their abbeys and monasteries. Again, at the time of the Saracen irruption there was a dearth of architects and skilled workmen, for these energetic savages came at once from poverty into fabulous wealth, and wanted mosques for their new religion and palaces for their kalifs, sultans and great men; and this want was tried to be met by schools and universities connected with the mosques; and there was again the same want in the days of Charlemagne, and to meet these wants the same methods were adopted. I fancy that all the systems but one offered teaching to all who came, and, I presume, who showed some aptitude; but Constantine, who was certainly an able man, only offered his premiums for learning architecture to young men of eighteen years of age who had received a liberal education—whatever that meant then or may mean now.

Looking at the enormous extent of the knowledge required by an architect, and the almost antagonistic powers of mind required, would it not be better to confine architectural teaching to architecture?

As architecture is pre-eminently a constructive art, construction should certainly be its foundation, the very last thing that would be thought of now, for the æsthetic architect would leave that to the builder and the engineer. It seems ludicrous not to insist on an architect who is to build having such knowledge of statics as to know the proper method of resisting the force of wind, of water and of earth, and the thrusts of arches, vaults and domes. Statics would give us too important lessons in æsthetics, for it gives us the proper proportions of each part of a building when we know the height, the weight to be carried and the strength of the material to be used. When these particulars are known and provided for, we may roughly say that we have only to accentuate the important part by mouldings, or have them adorned by the sculptor to make it into architecture.

The architectural student wants also to know how to plan conveniently and beautifully, to make his building wholesome, and finally to give it the shapes and ornaments that proclaim its destination, and are appropriate to that destination, and—"all the rest is leather and prunello." The literary, goldsmithing, painting and modelling architects of the Renaissance left us one pernicious legacy, for their aim was to imitate Roman architecture, and from their teaching the Gothic revivalists have wanted to imitate Gothic, and the Greek revivalists have wanted to imitate Greek, though the Italian Renaissance architects gave grace and artistic perfection to their Roman models.

This procedure of imitating the construction and æsthetic expression of a Pagan people who flourished 1,200 years before the Renaissance seems to me to be a mistaken one, for architecture is a progressive art, not only in the scientific part of construction, in the increase of material wants and the introduction of new materials, but also in the æsthetic part; for no two successive generations like exactly the same forms, nor are the emotions that should be raised exactly alike. You certainly should not ignore the advances made in the architecture of the immediate past. Between the Pagans of ancient Rome and the Renaissance there had been Christian Roman architecture, the Byzantine, when the dome took so prominent a part; there had been Romanesque and Saracen architecture; there had been Gothic which abandoned the opposing of inert mass to thrusts and used counterpoise, and showed a constructive skill never equalled till this age of iron; Gothic, too, had tried to express in its churches its ideals of knighthood and of Roman Catholic Christianity. It was certainly not wise to ignore former advances in construction, and it was hardly possible to go back to pure Roman Paganism, however hard the Renaissance men tried. If we want to advance we must follow the example of the Mediævals; we must study deeply, observe accurately, reason logically, and be never deterred by failure, and endeavour to express the leading character of our time, which, I fancy, is the getting an insight into nature's laws and applying them to our own wants. We must, too, endeavour to discover what in the heavens above, the earth beneath, or the waters under the earth we and our employers love to see embodied in our works, and how this embodiment should be expressed.

In England we have artificially divided the constant

increase of skill and knowledge, and the fluctuation in taste of the Gothic architects, into styles which we call Early English, Geometric, Decorated and Perpendicular. I want you to observe that these so-called styles were gradual developments. The first Gothic architects developed the mouldings of the Romanesque; the grouping of two or more lancet windows under an arch suggested a hole in the spandrel afterwards cusped with the new Saracen feature, and so on; and as skill increased and taste decayed the tracery of the enormous perpendicular window grew mechanical and ugly. It is only by increase of æsthetical and constructive knowledge and the development of necessary features that any characteristic features of our own can be stamped on our architecture.

When a race has had enough wit to invent mouldings on which the sunshine of its own country played the harmonies that it loved, how can these mouldings be transplanted into another country with a different atmosphere and a different sunshine, and produce the same effect? And if they could, are these the precise effects we want to produce now?

Any one who can appreciate the beauty of mouldings, and has seen Greek architecture at Athens, cannot fail to observe how absolutely ineffective these mouldings are in the misty atmosphere of London, particularly when there is no sunshine. The only other architects who understood the art of moulding were those of the Middle Ages, after what we call Gothic was developed; their mouldings are perfectly effective in misty weather, but are too coarse and hard when there is full sunshine, while they are at all times wanting in grace. Yet I may say that the art of moulding is as much neglected now as the science of statics.

No one can give genius, nor does it seem in one man's power to turn the desires of mankind in the direction he desires. You can, however, try to drive away from the profession, by a thorough examination, all those who do not love architecture better than anything else, and though this love does not always insure the possession of genius, it mostly does. Having got the proper sort of men, you can see that they have that necessary knowledge and skill that would enable them to use the divine spark properly if they have it.

Ben Jonson repeats Horace's adage that "the poet is born and not made," but he adds, for all that, a poet wants a good deal of making, and it is the same in all the fine arts. In painting and in sculpture the student with a passion for either does not come fully armed, like Athené from Zeus' brain; anatomy has to be laboriously acquired, as well as the power of drawing or modelling the perfect human form; the art of composition has to be learned, as well as what sculpture and painting can properly represent. Architects are not born with a knowledge of statics, nor of the strength of materials, nor of the art of planning, nor of how to express the emotions that each particular structure should evoke; though we now see ornaments from the palaces of the Cæsars, or from the boudoirs of Renaissance beauties, lavished on tailors' or oyster shops and on banks and insurance offices. I have seen the ghastly ornaments of Roman temples, bullocks' skulls, on a bank, but I looked on these as the monograph of the architect.

This Institute is a university—*i.e.* it does not teach, but it examines and informs students what they should know and where some of this information can be got. Amongst some the idea of teaching is almost a mania, and I admit that some things must be taught; the pronunciation of foreign tongues, the use of a foil or an oar; but as far as I know the art of teaching is mainly non-existent. My experience of school teaching is this. I was put under a man who had mastered the subject I had to learn and who was armed with a stick. He told me to learn a piece out of a book and he allowed me what he thought was enough time to learn it in. If I did not know it, I was soundly beaten, and without doubt this is a great stimulus to exertion. Lucian, of the Dialogues, was supposed to have a taste for sculpture, but his master thought he had not striven enough and as he had broken a piece of marble too gave him so severe a beating that he abandoned the art.

Unfortunately, no real text-book has been written on architecture, though all but how to produce the emotions proper to any structure may be picked up from various books. Those architects who can produce the proper emotions have something else to do than to explain the means they employ, even if they could explain them. And the knowledge, too, of the means used to produce emotions will not give the power to produce them, or else all the real critics of æsthetics would be poets, painters, sculptors, architects or musical composers as well. You cannot suppose that those artists who have excited emotions have not tried to learn all they could from their predecessors. In the case of the poets, at least, we know that they have studied the works of their predecessors, and translated them when in foreign tongues, and paraphrased them when in their own; and though Horace's maxim is excellent, that "If you want to make your hearers cry, you must cry yourself," yet even when he did cry he had to learn the precise mechanism for causing his hearers to weep. Architects must study and paraphrase those buildings and those members of buildings

that have produced the proper emotions in them. An architect must also recollect that those who are to be moved by his building are not Greeks, Romans, Mediævals, nor Italians of bygone ages, but the people of his own country and of his own time. Still if you can touch the master chords of humanity, they are not so very differently attuned now from what they were in the earliest times, or else we should not laugh at the wit of Aristophanes, of Rabelais, of Swift or of Molière, nor cry over the pathos of Homer, Æschylus, Sophocles, Dante or Shakespeare.

We can at least see that an architectural student has the knowledge that he cannot properly do without, and we shall find that this alone will have a very good effect on the profession; but it is almost impossible to divest men's mind of cant. The student is asked to know all sorts of things, some of which are interesting, some pleasant and some dull, that have no bearing on architecture. It is interesting enough to know that hazel nuts were shipped at Barcelona and currants at Patras, but we use neither dry nuts nor currants in architecture; it is pleasant enough to understand Greek, Latin, Hebrew and Sanscrit, French, Italian, German, Spanish, Portuguese, Russian and Arabic, but they are no more architectural arts than the broad-sword exercise or being able to shoot flying. It is interesting to know who built the Parthenon, or the Pantheon, or King's Cross, but it is no more architecture than playing on the fiddle or dancing the polka.

We believe that nature perfectly adapts all her living works to the actions they have to perform without waste of material, and while some are exquisitely beautiful, some majestic and some comic, others are commonplace, and some are repulsive, hideous or frightful; but they all have character. It is only by studying nature's works and former buildings, and deducing laws from them, that we can hope to cultivate that sense which makes us like one form and detest another, so I think that such a study is necessary for those who wish to become architects; for though a knowledge of statics will make our buildings safe and prevent a want of due ratio between the parts, we must trust to a cultivated eye, till the laws are discovered, to make them beautiful, majestic, or sublime. We should, I think, make our students first design in old-world materials—wood, brick, stone and marble—so that their designs can be compared with the existing successful monuments; but we have new materials, which have to be brought within the pale of architecture.

In my opinion we cannot do better than make students design in cast-iron when they have succeeded in designing in old world materials. It is too expensive a material to disregard its statical conditions. It is difficult to arrange a column or a stanchion so that its capital may securely carry a heavy superstructure with a large base. It is difficult to make the base of this column or stanchion wide enough to transmit safely the weight it bears on to a foundation of much softer material; there are difficulties in the design of mouldings and floral ornament that can be cast; and there are absolutely no examples to imitate, so that the knowledge, care, skill and invention of the student are called into play. We cannot believe that the ingenious Mediæval architects would have foregone the use of such valuable materials as wrought-iron, cast-iron and steel, on account of Mr. Ruskin's objection that they were not mentioned as building materials in the Bible.

It may be truly said that nothing can be effected in a structural art like architecture by talking; but when a man is lost in a wood, and you can direct him to the road out of it, you have done him most effectual service. Architecture has been in a wood since the fifteenth century, and it can never progress until it gets out of this wood. The intelligent architectural student wants to know the mark he is to aim at and how he may hit it, and I am afraid the general opinion would be that he is to learn to sketch in perspective, and when he asks what he should sketch, he would be told everything that appears to him interesting, striking or beautiful, because when he gets into practice he will find that the public may ask him to build in any style the world has known. This is a good instance of the ignorant instructing the wise. He should be told that he has first to learn how to construct, and that the aim of architecture is to make of each building an organism like nature's, fitted to fulfil its duties as perfectly as possible without waste of material, and to make it properly tell the tale of its purpose or purposes, and if sculpture and painting can be afforded, he is to use them to tell its tale more completely.

When the Associate's curriculum is amended I would reduce the examinations to two, a matriculation examination and a final one, for two reasons—first, because time would be saved, and, secondly, so that each student might keep up the knowledge and skill he had acquired. Professor De Morgan used to say that when an examination was passed, the students thought all the knowledge required for passing it might be forgotten, and looked on his asking again for subjects they had once passed as a fraud, as if they were asked to pay a second time when they had the receipt for the first payment. The final examination should include a certificate that the candidate has acted as clerk of the works on some building for at least

six months, to familiarise him with real work, and to impress on his mind that it is building and not drawing that is wanted. These amendments would greatly improve the condition of architecture; but architecture would be more improved if there were an examination of Fellows as well. The complaint is that there is a dearth of Fellows, and a proposition is made like that adopted by the giver of the Scripture feast, that we should send into the highways and byways and compel them to come in. There would surely be no need of compulsion if it were felt to be an advantage and an honour to be a Fellow. It has been said that eventually every Fellow must have been an Associate, but the present conditions of the Fellowship offer a way to escape examination. No one, I imagine, objects to see really distinguished architects being admitted by acclamation; but at present there are only three real qualifications for the Fellowship—that the candidate is thirty years of age, is honest, and has been seven years in practice; though it is true that the Council look at the drawings turned out of his office. Some one said of a Prime Minister in Cobbett's day that he was honest; to which Cobbett replied that no one would take a footman if honesty were his only qualification, and put this question, "Shall that be the only qualification for a Prime Minister?" No one can say that physicians or surgeons do not desire and do not strive to be Fellows of their respective colleges, or that both are not better for having learned the necessary elements of their profession. The only objection to a proper examination of Fellows is that it is absurd to expect it from men of thirty years of age who have been seven years in practice. The physicians and surgeons saw the force of this, and though the examination may take place at twenty-one years of age, the title cannot be assumed until they are twenty-five. The Fellow's examination should only be more complete than that of the Associate's; and the candidate should have a certificate of having acted as a clerk of the works for a year, and made out the necessary full-sized diagrams for the work on the floor.

I have only one remark to make before I give my peroration. I am rather surprised that architects do not see that degrees of excellence are possible in architecture; or, if they do see it, that they do not act on their convictions. The greatest living architects are contented with the same remuneration for their work as the apprentice just out of his time, and merely seek to get into a wholesale business. This greatly helps to degrade the profession in the eyes of the public, and gives a very wrong impression of the facts, as every architect well knows. Thousands of public monuments have been erected in Europe since the Golden Age of Greece, not to speak of important private buildings; yet the Parthenon and the Caryatid Temple on the Erechtheion have never been equalled since, nor the interior of the Pantheon, nor the west front of Notre Dame at Paris, nor the Cornaro-Spinelli Palace, nor the Scuola di San Marco, nor the town hall of Brescia.

In all the other fine arts the first successful effort brings its author next to nothing, but those produced in the height of his skill and knowledge mostly bring him wealth, if that be his desire. The great Diogenes was a beggar, and Jean François Millet, the one artist in Europe according to the Japanese, was in poverty; and so was Alfred Stevens. Every architect knows that in the case of architectural works of moderate size it is a question if he is to gain or lose a five-pound note; and the more care he takes, the more certainly is the balance on the wrong side. The fashionable architect with 100 buildings has a difficulty in persuading the profession or the public that he bestows the same loving care on each of his 100 buildings that he would do if he had only two, and is apt to provoke the retort of the lioness to the beasts in *Æsop's Fables*. "There was a great stir made among all the beasts which could boast of the largest family. So they came to the lioness. 'And how many,' said they, 'do you have at a birth?' 'One,' said she grimly; 'but that one is a lion.'"

I cannot help desiring to see the pursuit of architecture followed on sound principles, nor can I forget the absence of any system in my youth; for then after you had drawn out examples of the Greek and Roman orders, genius was supposed to do the rest. I am delighted at the admiration of our smaller Domestic architecture by our great morning newspaper, the *Times*, and by M. Paul Sédille in his "*L'Architecture Moderne en Angleterre*"; but I wish to see that admiration extended to our great public buildings as well.

One sees to what lengths a proper architectural education may lead from mere savagery in the architectural triumphs of the Middle Ages. If the true architectural high road could be again found all might hasten to the goal, and not be like the dragon's teeth when the stones were thrown into the middle of them. Who knows but that in the case of the right road being found the public might not again take a passionate interest in the excellence of our art, as it must have done at the great epochs? Modesty is a charming virtue in all, and especially in those of great intellectual endowments, but if this modesty is only to make us idle and worthless, let us throw it off. Let us no longer say we are so inferior to the ancient Greek, Roman,

Byzantine, Saracen, Mediæval and Renaissance architects that it is no use trying to equal them. Have we relinquished the courage, daring and self-reliance that once distinguished our race? If we have we must be contented to lag behind the rest of the world. If we are not equal to former races, and particularly to the Romans whom we so much resemble, I believe it is because we have got into a wrong road, and I would rather see architects take up the position of our ambassador at the Court of the father of Frederick the Great, than be ready to confess that the English are hopelessly inferior to the great architectural races. You may remember that Frederick William had a regiment of giants and paraded them in front of our ambassador, and asked him if he thought an equal number of Englishmen could beat them? The ambassador said he could not say that, but he would undertake that half the number would try. I hope we are not worse than the men of Milton's days, and hear what he says of them:—"Lords and commons of England! consider what nation it is whereof ye are, and whereof ye are the governors: a nation not slow and dull, but of a quick, ingenious and piercing spirit; acute to invent, subtle and sinewy to discourse, not beneath the reach of any point the highest that human capacity can soar to. Therefore the studies of learning in her deepest sciences have been so ancient and so eminent among us that writers of good antiquity and able judgment have been persuaded that even the school of Pythagoras and the Persian wisdom took beginning from the old philosophy of this island. And that wise and civil Roman, Julius Agricola, who governed once here for Cæsar, preferred the natural wits of Britain before the laboured studies of the French."

I firmly believe that the race has not degraded, and that if we will only again take up the right way of learning we shall astonish ourselves and the world. May I not say:—

Men, my brothers, men the workers, ever reaping something new;
That which they have done but earnest of the things that they
shall do?

To those who are not architects I may say that if you will devote yourselves solely to money making and feasting, architecture which mirrors the condition of nations at the time it is executed will certainly languish, for the admiration it should excite and the gratitude it should call forth is the very breath of its nostrils. It cannot, however, be said of the nation now that it is without aspirations, for there never was a time when so many were striving to penetrate the secrets of nature and the past acts and thoughts of man, and trying to yoke the power of nature for man's use, and to teach and elevate their fellow-man and his helpmeet. To women more liberty has been granted than Mary Wollstonecraft asked for, and they have achieved even more than she hoped for. But all these studies and pursuits rather throw our contemporaries off those primary delights that nature gave to raise, to solace, and to purify mankind—I mean the beauties of form and colour and the impressiveness of light and shade. But if these lessons be neglected, we shall leave behind us but a poor account of ourselves in those arts which strike the eye and impress the imagination. We have too unfortunately abandoned the symbolic, the emblematic, and the allegorical, so that we can tell no story to the eye by which the multitude may be impressed. It is foolishly believed that a paragraph in a newspaper or in an Act of Parliament will tell the same story and make the same impression on the multitude that can be made by a fine building adorned with storied and allegorical sculpture and painting such as we see in the Arch of Titus or Severus. The Jubilee procession, poor as it was compared with Mantegna's "*Triumph of Julius Cæsar*," told more of our power and extent of empire to the populace than all the history that has been written in this century. Recollect what an obtrusive art architecture is, and how strongly it forces itself on the attention; how long it lasts, and how it forces people to come to see it in its own country. If you would only think that it is the history of the present power and cultivation of the people, you would at least learn enough about architecture to be able to judge of its excellence as you do about the other fine arts you love, and be as proud of its excellence and as delighted with it as you are with the pictures, statues, poetry, romances, and musical compositions of the day, and when you do take the same interest in it you will certainly have your reward.

A vote of thanks to the President, proposed by Mr. H. H. Statham, was seconded by Dr. A. S. Murray.

Mr. A. S. Flower will read a paper at the next meeting on November 15 entitled, "*Notes on Renaissance Architecture in Malta, with special reference to the Buildings of the Order of St. John.*"

The New General Hospital which has been erected at Kettering at a cost of 10,000*l.*, on a site given by the Duke of Buccleuch, was opened recently by the Right Hon. R. C. Spencer.

NOTES AND COMMENTS.

THERE is at last a chance that the ruins of the Cour des Comptes on the Quai d'Orsay in Paris will no longer remain as a memorial of the Commune. Various schemes for dealing with them were proposed during the past quarter of a century, and at one time it was arranged to convert the ruins into an imitation of the South Kensington Museum. But utilitarianism has finally gained the prize from decorative art. The Chambre has agreed to a proposition for the concession of the block to the Compagnie d'Orleans, in order to erect on the site a terminus which will be more central than the present building on the Boulevard Montparnasse. The interests of the International Exhibition of 1900 must have had an effect on the voting, for some years ago a railway terminus in such a position would not be tolerated. But Paris, like London, must submit to the locomotive.

THERE is sometimes danger in approaching or returning from Mont St. Michel, but our readers will say that enhances the interest of the place, and establishes it in the memory. In the course of a few years the Mount will be less isolated, for it is proposed to construct a line of railway to it from Pontorson. Everyone who has seen the place will at once realise what a transformation will follow. There will be a railway station at the foot of the Mount, and the rampart will serve as a buffer. The dyke will no doubt be filled up, and other changes are sure to follow. A pilgrimage to the Mount will no longer be able to recall Mediæval days to the most imaginative mind, and although Americans, who would like to have an electric railway forming a circumference for the globe, will be satisfied, few architects will approve of an innovation which is vandalism on a big scale.

WE recently mentioned that an attempt to revive monopoly in the architectural work of the Birmingham City Council was defeated. The building which was to be the prize was a lunatic asylum at Holly Moor. The asylums committee have since invited the following local firms to send in competitive plans:—Messrs. MARTIN & CHAMBERLAIN, Messrs. COSSINS, PEACOCK & BEWLAY, Messrs. MANSELL & MANSELL, Mr. FRANK B. OSBORN, Messrs. CROSS, BROOKES & NICHOLS, and Messrs. INGALL & SON. Accompanying the invitation is an intimation that, instead of offering the usual premiums, the committee decided that each selected competitor should be awarded 100 guineas for the trouble of preparing the plans. The plans will be adjudicated upon by the committee, in consultation with the medical officers of the present asylum and the city surveyor. Contrary to the usual practice, the competitors are to sign their full names and addresses on the drawings.

THE principal librarian of the British Museum lately said that the trustees were most eager to obtain firemen from the London County Council, but the price demanded for the service was higher than could be paid. The trustees used to allow a gratuity to the superintendent of the Fire Brigade for occasionally inspecting the firemen belonging to the Museum, but the County Council considered it was not becoming that their officers should obtain pay from outsiders, and the arrangement was stopped. Commander WELLS, however, is allowed to make honorary visits. At the South Kensington Museum the Sappers are drilled as firemen, and if an occasion arose to test their services they would be sure to act efficiently. The Museum arrangement will have to become more general, for the London County Council have decided that they cannot spare London firemen to specially protect Government property, in view of the pressure which is frequently put upon the members of the brigade to deal with fires in the county of London. All their men have been withdrawn from the General Post Office and the India Stores. In accordance with previous arrangement, the duty of watching was at once taken over by a force comprised almost entirely of pensioned members of the Metropolitan Fire Brigade.

AN experiment lately attempted by the London School Board is worth attention elsewhere. It was decided to cleanse periodically the drains of such of the schools as have been brought up to modern requirements. According to the Board's sanitary surveyor the schools were divided into two districts (north and south), and two men in each commenced the work on January 4 last, since which date 289 schools have been visited, at an expenditure to end of July of 174*l.* 15*s.* 2*d.*, at 240 of which the drains, manholes and chambers have been thoroughly cleansed (cost 165*l.* 7*s.* 7½*d.*). A second visit has been paid to forty-nine of this number for the purpose of cleansing the manholes only (cost 9*l.* 7*s.* 7*d.*). There are still some ninety schools which have not yet been visited. The average time taken at the school where the whole of the drains, manholes, &c., are cleansed is two days. But this depends largely on the size of the school, the system of drainage and the means of access. When the manholes only are cleansed the average time has been one day. The sanitary surveyor considers that the present arrangement should be continued, as numerous stoppages have been cleared which would probably have become far more serious, necessitating orders to the local contractors, in some cases costing more than has been incurred in cleansing the drains. In addition to this, many caps to interceptors have been found missing and have had to be replaced, thereby avoiding complaints of smells. These caps are frequently removed by the pressure of sewer-gas, and if not noticed are washed through the interceptor into the sewer. It will be necessary to employ a couple of additional men.

ON Monday last Mr. HUGO MATEAR read a paper before the Liverpool Architectural Society on "The Birth and Development of Architecture." During the session the following papers will be read:—December 6, "The Domestic Architecture of the Renaissance, Elizabeth—James," by Mr. J. A. GOTCH; January 10, "The Architecture of MICHEL ANGELO," by Mr. BERESFORD PITE; January 24, "Brass and Copper Work," by R. LL. B. RATHBONE; February 7, "The Quality of Strength in Architecture," by Mr. W. H. BIDLAKE, M.A.; February 21, "Some Notes on St. George's Hall," by Mr. F. E. PEARCE EDWARDS; March 7, "Sienna and Baldassare Peruzzi," by Mr. FRANCIS W. BEDFORD; April 4, "A Description of the Royal Insurance Buildings," by Mr. JAMES F. DOYLE; May 2, closing address by the president, Mr. W. E. WILLINK, M.A.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: IN THE CLOISTERS, SHOWING DOORWAY TO MARTYRDOM.

ALLIANCE INSURANCE OFFICES, MANCHESTER.

INSTITUTE OF CIVIL ENGINEERS, WESTMINSTER.

PREMIATED DESIGN FOR THE HOTEL METROPOLE, MORECAMBE.

THE design illustrated was submitted by Messrs. H. & E. MARTEN of Bradford and Harrogate, under the motto "Pro bono publico." The stipulated cost was only 30,000*l.*; the authors, therefore, considered it was more prudent to build shops only towards Heysham Road, leaving to a future time the providing of houses over them. To extend the first floor of the hotel over the whole area of the shops as suggested in the instructions would only increase the cost of working and lose a large revenue from the houses over the shops in Sefton Road; there would also have to be corridors of interminable extent. The 150 bedrooms required are provided on the two principal fronts, with servants' rooms in the attic. The building as shown contains 1,430,410 cubic feet, which at 5*d.* per foot gives 29,800*l.* If houses over the shops in Heysham Road were provided the cost would be about 3,000*l.* in addition.

The Architect, Nov. 5th 1897.



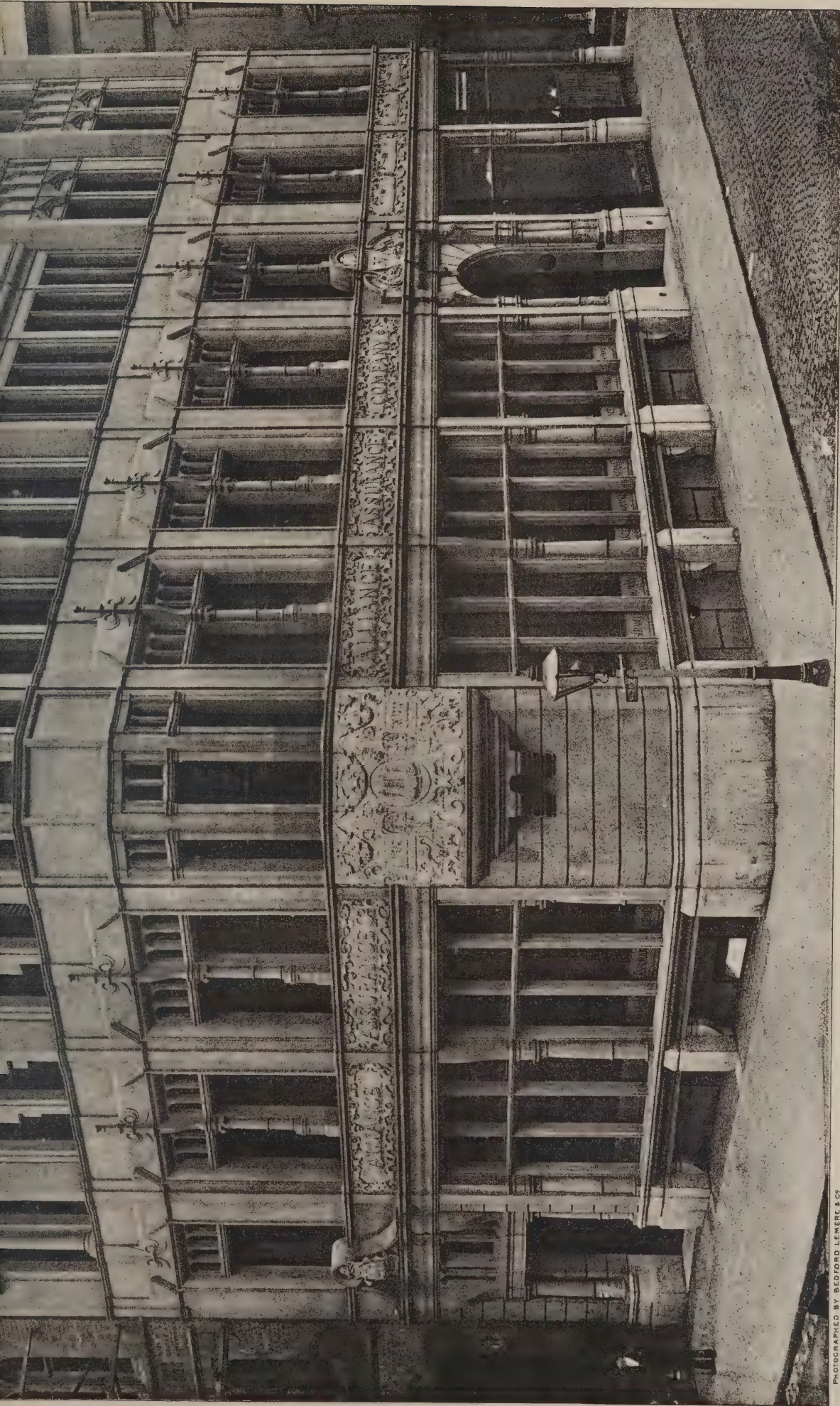


PHOTOGRAPHED BY S. B. SOLAS & CO. II, LUDGATE HILL, E.C.

INK-PHOTO, SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 87.—CANTERBURY: IN THE CLOISTERS, SHOWING DOORWAY TO MARTYRDOM.





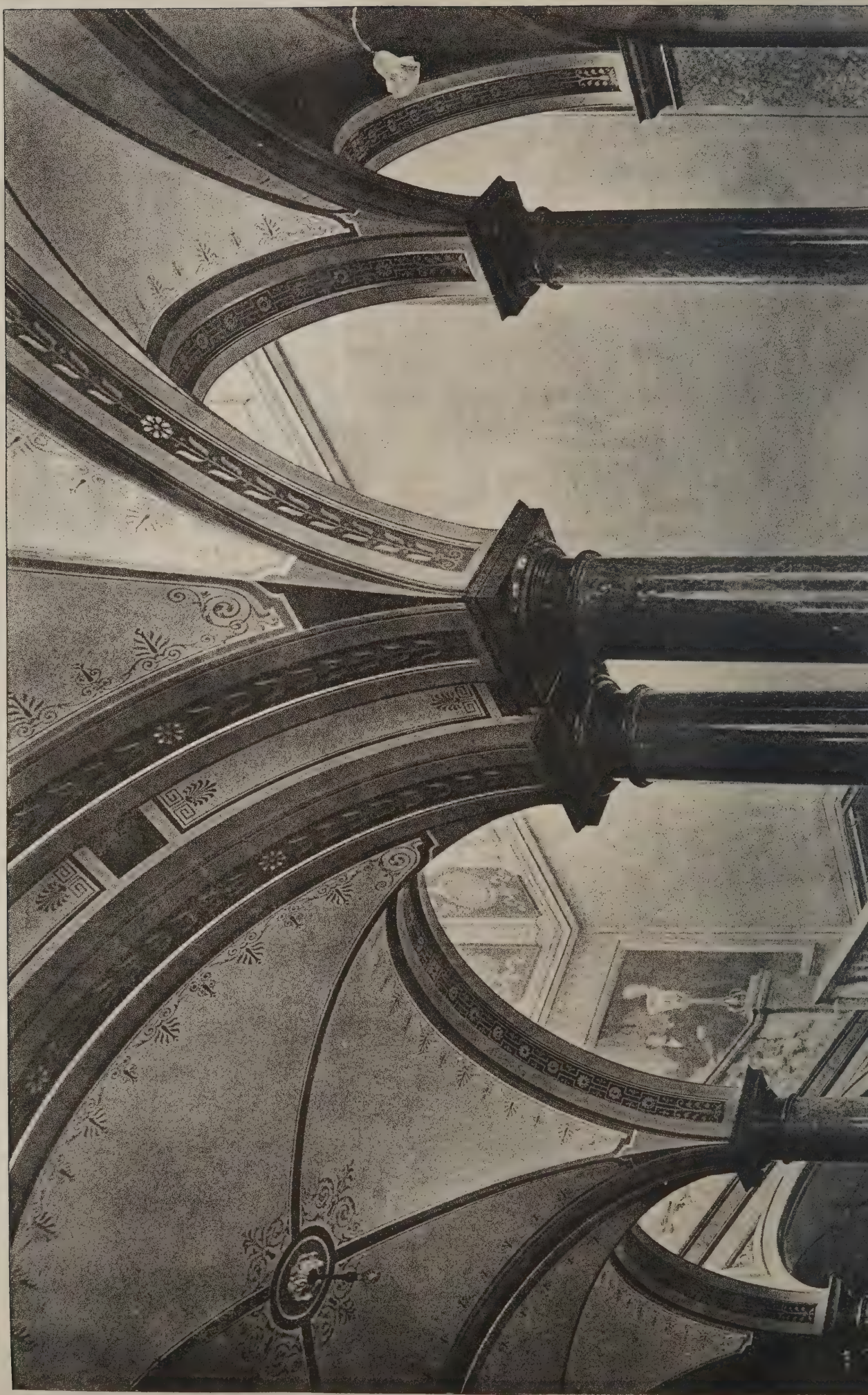
PHOTOGRAPHED BY BEDFORD LEWIS & CO

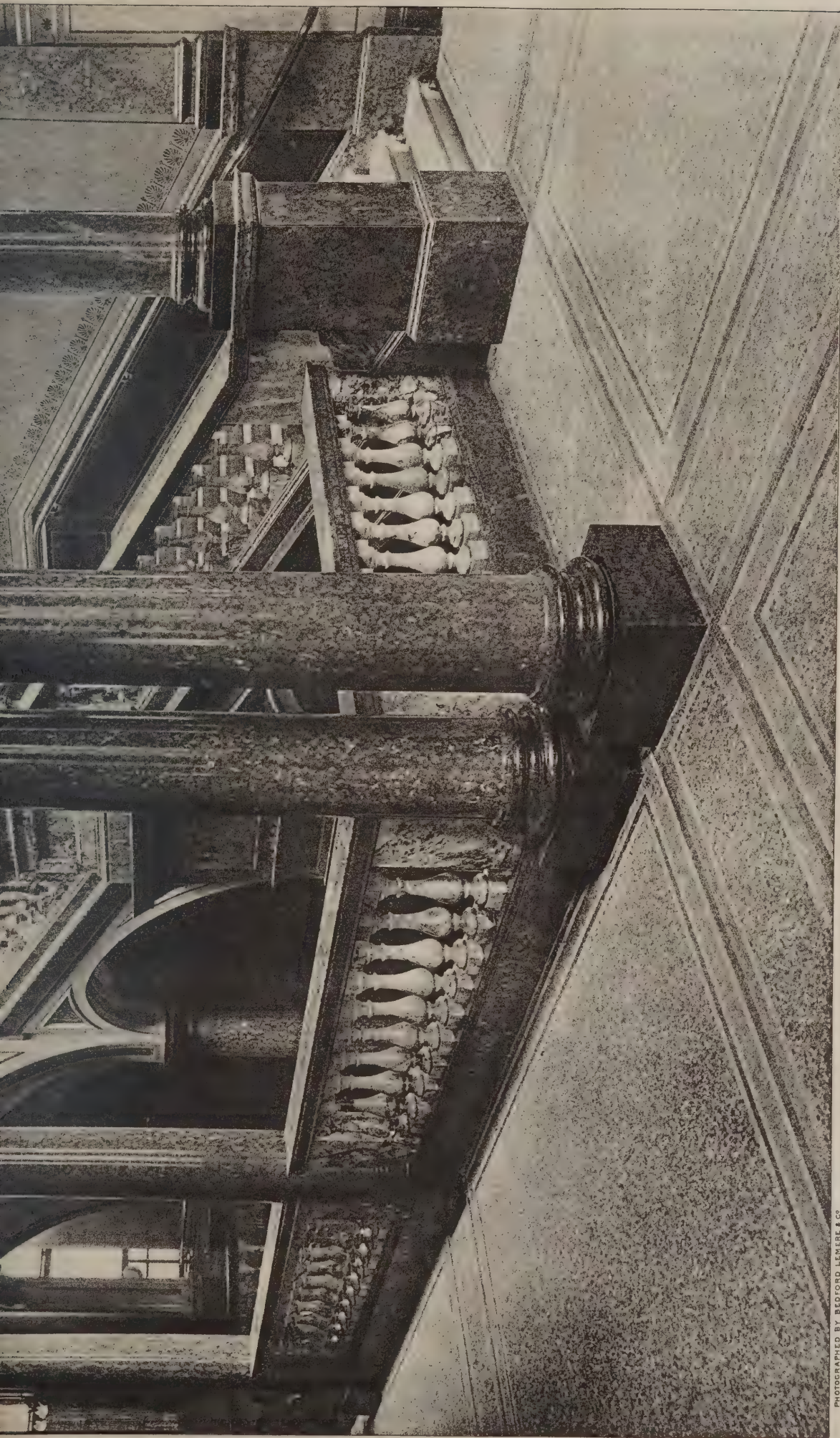
INX-PHOTO. SPRAGUE & CO 4 & 5 EAST HARDING STREET, PEYTER LANE, E.C

ALLIANCE INSURANCE OFFICES, MANCHESTER.

CHARLES HEATHCOTE, Architect.

The Architect, Nov. 5th 1897.





PHOTOGRAPHED BY BEDFORD LEMERE & CO

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INSTITUTE OF CIVIL ENGINEERS, WESTMINSTER.

C. BARRY, F.S.A., Architect



GROUND - PLAN





FIRST FLOOR PLAN



SECOND & THIRD FLOORS

ROOMS ATTACHED
FIRST FLOOR 38
SECOND 42
THIRD 22
TOTAL 102

ECCLESIOLOGIA GERMANICA.

By T. FRANCIS BUMPUS.

(Continued from last week.)

THE Catholic Jacobi Kirche (church of St. James) at Goslar, of whose western façade the accompanying illustration will convey a good idea, although more humbly dimensioned and poorer architecturally than the building just touched upon, will delight the admirer of picturesque interiors, containing as it does a considerable amount of eighteenth-century fittings. The nave is Transition between Romanesque and Pointed; the aisles, which are of the same height—thereby constituting the Jacobi Kirche a building of the "hall" class—are very late and inferior. Their windows have been gutted of whatever mullions and tracery they may have possessed, but some tolerable Late Gothic mouldings can be seen outside at the bases of their jambs, as well as some good foliated ornament in the caps of the shafts attached to the piers whence the groining ribs spring. Among the fittings, sundry bench ends and the pulpit are certainly most beautiful; they are typical neo-Gothic German work, and deserve a corner of the sketch-book. On the panels of the overhanging western organ

exceedingly picturesque, but they did not appear to advantage on the occasion of my visit, my ecclesiological researches in Goslar being, as I hinted above, prosecuted under the disadvantages of soaking rain and enervating mist concealing the tops of the Harz Mountains under which the town nestles. The latter disagreeable element did not, however, prevent the façades of its churches from standing out against the hills with a startlingly weird effect, which haunted me all the way to Halberstadt. The spires of this long-looked-forward to city, crowning the gentle eminence up which the town so picturesquely clammers, were—Chartres-like—visible long before the train, bound for Halle, had scoured across the rain-sodden, cheerless-looking plain and had steamed into the railway station, where it deposited me at half-past six to the minute.

In the courtyard of the station I was unfeignedly glad to see two omnibuses drawn up—glad, I say, because occasionally on arrival at a German town this economical vehicle has failed to put in an appearance. One of the buses appertained to the Hotel Goldenes Ross (Golden Horse), the other to the Weisses Ross (White Horse). Availing myself of the services of the vehicle that hailed from the establishment rejoicing in the appellation of the second named quadruped, I was shut in, the thing thundered off like a fire-engine at full gallop, and in less than no time deposited me at the door of a hostel to which, for homely comfort, I should never hesitate to direct any one visiting Halberstadt. It stands in a species of boulevard to the east of the old town, and from the windows lighting that "region of the drowsy god" to which I was ushered, the three great churches—St. Martin's, the Dom and the Liebfrau Kirche—placed as they are in an almost direct line with each other—presented the effect of one enormously long church equipped with eight steeples. The evening being too wet to pursue any ecclesiological researches, I spent it very pleasantly *en famille* with the "good people of the house," whose pride and delight at the installation of an Englishman in the establishment knew no bounds.

Halberstadt.

If the steeples of Halberstadt had worn an imposing aspect as they loomed through the mist of the previous evening, they looked doubly fascinating when, at six o'clock on the ensuing morning, the sun, shining out of a pure blue sky, was bathing their eastern sides in a flood of golden light.

Knowing by experience how treacherous such brilliant early mornings frequently are, I deemed it prudent to be out and among the architectural treasures of Halberstadt without loss of time. None of those *contretemps*, those little annoyances that so frequently occur just when you are anxious to be out sight seeing, such as the sudden dissolution of partnership between the shirt-collar and its button, or the slipping for the twentieth time from your hand of the soap, which, instigated thereto by a demon of more than ordinary impishness, alights (as a fit *combe* to the proceedings) upon the shoe, which the deft *Hausknecht*, Ludwig or Alphonsus or Heinrich—it is sure to be one or the other—has just succeeded in polishing to a mirror-like brilliancy—no such *contretemps*, I say, having occurred to mar the solemnities attendant upon sacrificing to the Graces, I was soon threading the picturesque streets in the lower part of this most delightful of old German cities. The Dominican church—a typical structure of the class that Order were so careful to raise in the midst of all the great towns—

Bernardus Valles, Montes Benedictus amabat;
Oppida Franciscus, celebres Ignatius urbes,

first challenged attention. Although an unclerestoried church, consisting of a nave with aisles and an apsidal choir without those appendages, all contained under one long line of roof broken only at the commencement of the choir by a light *flèche*, the external elevation of this Dominican church at Halberstadt is far more pleasing than that of other buildings of the "hall" class in Westphalia, owing in a great measure to its less exaggerated height and to the choir, which is much more elongated than in the same kind of church when purely parochial. The nave is lighted by five tall Late Decorated windows; the choir is of four bays, and the apse, where the work is decidedly superior to that in the rest of the church, is a three-sided one and very graceful. Some of the windows exhibit a curious fusion of plate and bar tracery, others are round-headed ones of three pointed lights having tracery composed of foliated circles. The central window of the apse is blocked



WEST FRONT OF ST. JAMES'S CHURCH, GOSLAR.

gallery are some eighteenth-century paintings, more curious than beautiful, of the Nativity and angels bearing various instruments of music. The eastern windows of the apse are completely obscured by an immense altar-piece in the "sprawling" style of the last century, which one would sacrifice without the least compunction. The font of 1592 with cover and railing is good, but the gems of the church are the two windows lighting the side walls of the chancel. They are of a type not often met with in Germany, *i.e.* the plate traceried. Each window is of two unfoliated lancet lights, the head being pierced with a quatrefoil.* The surroundings of this church are

* Another German example of plate-traceried fenestration occurs in the Westphalian church of Ober Marsburg. There is a Romanesque one at Dobrilugk in Saxony.

presumably by one of those gigantic Italian altarpieces—presumably, I say, for although this church and the similarly planned one of the Franciscans at the opposite extremity of the town are still retained by the Catholics, I was surprised to find the doors of both edifices hermetically sealed during the day. Indeed, I only gained admittance to the latter by somebody who had chanced to leave the door ajar while ringing the six o'clock "Ave Maria." The day, too, of my visit to Halberstadt was the Vigil of the Assumption, when one would naturally expect to find churches of the Roman obedience thronged with devotees in attendance upon the Ministry of Reconciliation, preparatory to the Masses of the morrow, but apparently Catholicism is not strong here.

A few remarks on the interior of the Franciscan church will apply equally well to that of the Dominicans. As is usual in the churches of this class in Saxony, as at Gortitz and Halle, the nave is separated from the aisles by very tall octagonal pillars without capitals. The roof ribs partly die into them, and are partly carried by a small shaft attached to the nave side of each pier towards the summit.

The apsidal choir is a very graceful one of four bays; it has no aisles, and its tall, three-light windows have their mullions intercepted midway by a very odd feature, viz. an unfoliated circle filled with painted glass, the rest of the window being *en grisaille*. The windows in the apse of the Martini Kirche—a church to be noticed hereafter—present the same peculiarity.* A small *flèche*, marking the commencement of the choir, alone breaks the long line of roof, as at the Dominican church, and the western elevation shows the main gable prolonged over the aisles, the centre portion above the west door being pierced with a tall three-light window, having a slender two-light one on either side.

And now I must take my readers with me to the Dom, perhaps next to that of Cologne the most satisfactory clerestoried cruciform church Germany can show—interesting, too, as having such cathedralic entourages as cloisters and chapter-house in a good state of preservation.

The history of this great church at Halberstadt is so interesting that a brief sketch must be given of it before considering it architecturally. The first care of Charlemagne, after his subjection of the Saxons, was to convert them to Christianity and instruct them in the Christian doctrine. The latter part of the eighth century therefore witnessed the establishment of the North German Sees of Paderborn, Bremen, Osnabrück, Minden and Münster. Of these bishoprics Bremen, Paderborn and Minden were for the Angvicar Saxons; Münster and Osnabrück for the Northern Westphalians, while the Westphalians of the south were placed under Cologne. For the Eastphalians Charlemagne erected the bishoprics of Werden and Hildesheim, and while the ninth century was in its teens the See of Halberstadt was founded, and its boundaries settled, for the Saxons of Thuringia.

Towards the close of the sixteenth century the long line of Halberstadt's bishops ceased, the city being among those that embraced the principles of the Reformation. The See was one of that large number subject to Mayence, its co-suffragans being Augsburg, Bamberg, Chur, Constance, Eichstadt, Hildesheim, Paderborn, Speyer, Strasburg, Verden, Worms and Würzburg. The Bishop of Halberstadt occupied a place in the Tenth Circle of the Estates General—the Circle of Lower Saxony—which included the Archbishops of Magdeburg and Bremen, the Bishops of Hildesheim, Lübeck, Schwerin, Ratzeburg and Schleswig, the Dukes of Holstein, Brunswick, Saxon Lauenburg and Mecklenburg, and the cities of Lübeck, Hamburg, Göttingen, Goslar, Nordhausen, Muhlhausen, Wismar, Rostock, Stralsund, Brunswick, Magdeburg, Lemgo, Erfurt and Limburg, each of which names is sufficient to conjure up visions of the greatest delight to the lover of architectural art and antiquities, with the study of which their historical associations are indissolubly bound up.

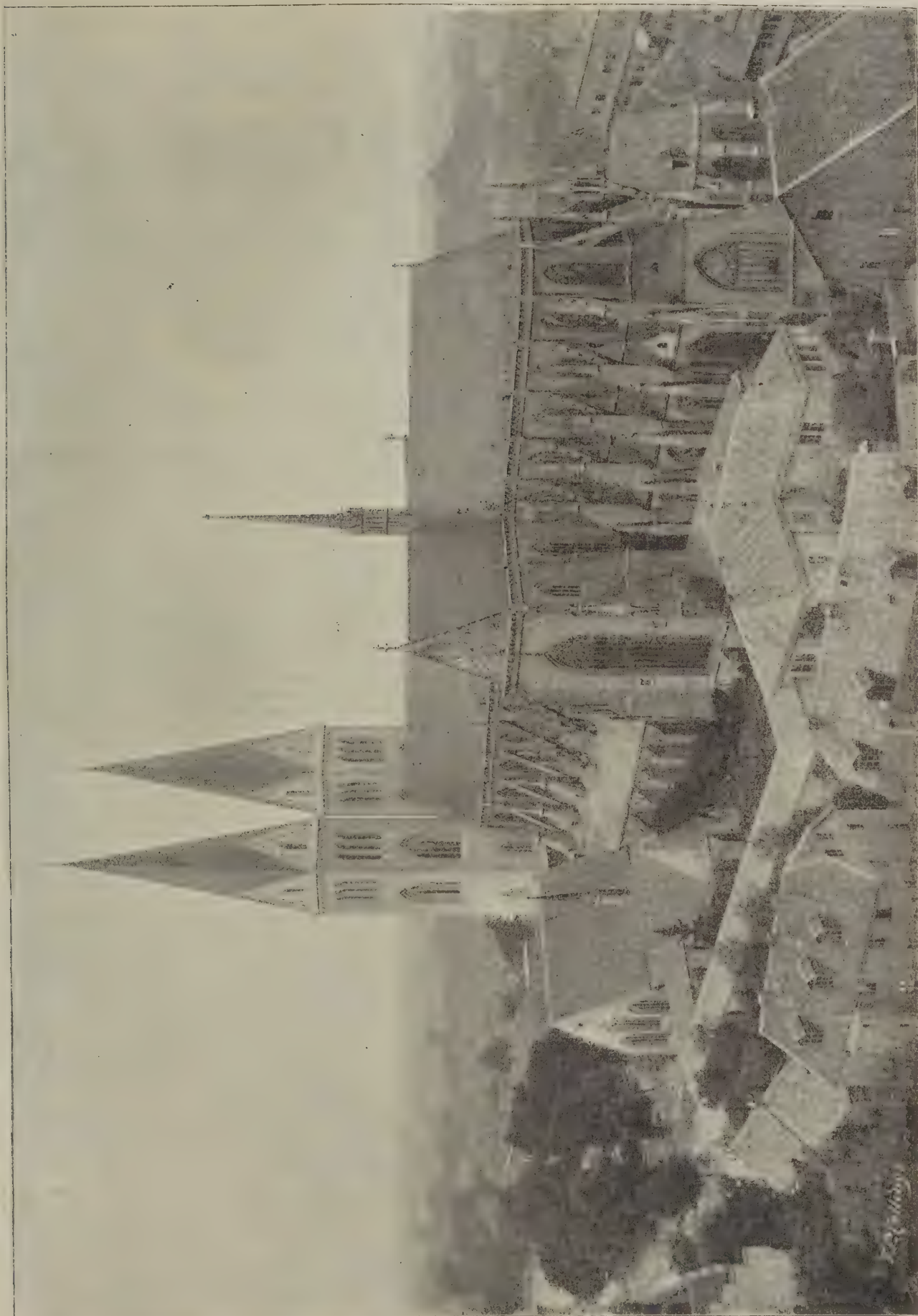
The present noble Gothic cathedral of Halberstadt occupies the site of several earlier ones.

The first Bishop of Halberstadt, Hildegryn I., commenced the original cathedral, which was consecrated on the day after the Octave of All Saints, November 9, 859, by Hildegryn II., and dedicated to St. Stephen. In 967 a grander building was commenced by the then occupant of the See, Bernard, by whom many relics of saints were brought from Rome to his cathedral. Hildeward, the next Bishop of Halberstadt, prosecuted the works inaugurated by his predecessor with so much vigour that on October 21, 991, he was enabled to consecrate the cathedral with great pomp and solemnity, in the presence of the Emperor Otho III. and of a great assemblage of nobles, among whom were four archbishops and eight bishops. What these cathedrals were like we have no means of knowing, for all vestiges of ecclesiastical buildings of this age have long since perished. Of the many magnificent basilicas raised in Northern Europe during the

Carlovingian, and immediately subsequent, eras it is sufficiently well known that hardly one remains, and in general all the Christian edifices which have come down to us from any high antiquity have been so overlaid with modern dress, so disguised, modified and mutilated by succeeding ages, as to be scarcely recognisable. This church continued till 1060, when fire, that enemy of Mediæval buildings, destroyed it; but its reconstruction was speedily undertaken by the reigning prelate, Burchard II., and with so much zeal that in ten years it stood completed, and again a splendid consecration took place amid much regal and prelatical splendour, the emperor Henry IV. being then on the throne. Sufficient data are not forthcoming to inform us of what character the eleventh-century church partook, but it is not unreasonable to suppose that it resembled such local contemporary churches as Hildesheim, Gernrode and Hecklingen, affecting, like them, a southern type of Romanesque. In its turn this cathedral fell a prey to the flames, for Henry the Lion, Duke of Brunswick, and founder of the existing solemn Romanesque church of St. Blasius there, pillaged Halberstadt in 1179, in retaliation for the insolence with which its bishop, Ulrich, as well as those of Cologne, Magdeburg and Münster, had opposed him during his war with the Emperor Frederic Barbarossa, and burnt the cathedral with 1,000 people in it, as well as a large part of the other churches in the city. Slowly Halberstadt rose from its ruins, twenty years elapsing before the chief portions of the cathedral were ready for the Divine offices once more. Early in the thirteenth century (1201-09) Bishop Conrad undertook great re-edifications, and in 1220, under his successor Frederic II., it was reconsecrated in the presence of the Bishops of Hildesheim, Minden, Havelberg and Culm. It is to this epoch that we may assign the glorious western front, with its portal or Paradise, and which, as a specimen of German First Pointed work, derives great interest not only on account of its excellence, but as an almost unique example of Early Pointed architecture on so grand a scale in this country. Johann Semika, provost of the chapter about the year 1236, began to rebuild the nave aisles, but did not proceed any further than the first three bays which, separated from each other by niched buttresses, are lighted by three-light windows in the Geometrical style; they are extremely beautiful, vying in purity with some of the best English work. To Semika was due the paving of the church with red and black tiles, some portions of which were discovered in 1847, 4 feet below the present pavement. During the thirteenth and two succeeding centuries the rebuilding of the cathedral on its present magnificent scale proceeded with great vigour, and under the auspices of various bishops, notably Ludolph II., 1257-85; De Volrad, 1285-95; D'Albert I. and D'Albert II., 1308-58, and of Burchard II., 1437-58. The church, much as we see it now, was essentially completed in 1491, and consecrated on the Feast of the Decollation of St. John Baptist, August 28 of that year. The year 1514 witnessed the completion of the chapter-house, and at last the buildings stood finished in 1574. But a change was at hand, for Frederic III., who occupied the See 1550-53, and Henri Jules, Prince of Brunswick, who presided over it 1566-1613, favoured the Reformation. The offices of the Catholic Church were said for the last time in Halberstadt Cathedral July 6, 1591, and except for a short time when the city was occupied by the troops of Wallenstein, during the Thirty Years' War, Protestantism has held sway here. But through it all this noble building has managed to preserve its ancient furniture and arrangements almost unscathed. The glorious Late Gothic rood-loft or Lettner, from which the Christ seems to look down with sad and wondering eyes upon the desolation around, still encloses the richly stilled and tapestried choir; the red marble font, which forms so conspicuous an object in the foreground of the illustration accompanying the first instalment of these papers, still retains its position; a fine corona of wrought-iron hangs in the nave; while a sixteenth-century bronze eagle lectern, and a considerable quantity of painted-glass, to say nothing of the treasures enshrined here in the shape of ecclesiastical orfèverie and needlework, all of which, having lost their religious significance, are carefully preserved and looked upon as curiosities merely by the sect into whose hands they have passed. Mournfully did the footsteps of the custodian and myself resound in the magnificent but sadly-deserted pile, as object after object was inspected during a long morning's visit. "Ichabod" is written everywhere; coldness, and the want of vital religion is felt as much as in the other great Lutheranised piles—Magdeburg, Lübeck, Naumburg and Brunswick.

It is, however, due to its custodians to say that elaborate and costly restorations have been in progress at Halberstadt Cathedral for many years past. Quite lately that of the lovely western façade has been taken in hand, and the towers which whilom were extremely insignificant ones, surmounted by simple broach spires of the local type, have been greatly elongated and terminated by gables from which spring metal spires, founded, I opine, on those glorious ones which lift themselves like lilies above the housetops of Lübeck and Lüneburg, and whose

* Reference to the illustration of this church in last week's issue will give the reader an idea of this.



SOUTH-EAST VIEW OF THE CATHEDRAL AT HALBERSTADT. (From a Photograph in possession of the Author.)

germs may be traced in that Westphalian group so proudly headed by St. Patroclus at Soest.

The chief feature in the plan of the Dom at Halberstadt is narrowness. The transepts project but one bay beyond the aisles, which are themselves destitute of those accretions so common to the great French churches—chapels thrown out between the buttresses; indeed, such additions to the ground plan never seem to have found favour in Germany, as with ourselves. It will be observed, on referring to the view of the church which accompanies this number, that the southern nave aisle is of unusual width; this is accounted for by the Treasury which has been built on to that side of the church for the accommodation of those precious relics of ecclesiastical antiquity of which mention has been more than once made in the course of these notes.

The restorations now in progress at the west end of the building precluded my gaining a very correct idea of its magnificence, but sundry peeps through the hoarding, which inexorably shut it out from the public gaze, showed me that the great portal was composed of two smaller cusped entrances contained beneath a great arch, nobly moulded and rising from clusters of banded shafts. In the tympanum, six plate-traceried lancet windows are pierced, receding of course in height, and in lieu of sculpture. Then comes a rose window, also plate-traceried, enclosed within an arch composed of a series of wavy lines like the corbel-tables of Romanesque work and springing from small belted nook shafts. In the next stage is a triplet of windows of three lights apiece, similar in arrangement to those seen in the view of the steeple in its penultimate stage, and apparently copied from those in the cloisters. The arches of the side portals appear never to have been completed. Their noble clusters of shafts have always been in position, and it is hoped that the rest of the work will soon have become an accomplished fact, enabling this western façade at Halberstadt to form the most imposing and at the same time purest piece of Early Pointed work in Germany. I have said that the first three bays of the nave on the north side are of the best Early Middle Pointed character (c. 1236); the next are later and not quite so good; but deterioration in workmanship is most apparent in the clerestory. It is thin, almost to flimsiness, though the flying buttresses serve in some degree to redeem it from this reproach. But the northern transept façade is very fine nervous Middle Pointed work, with just a *souçon* of the Flamboyant.

The Pointed portal encloses two smaller ones with square heads, the tympanum being filled with a sculptured group representing the Death of the Virgin. This doorway is surmounted by a wall space, unfenestrated, but relieved by a richly crocketed rood, from which The Figure, as well as those of St. Mary and St. John, has disappeared. Then comes a six-light window, whose tracery titubates between Geometrical and Flowing, and a richly panelled gable crowned by a finial. From this point the church presents a most imposing *ensemble*, especially since the completion of the western towers, recalling in some features the Lübeck churches; but the detail is far superior.

The greatest blemish on the otherwise fine plan of this church is the architect's arrangement of his eastern termination.

Instead of introducing that cluster of chapels which gives such a charm and grace to numberless French choirs, or that elongation of the side aisles to gain a procession path, which English architects knew how to use so gracefully, and which gives such effects of light and shade to the outlines of Chichester, Hereford, Salisbury and Wells, the planner of the Dom at Halberstadt has made the walls of his choir aisles stop exactly where the apse commences, and then, to connect them with those of the solitary eastern lady chapel, has introduced one elongated piece of walling lighted by a broad window of six divisions.*

Far better would the east end have looked had the architect terminated his aisles either, as in the English examples quoted above, or in a three-sided apse, if prejudice against the corona of chapels with their non-practicability of orientation was so strong. But perhaps some prescience of the Reformation dictated the adoption of such an arrangement. Who knows? Anyhow, it is far from being graceful or pleasing to English eyes.

(To be continued.)

Mr. Frederick Earp, who at one time was well known for his paintings of Sussex scenery, has died rather suddenly in Brighton.

* The church of St. Alban, at Teddington, which—from the pencil of Mr. Niven—must undoubtedly be considered the finest structure of its kind that has been raised of late years within a twelve-mile radius of town, exhibits the same arrangement of the circumambient aisle. There is a *souçon* of German about the whole building, but this is a particularly marked one. The lady chapel is, however, wanting here. Of course I may be mistaken as to the nationality of this church's *ensemble*, but the impression it left on my mind was decidedly a Teutonic one.

FORGERIES AT SOUTH KENSINGTON.

THE increase in the number of connoisseurs has led, among other effects, to a more exact scrutiny of the contents of museums and picture galleries. Works which formerly were admired are regarded with suspicion. It is now, for example, doubted whether any museum in Europe possesses a genuine work by Benvenuto Cellini. "Lermolieff's" observations have not only created misgivings about the Italian works in Munich, Dresden and Berlin, but about those in other galleries. As for the recent additions to the Louvre collections, they are accepted as excellent subjects for the exercise of French wit.

Visitors to the South Kensington Museum were aware that from time to time objects were withdrawn from exhibition or, if retained, were presented to notice under new labels. During Dr. Middleton's reign as art director a considerable number of forgeries were removed from the cases in the Museum. It was anticipated, therefore, that in the course of the recent inquiry by the select committee appointed to report on the administration and cost of the South Kensington and other museums of the Science and Art Department, there would be many revelations about the fallibility of the officers and advisers by whom purchases of objects were effected. It cannot be said that the subject was exhausted, for in many cases only suggestions of fraud were given, but some of them are remarkable. They bear out the assertion of Sir J. C. Robinson:—"When I retired from office a period of decadence and confusion ensued, and for years the conduct of the institution, especially as regards the nature of the acquisitions currently made, sunk lower and lower, until the state of the Museum became a by-word of reproach to all persons of real understanding in art."

One of the first cases mentioned suggests that a man so able as the late Sir Digby Wyatt can be mistaken, or it would be correct to say his opinion is not accepted by later experts. In 1870 a Dutch clock, which was said to have belonged to the King of Hanover, was offered to the Museum for 1,250*l*. The opinion of Sir Digby Wyatt was sought, and he sent the following report:—

"Although this object, which is of the very utmost importance as a piece of silversmith's work, bears the signature of a Dutch horologist, I cannot but believe it to be Genoese work, for the most part at least. I think this, not from the filigree work, because the Dutch were (and still are) excellent workers in filigree, but from the admirable design and execution both of the figures and ornaments." This is unquestionably the finest object which has come under my observation for a long time as procurable for the Department's Museum, and I do not hesitate to warmly advise the purchase; of course, if this object can be purchased for less than 1,250*l*., so much the better, but even at that price I do not consider it at all dear. There is nothing improbable in the union of Dutch and Genoese work in the same object, for the Genoese merchants were in constant relations with those of Amsterdam and with the Spaniards in Flanders, whom they were constantly supplying with works of art. There are (if I remember rightly) in the Doria Palace at Genoa a set of silver vessels of great celebrity and value, and I cannot but fancy that I recognise the same hand in the repoussage of those vases and this clock. The vases have been attributed to Cellini, but I have always believed them, as I do this, to be of the finest old Genoese work."

The purchase was also advocated by Mr. Redgrave, R.A., and 1,250*l*. was paid. It is now found that the clock was offered for sale at Christie's in the preceding year, and was "bought in" by the owner for 350*l*. Several examples of Della Robbia which were bought for large sums as originals appear now in the Bethnal Green Museum, which is a refuge for costly shams, as "imitations" of the ware. For a chair which was described as Cardinal Wolsey's 72*l*. was paid, as to the Museum experts it was Tudor in style, but when Mr. Purdon Clarke explained that it was Cingalese and made in the last century for the Government House in Ceylon the label was altered. An ancient French cabinet with marqueterie panels was bought for 816*l*. The man who made up the treasure is still living, and is now employed as a "repairer" in the Museum. The circumstances under which another strange work, the Molinari Gateway, was acquired are described by Mr. Thomas Armstrong as follows:—

"I saw it set up against the wall of the large space in front of Santa Maria delle Grazie at Milan, and was very much struck with it. I heard about it in the town, and saw the owner, and for some time we were negotiating with him for the purchase. The owner was a certain Molinari of Cremona, who was an innkeeper and dealer in works of art. I had heard from other sources where it had come from. Molinari told me he knew an architect, who was very clever indeed, then dead, who had studied very closely the façade of the church of the Miracoli in Brescia, of which this work is supposed to be an imitation; that he was a man of great genius, and that he had arranged or adapted this thing, and that there was a great deal that was new in it. I may say that Molinari was very old then, and that

this had happened long before, and the gateway had been lying where he had sold or tried to sell pictures close to the church there. He did not disguise the fact that many portions of it were new. We bargained about it, and bought it for 602*l*. I afterwards saw a man who said he had made the whole of it. I believe he qualified that statement afterwards, and pointed out the few pieces which he said were ancient. I may tell the committee, however, that this gateway is about 20 feet wide and 25 feet high and weighs tons, and that it is hardly natural or likely that any person would on speculation make a thing of this kind, which could not be bought by any private person except some monarch or prince who was building a very magnificent palace, and could hardly be admitted into any museum except ours. This carver is a very clever man; I do not think I need advertise him by giving his name, but he is a most skilful carver, and he has probably done certain parts of the work. It is very difficult to tell which are the parts. All the parts which he claims certainly were not done by him, and I may also point out that if the restoration had been on anything like the scale claimed by this carver, he might have restored the cornice, which is very important—so important that I have often thought myself that I should like to have to put up a piece of it restored to show what it was like when complete."

From the evidence of Sir J. C. Robinson the doorway is mainly a modern work. The following account of it by him is a further revelation of an industry which has existed for more than a century in Italy, and of which Englishmen are the chief patrons or victims:—

"In respect to this doorway, then, I beg leave to state that the year before Mr. Armstrong purchased it at Milan it had been offered for sale to the Museum and refused, and both he and Sir John Donnelly ought to have known that the correspondence and my report on the doorway were in the registry of the Department. Although Molinari, the Milan dealer, began by asking 1,000*l*. for the doorway, it was understood that it might at that time have been obtained for about 300*l*., for it had already been found to be quite unsaleable. Mr. Armstrong, however, paid 600*l*. for it, and I should think the expense of transmission to England and its re-erection at South Kensington must have brought the entire cost up to about 1,000*l*.; but the doorway would have been dear at any price, inasmuch as it is an overt fraud, such, indeed, as no person having even the most rudimentary knowledge of Italian fifteenth-century sculpture could have failed to perceive. The doorway is, in fact, a spurious modern 'make-up' by an ornamental sculptor who was living at Brescia, one Pietro Faitini, well known for his imitations of Italian Renaissance sculpture. I have here a letter from this man showing the exact state of the case. This letter is in the Italian language, and perhaps I had better read a translation:—'Brescia: December 28, 1885.—I, the undersigned, declare that the doorway sold by Mr. Molinari, of Cremona, to an English gentleman, of London, was acquired at Ghedi, in the province of Brescia, and was the property of Mr. Bondella. The said doorway was in the old feudal castle of the Counts of Pitilono. The ancient ornamental parts were the basements, which consist of trophies, the two impostes of the arch and two capitals; all the rest of the doorway is my work except six medallions. In confirmation, believe me, PIETRO FAITINI.' I may say that I have verified the exact truthfulness of this account, and that I am quite ready to point out all the details in question in presence of the work itself. Faitini, or his employer, Molinari, got possession of some mutilated portions only of an original sculptured doorway from a ruined castle in the mountains near Brescia. The fragments were made use of in the composition of a new doorway of very different design from the prototype—that is, by the addition of new details on a larger scale invented by Faitini; but this is not all; other details of ancient origin, but taken from entirely different sources and of different dates and discordant styles, some of them as late as the end of the seventeenth century, were got together and mixed up with the new work. In short, I believe, as it stands, at least three-fourths of the structure is modern, and a further portion of fragmentary and discordant ancient work. I consider this doorway an imposition on the public, and that it ought forthwith to be dismantled and removed from the Museum."

It is now difficult to determine whether a bust of Savonarola was bought as an example of Renaissance sculpture or as a modern work, but it was sold as ancient. Mr. Armstrong gives the following explanation of the transaction:—

"The bust of Savonarola was made later than that of Benevieni which was bought by the Louvre. I cannot remember the circumstances in which it was first seen by Costa and Banti, two distinguished artists; but they saw the bust and were very much taken by it. They considered it an old work; it looks like an old work and they bought it for what was then a large price, especially for two people who were not rich; they joined in buying it for 10,000 lire, or 400*l*. I dare say many of you know what a great commotion was made about it at the time, how it was exhibited at San Marco and the proceeds

given to a charity, and how everyone was talking about it. I remember Sir Frederic Leighton asked for leave to draw it and did go to San Marco to make a drawing of it. After that there were whisperings, as there had been about the Benevieni bust. The Benevieni bust was bought by the Louvre and there was a great commotion about it, because reports came from Italy, from Castellani, I believe, that it was false; this was disputed for a long time and it was only proved by Bastianini bringing forward the man from whom he had done it. They said it was quite impossible and that it was obvious that a bust of that kind, so lifelike, with this extraordinary character of vivacity, could not have been copied from anything; but it turned out that Bastianini had seen a man in the street who was very much like the portraits of Benevieni, and he had made this bust, working from nature. That was the way in which the Savonarola bust was done too; he got a certain quality of vivacity in it by working from the living model which could not have been got in the way of an ordinary forgery. It was the property of Costa and Banti, who had it year and year about; they used to take turns of having it in their houses, and it came on loan to the South Kensington Museum some years ago as a very interesting specimen of a class of sculpture which is very rare now, and afterwards it was bought on the recommendation, I think, of Sir Frederic Leighton, Mr. Tadema and Mr. Poynter; I do not know if there were any others. It was, of course, bought as a modern work and never since I have known it was it looked upon as anything else. Bastianini admitted he had done it."

Mr. Armstrong, in consequence of the deceptions, is rather despondent about the contest between experts and forgers. "Modern work," he says, "can be so disguised that you cannot detect it. I believe that people like Bastianini and Mariani of Perugia have made things which have been accepted in most of the museums of Europe, and that although there may be differences of opinion, no one can say for certain that they are modern things." Mr. Armstrong mentions a case of a very beautiful ivory lectern or reading desk which was offered for sale to the Museum and declined because it was supposed to be false. Some of the greatest authorities pronounced it to be a forgery, and yet a man who, in his own opinion, is the greatest judge in England has purchased it. In the case of the Savonarola bust there was more than one quality to tempt the unwary, for it suggested how sculpture was sometimes coloured:—

"It is in every sense an original work," said Mr. Armstrong; "it is full of the most extraordinary vivacity; it has great qualities as a work of art which would distinguish it anywhere, quite apart from the fact of its being an imitation of an old style or work. The manner of its execution is imitated from the old work. I think I have already related how that came about. There are certain things about that bust and about the Benevieni, which was bought for the Louvre, which convince artists or people who take any interest in works of art that it was modelled from nature. Anyone will see at a glance that there is an extraordinary vivacity about it; a lifelike appearance, which is a very high quality in art. This convinced artists at the time that it could not be merely a copy of an old bust or of some old work. No artist could put that kind of life into a copy, and, in the first instance, it was found out how this was done through the Benevieni bust which was bought for the Louvre. People refused to believe that Bastianini had done it; they said it was quite impossible. When Bastianini confessed he said he knew the existing portraits of Benevieni very well, and he told how he had met in the streets a workman who was strangely like these old portraits, and he set to work and modelled the bust from this man, making it sufficiently like him; he gave it a lifelike quality from the living model, and a sufficient likeness to the known portraits of Benevieni; he so skilfully manipulated the surface of the terra-cotta that the effect of time on the tempera paint is most skilfully and wonderfully rendered. The paint has been removed from the Benevieni bust, but it remains on the Savonarola bust, and on that account I think ours is much more valuable. The tempera painting in imitation of old painting remains, and the bust is a very extraordinary instance, not only of really admirable artistic quality in modelling a bust from life, but also of the method of colouring sculpture, which is very much in vogue now, and of which we have very few good specimens."

Another case deserves to be made known, for, by the irony of fate, it relates to Palissy ware, which was the creation of one of the most honest of potters. Sir J. Donnelly said that among a collection purchased in 1879-80 from Sir J. C. Robinson, the art referee, was a plate which was supposed to be Palissy ware. It appears that "one of the Museum keepers, thinking he had seen something of the same kind elsewhere, examined it carefully, and took off the seal and a piece of linen that had been fixed on the back over some breakage, and he found that there was the name of a modern French pottery manufacturer in Paris of the name of Pull. Sir Charles Robinson's attention was called to this, and he offered to repay 50*l*. if the plate was destroyed or given back to him; and it was given back to him."

Now Sir J. C. Robinson, with reason, demurs to a part of the evidence relating to the plate, and gives a circumstantial account of the affair. He was not art referee when the plate was purchased from him, and instead of offering to refund 50*l.* he actually paid it back.

Sir J. C. Robinson further says :—

"This is the only instance amongst the thousands of works of art purchased by me for the nation to which, so far as I am aware, any objection as to authenticity has ever been made. I have never yet heard of any other case but this one. This one, I think, so far from throwing any discredit, has the opposite effect. I wrote this to Colonel Donnelly :—'10 York Place, Portman Square, April 4, 1897. To Colonel Donnelly. Sir,—I have carefully inspected the plateau referred to in your letter of March 28, and I find that it is not a genuine specimen of Palissy ware, but a modern facsimile example moulded from an ancient pewter dish, which also served as the basis of Palissy's work (see details appended further on). In other words, both are plastic reproductions from a common original type in metal. This modern reproduction, having fallen into the hands of some fraudulent dealer or fabricator of works of art, was with great ingenuity invested with simulated appearances of antiquity, rendering it most deceptive, and, indeed, practically undistinguishable from the ancient specimens of the same type by Bernard Palissy. It is scarcely necessary to say that, considering the ever-augmenting scientific, artistic and industrial resources at the service of the artistic and unscrupulous persons by whom forgeries of this kind are continually being produced, it has become almost impossible, even for the most learned and experienced connoisseurs and experts, to avoid being from time to time deceived. Whilst, therefore, I cannot but regret the occurrence of the present instance, I do not take to myself any blame in respect of it. At the same time, being deeply conscious of the great responsibility devolving upon every person undertaking to purvey or advise Her Majesty's Government in respect to the acquisition of works of art for our national collections, and considering the circumstances under which this specimen became the property of the South Kensington Museum, it will be a personal satisfaction to me to be allowed to make a pecuniary compensation for the necessary withdrawal of the specimen in question from the Museum. I desire, therefore, to be allowed to return to Her Majesty's Exchequer the sum of 50*l.*, on condition that the spurious plateau be returned to me or destroyed. I may now state that, notwithstanding the so to speak infinite number of acquisitions (certainly many thousands) which by procurance have, from its first foundation down to the present time, enriched the South Kensington Museum and also other public institutions, this is the first instance, to my knowledge, in which the authenticity of any such specimens has been brought in question.—I am, sir, your obedient servant,

(Signed) J. C. ROBINSON."

"Further memorandum on the spurious Palissy ware plate :—

"The original work by Bernard Palissy, of which the present specimen is an exact facsimile, is known as the Briot plateau. It was itself a copy, by the process of direct casting (sur-moulage) from a pewter plateau, ornamented with arabesques in relief, the work of François Briot, a French artist, who was one of the immediate predecessors and contemporaries of Palissy. Several original specimens, both of Briot's pewter dish and Palissy's enamelled earthenware reproduction of it are extant. The example in question, now discovered to have been made by M. Pull, a modern French potter, some time between 1860 and 1870, and, as is evidenced by the sharpness and perfection of the relief ornamentations, must undoubtedly have been moulded, like Palissy's previous reproductions, directly from one of the ancient Briot pewter dishes. At the same time the manufacturer, having apparently also become possessed of an authentic example of Palissy's reproduction in enamelled earthenware, was enabled to copy in the most minute and perfect manner the enamel glaze and colour from it. These operations being all of the simplest and most certain nature resulted in the production of examples practically identical with and undistinguishable from the ancient specimens of Palissy ware in all but the appearance produced by the accidents and inevitable wear and tear of centuries. It is probable that having produced a certain number of these facsimiles, the manufacturer's attention was called to the fact that they would inevitably fall into the hands of the makers and utterers of spurious works of art, and that therefore the easy process of simulating by artificial abrasion and other means, the required appearances of antiquity being superadded, would give them an inevitable vogue as most dangerous frauds; or it may perhaps have been the fact that M. Pull, having obtained the loan of the original plateau from some conscientious collector for the purpose of making his copy, the latter stipulated that the modern imitator should impress his name on some part of the work; in any case M. Pull seems to have stamped his name in minute characters on the body of the ware under the glaze, in the centre of the reverse of the plateau, on some, if not all of the specimens produced by him.

The specimen at South Kensington, which has proved to be one of M. Pull's plateaux, was in the first instance purposely broken in many pieces, though as by accident. It was then carefully put together again, strengthened at the back with a wire rim bedded in plaster of Paris; the surface of the piece had then been discoloured and rendered dull as if by the effects of time, and lastly an attempt had been made to efface the signature of M. Pull by abrasion, but this process not having entirely succeeded the place was covered by a linen band glued on as if to further strengthen the piece, and upon it, directly over the signature, was put a seal in red wax, purporting to be the mark of possession of some former owner of the piece, and it was only on removing the seal that the fraud was discovered. I think I ought now to say that the result of these fraudulent occurrences has been that all authentic Palissy ware has fallen in value, probably one-half or more. It is absolutely impossible to distinguish in many cases the fraudulent from the real specimens. In this case this fraudulent manipulation having been had recourse to, it was absolutely impossible to tell whether it was genuine or not. At that time when I purchased it I knew nothing about M. Pull having done these sort of things; no person could possibly have discovered or understood, and therefore there is no discredit whatever in being deceived in a case like that. It is quite another affair when a work of art which purports to be an original work and not a copy of something else, and in which there are discrepancies of style and date, deceives a man; then, of course, it is an inexcusable matter; but in this case it was not so. I may add further that when I was a member of the jury in Paris, I think in 1867, I had occasion to know M. Pull's imitations, but I had no idea that he had arrived at anything like the perfection of this example. It is understood it was moulded not from another plate, but from the original thing which Palissy's plate had been taken from, and therefore it was quite impossible to tell the difference."

We have said enough to serve as a warning to those who are ambitious to set up as collectors or as connoisseurs. "Antiques" are not always survivals of a past age, and no matter what enthusiasts may say, ancient art of all kinds can be imitated with a fidelity that will deceive the most knowing. As the late Lord Lytton wrote :—"A thoroughly competent connoisseur is one of the rarest things in the world; rarer, perhaps, than a great artist. And a connoisseur who is not only a competent judge but a competent purchaser, who thoroughly understands the marketable as well as the intrinsic value of such things, is still rarer. The sort of knowledge required in that capacity cannot be obtained from books. To possess it a man must have personally visited nearly every corner, or must personally have known nearly every dealer in Europe. And to such knowledge he must add a highly trained taste and judgment. If he possesses all these qualities, it is clear that by exercising them on his own behalf he can easily make, if he pleases, an income much larger than any salary which any Government could afford to pay him; and therefore, to secure his services, the Government should be able to offer him some inducement which to a man of refined feeling would be stronger than money."

Vendors of "antiques" were to be excused if they imagined that the militarism of the museums of the Science and Art Department facilitated the disposal of shams. How far they succeeded will never be revealed, but, as Sir J. C. Robinson says, "elimination" of many of the treasures is desirable. The forgeries may become an obstacle to the completion of the South Kensington Museum, for, as the same authority suggests it is wiser to ascertain what is worth preserving before any builders are called in, the committee are not unlikely to follow his advice in their recommendations.

A.A. LYRIC CLUB.

THIS season's opening concert of the A.A. Lyric Club (president, Mr. John Murray) was held on Friday last, October 29, at the Swallow Assembly Rooms, Piccadilly, when the president of the Architectural Association (Mr. Hampden W. Pratt) took the chair. There was an exceptionally large attendance of over 200 members and friends, among whom were several prominent members of the Architectural Association. During the evening a presidential hammer was handed by Mr. Hampden W. Pratt on behalf of the Club to Mr. John Murray, and several nominations were read. An excellent programme was carried out. Among the artists were Miss Jessie Hotine, Messrs. Theo. Disdin, Roland Henry, S. Constanduros, Gurney Russell, J. Berridge Fraser, Stanley Graham, W. Coward, F. H. Willis, Mark Ambient. Mr. C. D. Imhof was the accompanist.

Mr. Walter Hanstock, of Leeds and Batley, has been successful in the competition for the proposed dead market for Leeds which is to be erected on a site adjoining the Kirkgate Market.

NEW BUILDING BY-LAWS FOR LEEDS.

THE building clauses committee of the Leeds Corporation are engaged, says the *Leeds Mercury*, in revising the building regulations for the city. A draft, numbering 117 by-laws, has been prepared, and copies sent to the Leeds Master Builders' Association and the Leeds and Yorkshire Architectural Society, in order that those bodies may review the list and make what suggestions they think proper. Many of the old by-laws have been retained, a considerable number have been materially modified, and there are some new regulations. With regard to the laying out of new streets, hitherto the minimum width has been 36 feet. Now it is proposed that main thoroughfares shall not be less than 42 feet. There is a proviso, however, that a street may be 36 feet, on condition that at each side there is an area of 6 feet, making 48 feet from house front to house front. A new by-law stipulates that in the case of dwelling-houses to be erected in damp situations there shall be a layer of concrete 6 inches thick or a covering of asphalt. Another provision of a like character is to the effect that in every new building a damp course shall be inserted at a height of not less than 3 inches above the surface of the ground. In order to restrict the use of old bricks in the erection of new dwellings, it is provided that no such material shall form part of an external wall or of an internal half-brick wall, but that good old whole bricks shall be allowed in an internal 9-inch wall on condition that "not more than two-thirds of the same are mixed with one-third of new bricks." Special regulations are introduced with reference to the quality of other materials. For example, mortar must consist of good lime and sand in the proportion of one-third lime and two-thirds sand. There are likewise provisions as to the strength of timbers supporting roofs, floor joists, beams and girders, both in the case of dwelling-houses and business premises. The necessity of providing ventilation, not only in dwellings, but also in places of entertainment and places of worship, has received attention, and further effort has been made to secure efficient sewerage and to provide for the ventilation of drains. The Architectural Society, whilst cordially approving of many of the provisions, have suggested the alteration of a number. We understand that surprise is expressed by some who have perused the draft that no alterations are proposed with regard to the thickness of party walls in business premises. At present such walls have to be of the same thickness as the external walls, and it is suggested that they should not be more than two-thirds as thick. This and other points, however, will no doubt be carefully considered.

TESSERÆ.

Thomas Cooley.

ABOUT Cooley, the Irish architect, little is known. He was born in 1740. His name is connected as designer with one of the most interesting buildings in Dublin, the Royal Exchange, which is now used for municipal offices. This structure was begun by him in 1769, and although of but moderate size is in a style at once noble and ornate; on the exterior a Corinthian order is continued in columns and pilasters, between which there is only a single range of upper windows, the lower part of the intercolumns being filled in with solid rusticated wall, a circumstance that contributes materially to character; nor is the interior less remarkable for both elegance and commodiousness of plan, it being a rotunda inscribed within a square, the circular part formed by a peristyle of twelve columns of the Composite order and covered by a dome. Had Cooley done nothing else this work alone would entitle him to very high rank among his contemporaries for originality and refined taste in design. He also erected the prison called Newgate (1773), in the same city, and commenced the noble pile of the Four Courts, which was begun by him in 1776, but he did not live to complete it, little more than the west wing being erected at the time of his death in 1784, after which the edifice was carried on by Gandon.

Salvator Rosa.

Salvator Rosa's greatest ambition was to obtain universal celebrity, and finding the immense difficulty of attaining his desire by his pencil alone, adopted an expedient as whimsical as it was rare by which he hoped to render his name famous. For this purpose he associated himself with a number of young men who were stimulated by the same motives, and during the carnival, masked and otherwise disguised, represented a company of mountebanks. On these occasions Salvator, as the wittiest and most fluent speaker, was chosen the head or leader under the name of Forbica. This party exhibited themselves in several places, and by their wit and drollery, wherever they went, attracted great multitudes, amongst which they distributed ridiculous prescriptions for different diseases, skilfully adapting them to the various tastes of their auditors. His fame as an actor, a poet, a singer and a musician being pretty well known, he began to apply himself to the grand object—that of

establishing himself as a painter. This he found no great difficulty, as he had already succeeded in ingratiating himself with many who had it in their power to serve him, and he soon had commissions by which he not only acquired reputation, but sufficient profit to enable him to purchase apparel and many other necessities, so that on his revisiting Naples in 1646 he was a very different being from the friendless lad who had excited the compassion of every one who saw him. It was during this residence of Salvator Rosa in Naples that the memorable popular tumult under Masaniello took place, and the painter was persuaded by his former master, Aniello Falcone, to become one of an adventurous set of young men, principally painters, who had formed themselves into a band for the purpose of taking revenge on the Spaniards, and were called "La Compagnie della Morte." The tragical fate of Masaniello, however, soon dispersed these heroes, and Rosa, fearing he might be compelled to take a similar part in that fatal scene, sought safety in flight and took refuge in Rome. There he met with great encouragement and painted many excellent pictures. But though indefatigable in this department of the fine arts he did not entirely confine himself to it, for at this time he wrote some of his satires and also several sonnets. His house was the resort of the most distinguished persons of Rome, ecclesiastical as well as secular, who were drawn thither not merely to see his paintings, but for the pleasure of conversing with and hearing him read his satires. This notice, added to other causes, made him much disliked among the painters—a feeling which was by no means lessened by the following circumstance. Salvator Rosa exhibited a clever picture, the work of an amateur, by profession a surgeon, which picture had been rejected by the Academicians of St. Luke. The artists came in crowds to see it, and by those who were ignorant of the painter it was highly praised; on being asked by some one who had painted it, Salvator replied, "It was performed by a person whom the great Academicians of St. Luke thought fit to scorn because his ordinary profession was that of a surgeon, but," continued he, "I think they have not acted wisely, for if they had admitted him into their Academy they would have had the advantage of his services in setting the broken and distorted limbs of their fraternity that so frequently occur in their exhibitions."

Renaissance Architecture.

The Renaissance in general is usually spoken of as if it were nothing more than a direct but unskilful imitation of the antique, previously to the orders being so well understood as they were afterwards when studied through the text of Vitruvius and reduced to a methodical system of bookish rules by Palladio and Vignola. But in the first place it was founded only upon the Roman antique, and in the next, not upon the temple style of the Romans, but their triumphal arches, baths and other edifices. It was not either the portico or the continuous colonnade, where columniation displays itself in all its purity, that was taken as a model, but rather such structures as the Coliseum, where several small orders—that is, small in proportion to the general mass—are introduced for little more than decoration to it. And in the Renaissance and Cinquecento styles entire orders are used only as embellishment, and avowedly so. Where columns are employed for actual support, as in open loggie, it is only in combination with arches springing from them, the columns performing the office of piers to the latter, which is regarded by some as a most indefensible heresy and utter violation of good taste, though for no better argument than that columns were never so employed in the Classical style, but were originally intended to support a horizontal entablature; in other words, trabeation is essential to them. Essential it certainly is to the completion of an entire order, but it cannot be a whit more contrary to either good taste or good sense to employ columns as actual pillars or supports to arches resting upon them than it is to employ the trabeation or entablature without columns, as decoration in astylar buildings. In fact, a great deal of Italian Renaissance is astylar, with either a full entablature or a cornicione crowning and proportioned to the entire mass. This large and simple mode of treatment was greatly affected by the Florentine and Roman architects of the period of the revival, and contrasts very strikingly with the Transalpine Renaissance in France and other countries, which is characterised by multiplicity of parts and numerous divisions and breaks. It contrasts also with the contemporary practice of the Italian architects themselves when they employed the orders, in doing which they made their compositions microstylar, applying a separate small order to each floor or horizontal division of a façade above the ground floor, and they further reduced the height of the columns by giving a considerable proportion of each order to high pedestals beneath the columns. In Transalpine Renaissance such application of the orders was greatly exaggerated, they being employed for the ground floor as well as the others, and the spaces between the columns being filled in, either entirely or nearly so, with large windows, so that the columns or pilasters between them show only as accessories to the

windows themselves and as narrow piers between them. Fenestration completely predominates, both as to the quantity of surface the openings occupy and the architectural character occasioned by it.

Mouldings.

There are two principles diametrically opposed for the appliance of mouldings, viz. projection and recession. Classical architecture shows the first; Gothic and Norman have adopted the last, and in many cases combine both. This is as regards their relation to the face of wall. Again, the southern and their followers have designed their mouldings for the sake of light, the northern for the sake of shadow. This is as regards their actual forms. The reason why the northern did this would be on account, in the first case, of the inclemency of the climate, its destructive effect on any ornament too exposed to it; and in the second case, from the fact that light is not favourable with us to the production of effect, or the expression of delicate outlines. The principle in both respects, as practised by our forefathers, seems to be correct, because adapted to produce the best effect and the surest protection; but as the thickness of modern walls does not often admit of the same depth of recession, it may be necessary to practise it always in conjunction with the southern principle. Be this as it may, we are sure that nothing is more important than the study of mouldings; but this study so insisted on by all is not what is usually meant, viz. the production of a more beautiful example from a known model; not the making a cyma more delicately exquisite in outline than any known, but the study which shall give to each individual member the tone of the intended expression, both in outline and shadow, for it is necessary that we should be impressed with the fact that even the most simple forms convey an expression of some definite character to the imagination; the nature of this difference was shown before in the three cyma rectas, and the nice perception of this difference is always a great merit in the artist.

Proportions of Buildings.

Alberti says the width of a space being 4 feet, say, and its length 8 feet, the proportionate height—that is, the height most agreeable to the eye—is 6 feet, as equidistant from four and eight, or bearing a relative proportion to each; but draw this form, and in itself it certainly does not appear so pleasing as a double square. Others say, the width being 4 feet and the length 8, the height should be three-fourths, or 3 feet high. The reasonableness of these rules has to be shown, and their good effect is most doubtful; even if true they can only express one quality and, according to circumstances, different proportions are necessary. Utility and propriety should influence an architect in interior house design or all design, and beauty of proportion should give way to this, should be made to square with such requirements as far as can be, but certainly should be subservient; and in all that the architect does he has this drawback on the abstract principles of beauty, whatever they are, which should guide his design.

An Early Surveyors' Guide.

The oldest known book in English relating to surveying bears this title:—"This booke sheweth the maner of measurynge of all maner of lande, as well of woodlande, as of lande in the felde, and comptynge the true nombre of acres of the same. Newlye invented and compyled by Syr Rycharde Benese Chanon of Marton Abbay besyde London. Prynted in Southwarke in Saynt Thomas his hospitall by me James Nicolson." There is no date, but Nicolson's dated works run from 1536 to 1538. There is another edition (which omits the tables) printed by Thomas Colwell, who printed from 1558 to 1575. They are double-entry tables of the rudest character, for finding the number of acres in a given length and breadth, and for casting up payment at per perch, per acre, &c.



Royal County Theatre, Kingston-on-Thames.

SIR,—My attention has just been called to your issue of October 22, in which an illustration of the above appears. You have evidently been misinformed as to the relative positions of the late Mr. Phipps and myself in the matter.

Mr. Phipps acted as consulting architect in the preparation of the plans, but all the working drawings and specifications were prepared by me, and the contract was arranged and carried out entirely under my sole supervision.

I shall be much obliged if you will kindly give a note to this effect in an early issue, as the title on the illustration is apt to give a wrong impression.

I should like to add that any success the theatre is achieving is very greatly due to the valuable suggestions made by Mr. Phipps at our interviews, and it is a matter of much regret to me that he did not live to see those suggestions realised.—Yours faithfully,

J. CHARLES BOURNE.

62 and 63 Basinghall Street, London, E.C.:

November 3, 1897.

Endurance of Poplar.

SIR,—We have a rather fine black poplar, about 7 feet girth, which, from its pestilent habit of distributing its leaves carefully every morning all over the lawn from June 15 to October 15, inclusive, is condemned to the axe. We think of cutting it off about 25 feet from the ground, and building on the branch stumps a sort of gazebo platform, from which to view the regattas. Would it be safe so to do, or will the tree rot within, say, twenty years or so?—Faithfully yours,

C. ADAMS.

Harewood House, Keyhaven, Milford-on-Sea

Hants: October 26, 1897.

GENERAL.

A Committee of the Dundee Institute have recommended the members to decline taking part in any competition for the improvement of Carnoustie Church on the grounds that the size and nature of the work (being only alteration and enlargement) rendered it a very unsuitable subject for a competition; that under the conditions issued competitors were asked to work and furnish information not generally asked in such competitions; that no professional assessor or referee was named; that the remuneration offered was 4 per cent. on the cost instead of 5 per cent., plus travelling expenses.

The Lord Mayor and Sir Edward Poynter, the president of the Royal Academy, with Mr. Temple, the director of the Guildhall Art Gallery, viewed at the Pantechnicon on Tuesday the pictures which Mr. D. P. Sellar has offered to present to the Corporation of London as the nucleus of an art collection in the City. The result of their inspection will be made known to the Corporation and to Mr. Sellar at an early opportunity.

M. Osiris has lodged 100,000 francs with the Bank of France, which is to be placed at the disposition of the syndicate of the Paris press in order to reward the producer of the work which will be considered most meritorious from the artistic, industrial or humanitarian points of view in the exhibition of 1900.

The "Lancet" says that Dr. A. M. Berger has found in the Vatican Library (Cod. Vat., 3,211) a collection of prescriptions and directions for treating various eye diseases in Michel Angelo's own handwriting, obtained probably from medical friends mainly for his own personal benefit, as it is known that the great sculptor was nearly blind before he died. Dr. Berger has published this in its original Italian, with a few notes in German. It appears not to have been previously published, though it is mentioned by Pierre de Nolhac as forming an addition to Michel Angelo's manuscript poems.

The Next Ordinary Meeting of the Institution of Civil Engineers will be held on Tuesday next, at 8 P.M., when a paper will be read, with a view to discussion, on "The Manchester Ship Canal," by Sir E. Leader Williams, M.Inst.C.E.

The Society of Arts have placed a tablet on the house at Hampstead in which Sir Harry Vane formerly resided, bearing the following inscription:—"Sir Harry Vane, statesman, lived here. Born 1612. Beheaded 1662." The house is now known as Belmont, and adjoins the Soldiers' Daughters' Home. Both houses originally formed one residence. Bishop Butler also lived there, and wrote his "Analogy of the Christian Religion" there.

Mr. James Plevins, who was well established in Birmingham as a surveyor, died at his residence in Coventry on Sunday last. He was in his seventy-second year.

Mr. James Orrock, the painter and collector, on Wednesday was awarded by a jury 300*l.* for injury to his eye caused by the opening of a bottle of aerated water in the Café Monico.

St. Luke's Church, Harrogate, which was recently consecrated, has been built to meet the requirements of a thickly populated district and is situated in Walker Road. The foundation-stone was laid on October 20, 1895. The new church occupies a site of nearly 4,000 yards area. The style of the church is Decorated Gothic, rather late in type. The design consists of a lofty nave, 85 feet long by 27 feet wide; chancel, 35 feet long by 23 feet wide; south chapel, 34 feet long by 16 feet wide; north and south aisles, each 13 feet wide; with lofty organ-chamber and commodious vestries. The roofs are chiefly constructed of pitch pine, boarded, felted and covered with Westmoreland slates. The seating is also of pitch pine and will provide for 850 persons. The choir-stalls and chancel fittings are of oak. The cost of the church, exclusive of the upper part of the tower and spire, is about 8,000*l.*

The Architect.

THE WEEK.

IF the Bill which is to be lodged in the coming session of Parliament for the construction of an underground railway in Brighton should become law and the works are carried out, the Sussex town can with more reason be called London by Sea. There are two lines of railway proposed. One will commence at the northern end of Queen's Road, near the railway station of the London, Brighton and South Coast Railway, and will be continued under Queen's Road and West Street to the King's Road, opposite the end of Russell Street, that is, between the Alhambra and the Grand Hotel. The second line, which will serve as a siding, will join the first at West Street, and terminate in the King's Road at the end of Middle Street, not far from the "Old Ship." The gauge is to be the usual 4 feet 8½ inches, and the motive power will be electricity or such other mechanical power as may be prescribed or authorised by the Act. Power will be sought to make communication with the beach through the sea-wall of King's Road. The precedent set up of late years for purchasing no more than the lower parts of buildings will be followed.

ONE of the reports of the school management committee of the London School Board suggests that the adaptation of the earlier schools to modern requirements will be a very costly operation. In February last it was proposed to convert two classrooms for ninety children each into three for sixty children each. The cost of the work was estimated at 316%. The local managers took advantage of the opportunity to recommend the addition of a hall and the extension of the west wing. That means an outlay of 8,000%. The school management committee, or rather a majority of the members, for the chairman and vice chairman dissent from the scheme, now recommend that the larger sum should be expended.

THE annual meeting of the Egypt Exploration Fund was held on Wednesday, when Sir E. MAUNDE THOMPSON presided. It was reported that the total expenditure on the exploration fund account amounted to 2,698%, of which 1,558% was expended on the expedition account. This large amount was due to the fact that two expeditions were undertaken—one to Deir el Bahari, which cost 597%, including the partial restoration of the temple, and the other, under the direction of Professor PETRIE, with whom Mr. BERNARD GRENFELL was associated, worked on the sites Behnesa and Deshasheh. This latter expedition cost 885%, but when it was considered that it resulted in the discovery of the very early statues and objects which were lately exhibited at University College, and the very remarkable papyri, including the "Logia," they would agree that the outlay was more than justified. The total receipts had been 2,488%. Thus expenditure had exceeded receipts by 209%. There had been a considerable falling off in subscriptions, but it was hoped the present year would see a return to the former standard. The expenditure on the archaeological survey had been 464%, against receipts of 563%. The capital account showed that the assets of the Fund and the survey amounted on August 1 last to 2,661%, 215% of which belonged to the Græco-Roman branch, leaving the available assets for the forthcoming year at 2,446%. The Chairman said that in the coming year they proposed to complete the replacing of the blocks of the Punt expedition, to rebuild the columns of the Punt terrace and the wall leading up to the Hathor chapel, and to rebuild the great retaining wall which protects the temple from the *débris* which fell from above.

THE Society of Antiquaries has obtained, through the Foreign Office, some information concerning the practice adopted by various countries for the preservation of ancient monuments. In France "the regulative and restraining authority is only to a slight extent differentiated from the initiating and executive authority over ancient buildings," for

the architect, who should restrain rash alterations, may be the proposer of them. In Bavaria the plans for alterations of historic buildings have to be examined by a special committee, and without official approval they cannot be carried out. The restoration mania is a bar to the promotion of the clergy. Belgium has also a Royal Commission to advise on alterations of ancient buildings. In Rome there has been a commission since 1820. The royal consent is necessary before any changes can be made in the ancient buildings of Sweden and Norway. Italy, and in Italy Rome, may be regarded as the original parent of all legislation on the subject. Its principal work, the establishment of a Commission comprised of officials and experts and artists, specially charged with the preservation of historical monuments, has been followed by France, Spain and Belgium, among Latin countries; by Austria, Bavaria, Saxony, Holland and Switzerland, among Teutonic peoples; by the Scandinavian countries, and last, but not least, by Greece. It is noteworthy that those countries like Italy, Greece and Sweden, in which legislation, though not perhaps the best enforced is the most stringent, and where least regard has been paid to the so-called rights of private property, are precisely the countries in which there is the most immediate hope of future measures in the same direction. The next most important work, the formation of an inventory or register of ancient monuments, whether prehistoric or historic and artistic, whether the objects included in it are or are not placed under the protection of the State, has been attempted in Italy, France, Spain, Austria, Bavaria (so far as concerns prehistoric monuments) and Greece.

FROM a paper read on the Manchester Ship Canal before the Institution of Civil Engineers on Tuesday, it appears that as early as 1721 the necessity for providing efficient water communication between Manchester and Liverpool had been recognised, and many schemes had since that time been propounded. The first company proposing to construct a ship canal to Manchester had been formed in 1825, with TELFORD and Sir JOHN RENNIE as consulting engineers. Docks were to be constructed at Dawpool, on the river Dee, for large vessels, the cargoes being lightered to Manchester, smaller vessels passing to Manchester, a distance of 51 miles. The depth of the canal was to be 15 feet, and the locks 110 feet by 28 feet. In 1838 Sir JOHN RENNIE reported in favour of a ship-canal from Warrington to Runcorn; and in 1840 Mr. HENRY R. PALMER made a report to the Mersey and Irwell Navigation Company on the improvement of their navigation, so as to adapt it for sea-going vessels. No action had, however, been taken on these reports, and it was not until 1882 that the question was revived. In 1885 the Act for the Ship Canal was obtained. The length of the canal to its termination is 35½ miles. The excavation amounted to about 54,000,000 cubic yards, including 12,000,000 cubic yards of sandstone rock. The expenditure of the company to January 1, 1897, was 15,168,795% 15s. 11d., and the traffic increased from 925,659 tons in 1894 to 1,826,237 in 1896.

Is there any precise rule for determining the number of persons that can be accommodated in a theatre? In Dublin a law suit appears to hang on the solution. An injunction was applied for to prevent the erection of a theatre on the site of the old Theatre Royal in Hawkins Street unless it had seating capacity for 2,300 people. The applicant was Mr. GUNN, who holds the patent for the theatre. His architect, Mr. ALBERT MURRAY, saw the plans of the new building, and estimated the seating accommodation at 1,910. Mr. MCCARTHY, the city architect, calculated the number at 2,146. The plans were sent to London, where Mr. MATCHAM and Mr. JACKSON gave the number as 1,931, or 1,991 seats at the maximum. A partner of the late C. H. PHIPPS calculated there were 1,991 seats. There was some amendment of plans, and the city architect found the number rose to 2,322, an excess of the stipulated number. It is no wonder the Master of the Rolls, to whom the application was made, appeared bewildered, and allowed the case to stand over.

SOUTH KENSINGTON LOAN COLLECTIONS.

AMONG the results which are expected from the inquiry into the museums of the Science and Art Department is the enabling of the provinces to have more opportunities for enjoying the national treasures than are now allowed. A miserly reserve of the works of art confided to it cannot be charged against the Department. At the time when it was founded there was hardly a museum that was entirely thrown open to the public. A visitor to the British Museum was supposed to possess the privilege of seeing all the collections. But he must be a bold man who would have dared to act simply on his rights as a citizen and disturb such a keeper as the late Mr. CARPENTER in his enjoyment of rare prints. Sir E. MAUNDE THOMPSON, the principal librarian, delicately suggested a common state of affairs when he told the committee of the House of Commons, "Formerly we had keepers who did not develop departments, they did not develop the staff; the old-fashioned keeper was rather inclined to do everything himself, and to think he could do everything himself." An official who was jealous of an assistant was not likely to welcome the public, and so strong is the conviction of their impenetrability that various departments of the British Museum continue to be as little known to the people of London as if they formed parts of some private museum. If the collections of the Science and Art Department are not familiar to all inhabitants of the Metropolis it is not the fault of the administration. It was also an innovation when the Department endeavoured to give people in the provinces occasional glimpses of the objects which gratified so many eyes in town. Credit should be allowed for so bold an experiment. Facilities for the study of art exist in foreign countries, and the museums in continental towns are remarkable; but in England alone are national collections to be seen travelling from town to town in order to give pleasure to those who are unable to enjoy the advantages of living in London.

As a matter of fact, the collections which are sent about are adapted to conditions of time and place, but in theory, as Sir JOHN DONNELLY says, "Any object that is purchased for the South Kensington Museum is, and shall be, available for circulation." Proprietors of circuses and waxwork exhibitions know that rustic spectators are exigent for novelties, and a collection of objects arranged by Government officers must be submitted to a like law. If the inhabitants of provincial towns were to see the same case with the same trinkets in two successive loan exhibitions they would be wearied. It is therefore an advantage to be able to have recourse to a great collection like that of South Kensington, for although what is taken on one occasion may not be of importance, it will at least be sufficient to raise expectation of more attractive contributions at another time. There are towns which enjoy what is called a permanent loan of objects belonging to the Department, but there is no permanency, for experience proves that there must be a change at least once a year. The attention of students cannot be kept up for a longer term. In many towns, after three or four days the limit of the attractiveness of a collection is reached.

It is easy to conclude that if a loan collection does not "draw," or for only a brief time, the reason is that the objects were selected by officers who are ignorant of local needs. The officials are answerable for many costly failures, but they must be held guiltless of the charges made against them as showmen. The objects shown in local exhibitions are selected by local men who in some way claim to be judges. They are allowed to visit the collections at South Kensington, and to select whatever is considered most eligible. Who can say what principle inspires them? There are rigorous censors who hold they should not be allowed to have an object which does not relate to the staple industry of the town in which the exhibition is to be held. But are Londoners always thinking of production while they linger over the cases in the South Kensington Museum? In most instances they are simply deriving pleasure from the sight of beautiful objects, and why should provincial amateurs be prohibited from a like enjoyment? Moreover, there is a good deal of conventionalism about the notion of a staple industry. It is found that advantages are derived from having allied industries in one place, and a glance at the directory of any

provincial town will suggest that of late years the success of any trade is an incentive to attempts being made in various others. To insist on Manchester receiving cottons alone, that Birmingham is to have every year fine jewellery which is to be imitated in examples costing a few pence, that Nottingham is to be restricted to lace and Belfast to ancient linen, would be ridiculous. Take the last city. If a collection of models of liners were sent to Belfast there would be many to enjoy the absurdity, but as it is not improbable that shipbuilding will become a rival of weaving, an exhibition of models of vessels would not be very inappropriate. Incipient industries deserve encouragement, and we imagine that many of the local exhibitions which have excited ridicule were got up with that intention.

We believe it is wise to leave as little as possible to the choice of the Department's officials, for it is only on the spot that the requirements of the inhabitants can be ascertained. Moreover, there is more likelihood of success when the loan collection is supposed to correspond with the good taste of local amateurs. Sir JOHN DONNELLY handed in to the parliamentary committee a great many testimonials of the Department for sending objects to be exhibited, and of the courtesy, anxiety, care, kindness, attention, help, support, &c., shown by the officers. It is a revelation to learn that such excellent qualities are to be found in operation at South Kensington. Never before was there such an array of grateful effusions. But the gushing becomes plain if we remember that the Department simply agreed to the desires of the honest folk who came to the museum to select objects. In admiring the objects contributed, and in eulogising the officials, the provincial committees were praising themselves for the judgment they exercised, and which the authorities could not help approving.

It is impossible to determine the success of the local exhibitions, for often the full effects of one may not be visible for years. Who can measure the influence of a fine example of pottery on the minds of apprentices in Burslem? But whatever may be the success, it is not gained by any injury to the national or to private property. When the frailty and delicacy of many of the objects are considered, it is remarkable that hitherto they have escaped all the mishaps to which the movables of ordinary individuals are liable. Sir JOHN DONNELLY in his evidence observed:—"It is an astonishing thing to say, but I have never heard or been able to find out that there has ever been any serious damage to any object of value. No doubt in some cases furniture, especially old furniture, has got a little rickety and shaken by travelling in the vans. But we had some very magnificent Sevres china that belongs to HER MAJESTY, which travelled, I do not know how many thousands of miles, and was returned some few years ago without a chip or damage to them, although they were always out on loan." The safety is the more fortunate, since insurance is not provided for in any sort of Government property. The Department provides the cases used, the objects are arranged by trained assistants, then the cases are locked until they are returned. The cost of the objects sent out in one year was 102,865*l.*, and it has been calculated that, if large architectural subjects and sculpture were excluded, "a very full quarter of the valuable objects were in circulation" from the South Kensington Museum. It must therefore be admitted that, if the provinces contribute towards the cost of the collections in charge of the Department, there is some return.

The removal is not an unmixed advantage. Naturally a student of any section of industrial art who seeks one of the museum examples is disappointed when he discovers it is peregrinating Wales or Scotland, but the inconvenience cannot be helped. He would hardly be satisfied with a reproduction as a substitute, and provincial towns would be offended if they were compelled to forego the sight of originals. The students of schools of art might be more easily contented, but for exhibitions in municipal buildings reproductions are almost useless.

The demand for objects on loan is growing, and the grants from the Treasury are not increasing in proportion. The South Kensington Museum cannot be entirely stripped of the contents of the cases. To meet the difficulty Mr. PURDON CLARKE has suggested a scheme which would serve local art classes especially, without impoverishing the collections

of the museum or adding much to the taxation. He would combine photographs, casts or other reproductions and actual examples, according to the class of work. Wood-carving would be illustrated by sets of photographs, details, casts, and a few actual specimens of Gothic and Renaissance work. In addition to photographs of textiles there would be fragments of stuffs, and when the latter were not available coloured photographs would be substituted. For pottery small collections of tiles and fragments would be used with plain and coloured photographs. Photographs and electrotypes would be utilised for metal-work. In each case there would be a special catalogue and a set of lantern slides for lectures. If systematically carried out the plan would be excellent in art classes, but for popular exhibitions it might be less successful. Something will have to be done to meet the demand, which is as much inspired by a fear of monopoly by Londoners as by a desire to improve manufactures.

ELECTRIC TRAMWAYS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from page 260.)

Apparatus on the Car.

THE methods of control, the gearing and starting arrangements of the cars are of great importance in connection with electric tramways, and the same principles apply to all electric tramcars.

Starting and Control.—The first matter which calls for attention is that of the electric motor, as upon this depends the whole principle of the control.

Without going too deeply into the theory of an electric motor, it is necessary here to briefly discuss the construction. It may be said to consist of two parts—a magnetic field and a coil of wire, the latter usually being the revolving part. The main current is sent through this coil of wire, which then reacts on the magnetic field, causing a torque or twist, which is transmitted to the wheels of the car. The electrical resistance of this coil of wire, which is the armature, is very low, otherwise there would be a large waste of energy in it when the current is passing; and for this reason, if the motor is switched directly on to the dynamo or generator while stationary, an enormous current would be sent through it, which would probably burn the insulation of the wire. When, however, a motor is running it generates a back pressure, which keeps back the current to a reasonable amount. A motor running without load will rotate at such a speed that its back pressure nearly equals the pressure at which it is supplied. The current is thus reduced to the exact amount which the motor requires to do the work. It is evident from the above that until the motor gets up speed some means must be taken to keep the current within limits. One means would be to insert a small resistance in the motor circuit until it is running at its proper speed, and then to connect the motor to the car by means of a friction clutch. As a matter of experience this is not done, because of the unreliability of these clutches.

It will be well here to explain why such a large motor as 30 or 40 horse-power is required on a car which two or three horses can start.

The weight of a car is usually about 10 tons complete, with passengers; and for example we will suppose that it is to run at 9 miles per hour, and that 15 seconds are required to allow of this speed being obtained.

$$\begin{aligned}\text{Kinetic energy} &= \frac{1}{2} \text{ mass} \times \text{velocity squared.} \\ &= 10 \times 2240 \times 13.2 \times 13.2 \text{ ft.-lbs.} = 60605. \\ &\quad 32.2 \times 2\end{aligned}$$

To do this in one-third of a minute, making no allowance for friction, needs an average of just under 6 horse-power. As, however, the horse-power of a motor is greater as the speed increases, and the average speed is only half that at 9 miles an hour, the motor must be rated at 12 horse-power merely to start the car in motion on the level, assuming no friction. When allowance is made for the facts that the car may have to be started on a gradient, that the resistance to any motion due to friction has to be overcome, and allowance is made for the heavy starting strain and for the waste in gearing, it is quite clear why the motor

must be of 30 horse-power. Of course, a horse can exert much more than a horse-power for a short time, as the definition of a horse-power by WATT is the power that can be exerted by a horse continuously.

The motor which is specially suited for tramway working is the series type, as in this type the field magnets carry the main current on its way to the armature, and so strengthens the field, increases the torque and allows the armature to exert a large back pressure when running slowly. With this type of motor, therefore, we have the nearest approach to the ideal conditions.

It is evident with one motor that extra resistance must be placed in the circuit at first, to keep the current within limits, which resistance is gradually cut out as the speed of the car increases. This is the usual method of control.

It has of late years been the practice to use two smaller motors on each car, these being placed in series at starting and paralleled later. The placing of the motors in series reduces the starting current very much, as it is nearly all used usefully, the starting torque is the same with two motors and half the current as before, and the resistance can be cut out entirely when the car has attained half speed. To increase the speed the fields are paralleled while the armatures are in series, and later the armatures are paralleled, or the last two operations may be reversed.

By this means the control of the speed on a car is almost perfect, without the use of extra resistance except at the very start. This method of control is called the "series parallel."

The very latest method of control is the "Johnson-Lundell." This is similar to the series-parallel arrangement, but enables one large motor instead of two smaller ones to be used. The armature has two windings, and so also has the field, the former having two commutators. These windings are used in exactly the same way as with the ordinary series-parallel control.

Where accumulators are used on cars there is not so much need of a series-parallel control. One motor may be used, and the accumulators connected in parallel at first and in series afterwards. This is just as good as the series-parallel connections on the motor. A combination of series-parallel connections on both accumulator and motor would no doubt be an ideal system.

The only objection to this system is the fact that accumulators are not always uniform, and when paralleled might not perhaps share the load equally.

Gearing.—This is the chief problem which remains to be faced in connection with tramway running. There are many systems of gearing, and perhaps it will be of interest to give a list:—

- 1, Direct coupling; 2, toothed gear; 3, worm gear; 4, belt drive; 5, ropes; 6, friction gear; 7, chain.

Nos. 4, 5 and 6, although they have all been tried, are hardly feasible, owing to moisture in the air, change of temperature and the effect of mud splashing. These defects are of a serious nature when it is remembered that the car must run in all weathers, but when the starting strains are taken into account and the tendency to slip, it will be seen that any gear working on the friction principle is impossible. The chain gear is also of a rather unsatisfactory character, as the wear is very serious; however, it is not affected by temperature, and this is a great point in its favour.

The first three gears on the list are those which have demanded the greatest amount of attention and are really serious competitors.

There is no doubt that a motor direct coupled to the axle is the best form of gearing as regards efficiency and reliability. No form of intermediate gear is then required, but the motor is heavy as it runs at a slow speed, usually about 120 revolutions per minute on a tramcar. It must not, however, be supposed that the weight of the motor is an insuperable obstacle, as the greater part of the weight is direct on the axles, and therefore it does not increase the weight of the car as much as the same weight of accumulators, say, would, as no extra strong framework is required. This form of driving is no doubt destined to be the survivor, and as methods of motor construction improve it must take a more prominent place.

On electric railways where the speed is higher than with tramways, the direct coupling is already accepted as the standard method of driving.

Spur-gearing is at the present time the most used form of gearing for tramcars. The use of accurately machine-cut teeth, and the results of experience in the use of different metals, have done very much in the achievement of success. The result of experience with toothed gearing in general has been that the spur wheel and pinion should be of dissimilar metals or materials. It has been found very good practice to use phosphor bronze for the driver and steel or iron for the driven wheel. In some cases the driver is made of raw hide; in others the teeth are of wood, fibre, &c.; but there is not much experience in the use of the raw hide or fibre as yet.

The method of suspending the motor calls for attention with spur-gearing. The field magnets are often connected to bearings running on the car axle, the armature shaft being at a distance from the car axle equal to the sum of the radii of the pitch circles of the driving and driven wheels. When arranged in this manner the whole motor may be swung round the axle, while the two wheels will remain in gear. The framework of the motor is supported by means of springs fixed to the car frame. Thus one end of the motor is connected to the axle by means of bearings and the other to the car frame by means of springs. By this means the bad effect of jolting is minimised, while the wheels always gear perfectly. Another advantage of this method of suspension is that at starting the motor pinion as it were climbs up the gear wheel; this takes off the shock of starting, allowing the armature to rotate a little, while the weight of the motor is used to assist starting in much the same way as a horse uses its weight in starting. Worm-gearing between the motor and the car has often been tried, but with indifferent success as a rule. The chief drawbacks to it are the great amount of attention required, the end thrust which must be taken up by some form of thrust block and the inefficiency when the worm and wheel wear slightly. Worm-gears are almost always run in oil to reduce the grinding action between the worm and the wheel teeth. In a properly designed spur wheel the action is a rolling one, but in a worm-gear there is a rubbing of metal on metal which cannot be obviated, at least in the form of worm used up to the present. The efficiency of a well-designed spur-gearing averages about 60 to 70 per cent., but that of a worm-gear will not exceed 50 to 55 per cent. after a few weeks' wear.

It will be seen that a direct drive has the advantage of an efficiency of practically 100 per cent., and for this reason the motor need be only about two-thirds as "powerful" as one with an intermediate gear. This fact considerably helps the direct coupled system, as the motor need not be as large in proportion as its speed is decreased. When the waste of energy and noise of gears are taken into account, there is very little doubt that the direct-coupling principle will be the survivor.

The Central Station.—The conditions of running of a tramway plant are very different from the conditions of ordinary work. One case which is a good parallel is that of an engine driving heavy machine tools or similar apparatus. The load jerks on and off with a great effect on the speed of the engine and its working parts. In the first place there is the variation of load with the time of year and time of day; these vary considerably with the service and the habits of the people. Then there are the great variations due to the gradients, condition of track, &c., and lastly the great fluctuations due to starting the cars, either on a gradient or on the level. These fluctuations cause the load on the dynamo to vary between nothing and twice full load; as a rule, this may take place in a few seconds.

From this it will follow that the maximum load obtained depends more upon coincidence than anything else; the highest load would be obtained if all the cars happened to be starting at one instant. When this is the case the plant used will depend upon the number of cars in use at once. As this is usually a large proportion of the whole, the greater part of the plant must be running. This means that a tramway plant should consist of about two or three large units, one being a reserve, as the load varies so quickly that extra machines could not be run up in time to meet heavy demands.

It is evident, then, that the design of a plant for tramway working is a different matter from that in the case of a central lighting station. The question of governing is of the greatest importance, and the large units must run

economically at about half-load; while they must be capable of running at full, or even 25 per cent. in excess of the usual full load without danger, and also the engine must be designed so that in driving the dynamo it will stand any shock caused by sudden overload. The solution of the difficulties has come through the medium of automatic expansion engines, and partially by the use of accumulators paralleled on the mains, which to a great extent take up the fluctuations; and further by the use of heavy fly-wheels on the engines. The question of automatic expansion governing is certainly rather too complicated to discuss fully here, but the whole point may be put shortly. To obtain economy from a steam-engine two facts must be borne in mind—(1) That a high expansion is desirable, because the steam is at a lower pressure when exhausted; but (2) a high expansion means a large engine, as the mean pressure is low, and a large engine means heavy condensation losses. There is a particular expansion which gives the best result in any engine; it varies with the engine, but can be obtained by experiment, and in a variable expansion engine the valves should be arranged so that this is the expansion which gives the usual average load. This point is usually about two-thirds of the ordinary full load, with a variable expansion. However, the ordinary full load is when the cut off of steam is at $\frac{1}{6}$ of the stroke, and thus the percentage of the actual capacity of the engine is $\frac{2}{3} \times \frac{1}{6} = \frac{1}{9}$ of the total. Fortunately, as a rule the engine for tramways usually works at about 50 per cent. of the maximum load ever on, so we have the engine working at its best load. When doing less or doing more the economy is hardly as good; in fact, it is usually much worse. However, it has been fairly proved that the economy with a variable is better than with a fixed expansion at $\frac{1}{6}$ of the stroke and throttle governing, especially at loads above two-thirds of the full ordinary one.

Shaft governors are said to act so quickly that the load is met with only about 2 per cent. variation in speed. The fly-wheel has a function entirely apart from the governor. The latter cannot act in less than one revolution, and therefore it is necessary to prevent sudden strains affecting the reciprocating parts. The fly-wheel stores sufficient energy to be able to meet the greatest fluctuation which ever occurs, without being reduced in speed more than 2 or 3 per cent., while the governor adjusts itself to the new conditions.

The point which always appears when the question of the engine for traction is mentioned is the belt drive *versus* direct coupling. In the former case it is supposed to be necessary to have a slip between the belt and pulley, and also an elasticity in the belt to prevent the shock from reaching the engine when a car is started. This has been proved to be little more than a superstition. There are a great number of direct coupled plants in America working satisfactorily. The reason for this may be set down to the fact that the fly-wheel is combined with the armature of the dynamo, and because of this any sudden increase in power demanded, which must be caused electrically by the rush of current, is supplied by the fly-wheel on slowing down a little without being transmitted by the crank shaft, and the shock to the engine is only that due to its being slowed down slightly. The twist on the crank shaft is, therefore, never in any large excess over the normal. The flexibility of the belt is really very little at the enormous speed at which it travels, as any one can see by striking a fast moving belt with a stick, and the slip is not to be depended upon.

The essential point to bear in mind in the design of any traction plant is that the fly-wheel action must be provided where it can act on the dynamo without going through the crank-shaft, such as on the driving pulley, or the dynamo armature, and that a larger factor of safety should be allowed in the engine parts than is usual.

(To be continued.)

The Second Members' Meeting of the fiftieth session of the Liverpool Architectural Society will be held on Monday, November 15, in the Picton Library, William Brown Street. A selection of the most valuable architectural books in the library will be on view from 5.30 till 9.30 in the librarian's private room. Professor Simpson will read a short paper on "The Use of Books."

G. B. CAVALCASELLE.

THE Roman papers announce the death of Signor Giovanni Batista. Cavalcaselle, who has thus lived little more than a year longer than the late Sir Joseph Crowe, the friend with whom he collaborated in the production of the notable art histories which bear their names. According to the obituary notice in the *Times*, Cavalcaselle was born at Legnago in 1820, his family being settled on a small family estate there; but he left his native place early in life in order to study art at Padua. He soon became tolerably efficient in mastering what can be taught by professors, but he never showed original power, and threw up the profession of painting after awhile and turned his mind exclusively to the study of the styles and technique of the old masters. In prosecution of this design he visited in succession most of the museums of Europe. Sir Joseph Crowe in his "Reminiscences" told the salient points of his career, and related that he first met him by chance whilst posting in Westphalia on his way to Berlin. This was in the year 1847. Then followed a checkered career for Cavalcaselle, owing to his ardent Liberal views. He first joined Mazzini at Venice in 1848 and next year enrolled himself as a Garibaldian soldier at Rome. The hardships then endured, aggravated by the smart of being more often than not compelled to retreat before superior forces, used to be amusingly dilated upon by him afterwards. It is enough to mention here that he was taken prisoner at Piacenza, and only escaped the death which overtook his three companions owing to the timely retreat of Radetzki, who was obliged to retire before the insurgents, and to release him from duress and imminent death. Next year, 1849, found him in the trenches fighting the French as a common soldier. When the French entered Rome those who could escape, Cavalcaselle amongst them. He managed to get to Paris in a tattered condition, and was conveyed by friends to the safer shelter of English shores. Here he earned what was in those days the precarious living of an illustrator, now drawing outlines of famous pictures for art histories and now working at elaborate, large-sized cartoons, used in lecturing by popular art teachers. Now also began his collaboration with Crowe. Whilst to one collaborator was given exclusively the task of collecting notes and facts, the other wrote down the resulting judgments, after they had together discussed documents and viewed the pictures commented upon. Unlike some pairs of workers in literature—notably MM. Erckmann and Chatrian—Crowe and Cavalcaselle worked on to the last without friction. The first appearance of the fruit of their labours was in 1857, when the single volume, "Early Flemish Painters," came out. The last was the "Life of Raphael," which was published in 1882, a quarter of a century later. The intervening works were a "History of Painting in Italy" (1864), "History of Painting in North Italy" (1871), and "Life of Titian" (1877). Both for their learning and for their appreciative art criticism these volumes have been, and continue to be, highly valued by students of painting.

Cavalcaselle used to relate an incident which gives some idea of his pertinacity in search of pictures that it was necessary for him to see. The owner of a certain gallery had granted permission for him to go round it. The family happened to be absent at the time, and Cavalcaselle was conducted through the rooms by the domestic cicerone. But, not noticing anywhere the little Van Eyck which he had gone expressly to see, Cavalcaselle sat down and declined to look at anything unless the work he was in search of was forthcoming. The maid-servant was at her wits' ends, when, suddenly recollecting that a small panel, wrapped in paper, had been stowed away in a drawer, she fetched it; and the delight of the visitor was great at the discovery. He immediately copied Van Eyck's well-known motto upon it, "Als ikh Kan," which, no less than the workmanship, attests the authenticity of the little Madonna.

It is pleasant to reflect that gratitude for services rendered by Cavalcaselle in solving knotty problems of authorship, whenever fresh additions to our National Gallery were in contemplation, induced Sir Charles Eastlake, then in charge of it, to bring to bear sufficient influence to restore the exile to his own country. This was done with no little amount of opposition. When, however, the Italian Government was reconstituted he was given office, first as Inspector of the National Florentine Museum, and subsequently as Chief Inspector of Antiquities and Fine Arts at Rome.

Allusion has been made to Cavalcaselle's narrow escape at Piacenza. Equally melodramatic was an adventure he had in time of peace. In some small Italian town, after an altercation at a café, he was dogged home by three irate companions who resented his utterances. They surrounded him, but he stood at bay against a wall. First one man on his left then another on his right stabbed him. The third aimed at his abdomen, but in the nick of time Cavalcaselle bent forward and somewhat diverted the aim. He fell senseless, however, and was left for dead. After awhile he got up, and soon, by good luck, friends passing by recognised him and took him home. He made a wonderful recovery, and used to remark afterwards, "It was lucky for me the stilettos were not poisoned." His powers of

endurance were remarkable. He knew perfectly well the names of the perpetrators of the outrage, but he never would divulge them. He had a sincere admiration of England and Englishmen, though he could never speak a word of their language except in a broken fashion.

THE HELLENIC SOCIETY.

THE first general meeting of the Society was held on the 4th inst. at 22 Albemarle Street. Mr. Talfourd Ely presided.

Professor Ernest Gardner read a paper on a Greek vase in the museum at Harrow School. This vase, he said, of which the subject was Caeneus and the Centaurs, was the gem of the collection which was presented to the school museum by Sir Gardner Wilkinson. It had recently been admirably cleaned, in common with others, by Mr. Sharp of the British Museum, and we might now be tolerably sure that all that was left was the work of the original artist. The figures painted on the vase were those of Caeneus, who had wounded the central Centaur. The latter was about to hurl a huge stone on the hero. Two other Centaurs on either side held pine branches with which they were about to strike Caeneus. The drawing was wonderfully vigorous and belonged, undoubtedly, to the best period, and no hesitation could be felt in assigning the vase to the age of Euphronius or Onesimus. The fishy eye and fierce aspect of the middle Centaur and the subtle gradations of expression from the more or less savage appearance of the two Centaurs on the sides to the delicate features of Caeneus were efforts of marvellous skill, and the bold invention exhibited in the drawing was probably due to Euphronius himself. The legend of Caeneus was one of the most interesting in Greek mythology. It was found in various forms from Homer downwards, and the beginning of it was to be traced to the battle with the Centaurs at the wedding of Peirithoos. In one version Caeneus was overwhelmed with stones and sank straight to Hades. Pindar used the words *σχίσας ὀρθροπόδι γὰν*. According to Ovid he emerged as a bird, and Virgil speaks of him in the Shades as "Juvenis quondam, nunc femina." His connection with the pine was only one of many indications of the sanctity of the pine, as shown with respect to Pentheus in the Bacchae and in the story of Atys. The origin of the myth was obscure, but the most probable was that which explained it with reference to spirits of the woods, as the belief in such spirits was very widespread among all primitive people.

Mr. G. Beardoe Grundy then read a paper on the topography of the battle of Salamis.

THE SOCIETY OF ARTS.

THE first meeting of the one hundred and forty-fourth session will be held on Wednesday evening, November 17, when an address on "The Colonies: their Arts, Manufactures and Commerce," will be delivered by Major-General Sir Owen Tudor Burne, G.C.I.E., K.C.S.I., chairman of the Council. Previous to Christmas there will be four ordinary meetings, in addition to the opening meeting.

November 24, "Progress of Metallurgy and Metal Mining in America during the last Half-century," by Professor James Douglas. December 1, "The American Bicycle—the Theory and Practice of its Making," by Professor Leonard Waldo, D.Sc. December 8, "The Stockholm Exhibition of 1897," by Bennett H. Brough (the Right Hon. Sir Bernhard Samuelson, Bart., F.R.S., will preside). December 15, "The Purification of Sewage by Bacteria," by Samuel Rideal, D.Sc. (Sir Douglas Galton, K.C.B., F.R.S., will preside).

Papers for meetings after Christmas:—"The Protection of Industrial Property," by J. F. Iselin. "The Projection of Luminous Objects in Space," by Eric Bruce. "Aeronautics," by Captain B. Baden-Powell. "Fruit Growing," by Cecil Hooper. "Stage Mechanism," by Edwin O. Sachs. "The Recent History of Papermaking," by Clayton Beadle. "The Preparation of Meat Extracts," by C. R. Valentine. "Children's Sight," by R. Brudenell Carter, F.R.C.S. "Fireproof Construction," by Thomas Potter.

The meetings of the Indian Section will take place on the following Thursdays, at 4.30 or 8 o'clock:—January 20, February 17, March 10, 31, April 28, May 19.

The meetings of the Foreign and Colonial Section will take place on the following Tuesday afternoons at 4.30 o'clock:—January 18, February 15, March 15, April 5.

The meetings of the applied art section will take place on the following Tuesday evenings, at 8 o'clock:—January 25, February 22, March 8, 29, April 26, May 17.

The following courses of Cantor lectures will be delivered on Monday evenings, at 8 o'clock:—Eugene F. A. Obach, Ph.D., F.R.S., "Gutta Percha," three lectures, November 29, December 6, 13. Cyril Davenport, "Decorative Bookbinding,"

three lectures, January 24, 31, February 7. Hugh Stannus, "The Principles of Design in Form," four lectures, February 14, 21, 28, March 7. Professor W. Noel Hartley, F.R.S., "The Thermo-Chemistry of the Bessemer Process," three lectures, March 14, 21, 28. Dr. D. Morris, C.M.G., "India Rubber," two lectures, April 18, 25. Professor Carus Wilson, "Electric Traction," four lectures, May 2, 9, 16, 23.

ELECTRIC CURRENTS AND BUILDING MATERIALS.

THE following report of the special committee of the American Institute of Architects appointed to consider "The Influence of Electric Currents on Adjacent and Surrounding Materials," was presented to the Convention at Detroit by the chairman, Mr. James B. Cook.

As chairman and on behalf of the committee appointed at your last convention to consider and report upon the "Influence of electric currents on adjacent and surrounding materials," I beg to say that we have given the subject considerable thought, study and investigation, and we also find that the study of these questions leads on to the study into such laws of the physical sciences as are in a measure intimately connected with the same. This study collectively is, in our opinion, one of the greatest interest to the architectural profession, in a scientific point of view, for it opens up new avenues of thought, new theories and new developments. It banishes old accepted ideas as laid down in the text books for new formulas and more progressive thought; therefore, to make the subject intelligible to those who are interested in the same, to enter more fully into it on account of its importance, and, again, as there is to be a "standing committee on the applied arts and sciences," this matter will naturally come under their control. Such being the case we feel desirous, as this subject is one of a series and one entirely new to the Institute, to commence on the same by an introduction into the "phenomena of electricity," and in doing so we ask your indulgence if you find we are wandering somewhat remotely from the text as laid down, but we deem it necessary, this wandering, in order that the true path may be discovered, for as yet in all that has been written on the subject of electrical causes and effects little is known, new paths have to be found and the old ones abandoned; and while we must acknowledge brilliant results have been obtained, which in a measure are, in the greater development of the spark and power, caused only by an increase of the developing power and its generators, yet as to actual causes the mystery is still unsolved.

The old familiar question, What is electricity? that is asked in every text-book on electricity, and is answered by saying that it is an imponderable fluid capable of traversing the air, the earth, and especially all metals, and for commercial purposes flows through iron or copper wires in an invisible fluid state, has no foundation in fact; but advanced electrical scientists to-day recognise no such theory and are free to admit that the exact nature of electricity is unknown. The sources of electricity, such as are termed frictional electricity, hydro electricity, pyro electricity, magneto electricity, thermo electricity, animal and vegetable electricity, &c., are not different kinds of electrical force. Electric force or energy is of one kind only, no matter from what source it may originate. With these denials we are brought to our belief, and to give force to the same we call your attention to the wonders of creation. The visible and invisible worlds, the mightiness of the planetary and stellar systems, our world and all it contains, and the unseen force that regulates the movements of all that is contained in the whole universe, from the largest planet to the smallest atom of dust, each and all are under one law, one force. This law has no deviation; it is the same for a part as for the whole. In order to well understand this law it is necessary to consider the theory of atoms.

By this theory of matter we are told that all substances, either fluid, gaseous or solid are made up of atoms. These atoms are the ultimate diminution of each particle; that the atoms are absolutely unalterable in size, shape, weight and density and are unaffected by any known physical force, but nevertheless possess a definite size and mass, and according to the latest authority the smallest particle of matter, 1,400 of a millimetre in diameter, will contain about 30,000,000 atoms. This theory of atoms extends from the centre of our globe to its surface and all things about the same to our atmosphere, and to all the systems of the heavens and its limitless region and to all things visible and invisible.

It is not possible in a report of this character to enter into a full explanation of the theories advanced; we can but call your attention to them in order to complete a chain of reasoning.

Our next and most important consideration is that of the ether that pervades every vacant space of the whole universe; it penetrates everywhere in the animal and vegetable kingdom; everything that is organic or inorganic pervades everywhere

to the utmost limits of the limitless universe; it is the invisible medium that connects everything from the minutest atom to the sun, moon, planets and stars of our own system and of all other systems, known and unknown. It is the medium in which they all maintain their position in space, sustaining them as they perform their various revolutions. This ether was in the beginning before the creation of the universe; it filled the limitless space that before was a void; it was the first creation.

This ether is a material substance of a more subtle kind than visible bodies and is totally different from the atmosphere that surrounds our globe.

The transmission of light, heat, electricity and sound are due to this ether medium. The atmosphere has nothing to do with it. Our atmosphere has its specific functions to perform perfectly independent of this ether medium, and it is to this ether alone we must look for the solution of the phenomena of light, heat, electricity and sound. Atmospheric air is a necessity for the production and maintenance of life in the animal and vegetable kingdom.

The true study of the distribution of heat must be made through a study of the ether medium, and also alone can we solve the great problem of acoustics only through a study of the ether medium, as also the study of light and electricity, all as in connection with the great problem of the life and existence of all buildings.

Briefly we have given this introduction, for it is impossible in our allotted time to do otherwise, although volumes might be written on it, so wonderful is it in all its various phases, but we have merely entered into it for the purpose of a foundation for further investigation.

I now hold in my hand a small piece of iron ore; I choose iron from the fact of its being a substance in which we have the greatest familiarity, being the most extensively distributed and one of the most important of all metals, not only to mankind at large, but particularly to us as architects. It has been in use from time immemorial, and marks the gradual progress of the human race from barbarism to civilisation.

The reduction of ore to its necessary condition to be wrought into useful forms, from the simplest tool to the most complex machine, also in all forms for peace as well as for war, all combine to excite the energies of the people for its acquisition, whether by labour or commerce, impelling a greater mental activity and a greater civilisation. It is the greatest of metals for the material advancement of national intelligence and industry.

This iron ore as we now see it must undergo a reduction or smelting to eliminate various earths and salts in which it is combined; after this operation we have the ordinary pig-iron of commerce—cast-iron as it is commonly called.

This piece of iron I now hold in my hand is a specimen of the ordinary cast-iron of commerce; from this cast-iron wrought-iron is made and also steel. Observe this piece of cast-iron; to the naked eye it seems to be of a crystalline character—very compact and of a bluish colour. Now, if we observe this piece of iron through a magnifying glass, we find that the interstices between the crystals are again filled with smaller crystals, and as we increase our power of observation we still discover smaller particles, and so on increasing to infinity. With the point of this very fine needle I take up a minute portion of this iron. You cannot under any possible condition with the naked eye see the particle on this point, but under a very powerful microscope we can see it; it is an atom of iron so small that 1,400 of a millimetre in diameter will contain about 30,000,000 atoms. Now, all we have been talking about, and all we have been saying has been for the purpose of introducing to you this atom, to the naked eye perfectly invisible, yet this atom and he ether of the universe play the most important part in the creation of all things. The atom as already described, though exceedingly small, possesses a definite size; the atom is indivisible and unaffected by heat or cold, or by any known physical force. As an atom, its life is from the beginning to the end indestructible and for ever. Now, this little atom on the point of this needle seems a small thing to talk and write about, but to us all it is a most important factor, and deserves a deep research and important investigation.

If we take our own globe, the earth, it is but an atom in the whole universe. We find it has an envelope or atmosphere of its own, extending up forty-five miles. Investigation tells us that there is an atmospheric envelope to all planets and stars, but the kind of atmosphere is unknown. Take our atom of investigation, it too has its atmosphere, an envelope of its own; not only it, but every other atom of whatever kind, liquid, gaseous or solid.

This atom existing in this envelope or covering has a potential force, and has under certain conditions great energy, and under other conditions can assume polarity. The power of the atoms exercised on their envelopes sets up the power of cohesion, one as with another, which is the law of cohesion. The loss of the power of this atom to set up the cohesive force produces non-cohesion or disintegration, and decomposition.

takes place. The life or cohesion of the atoms of a mass of material depends on the life and ability of the atom to maintain the cohesive force in the envelope, and as soon as that life ceases the cohesive force ceases.

Under all conditions in the inorganic materials of the earth as they exist in their original condition the atoms of the mass are at rest. A disturbance of the mass causes a movement of the atoms causing energy; this energy is productive of heat, light and electricity. The ether, as described, is the medium that makes manifest to our senses these phases of the atom energy; without this ether medium no sensible conveyance could be made.

The envelope or covering of the atom is of the greatest importance in the economy of all matter—the atom is merely the germ of the envelope. The envelope constitutes the nature of the material, whether iron, copper, gold, silver, &c. The atom itself is neither, and its nature cannot be determined by any known analysis as to its composition, for it has none, but the envelope assumes all that is wanting in the atom except electrification, and that belongs only to the atom; the envelope assumes none of it, but the envelope is the receiver after having been created by the atom.

Agitation, rotation or vibration, when applied to these atoms, produces electrical manifestations; the greater the increase of these forces the greater the manifestations.

There is another condition of all matter, viz. a sympathetic manifestation. A body that is in a state of electrification will induce another body some distance away to a similar condition of electrification, and that without any contact or connection. This condition being brought about by the ether medium, this ether medium being the communicator.

We again find that magnetism is the normal and latent condition of all matter, and that the law of cohesion, as between all atoms, is the result of magnetic influence. Electricity, we find, is caused by disturbing or bringing into life the latent magnetism, and the result is to destroy cohesion and produce disintegration.

We sum up by saying that cohesive force is the result of magnetism and that disintegration is the result of electricity.

Magnetism is a conservative force and pervades everywhere; electricity is a destructive force and the primary cause of disintegration.

Briefly we have called your attention to the ether, an invisible medium pervading every void of the universe, either solid, liquid or gaseous; a most important factor in the study of heat, light, electricity and sound. We have also called your attention to the theory of atoms and cohesion, also to magnetism as a necessary condition and pervading all things, and to electricity as a destructive or disruptive agent, which, unlike magnetism, does not exist in nature as a force, but is brought into existence by agitation of some kind.

We now come to the consideration of the effects of electricity or electric currents on the materials of buildings. The atoms of matter of all kinds in their natural or normal condition are at rest, and cohesion is perfectly maintained by the magnetic influence of the atoms on the envelopes of the atoms. A disturbance of any kind on material sets up electrical manifestations; it may at first be exceedingly minute, yet nevertheless it exists. Every operation in building, from the digging of the foundation, the erection of the walls and the covering in of the edifice and equipping of the same, is a disturbance. The mining of the metals that enter into the building is a disturbance; in fact, the making of the different kinds of materials from the raw to the finished stock is a disturbance. Everything that is done about a building or enters into its construction has been disturbed from its primitive rest, and from that moment of disturbance electrical conditions have been set up. The magnetic force of the atoms which induced cohesion have been at that moment displaced by electric conditions destroying cohesion and producing as an ultimate result disintegration and the dissolution of all things.

The atoms of matter in their natural condition which were at rest have by this disturbance been set in motion, and this motion never ceases until dissolution takes place.

The wiring of buildings for electrical purposes, such as heat, light and power, however well insulated, when electrified sets up by a sympathetic action a greater disturbance or agitation of the atoms of the materials and thereby decreases the cohesive force of the atoms, and directly as the electricity in the generator and in the wires is increased, so is by sympathetic action the want of cohesion in the atoms increased. Rest does not restore cohesion once set up; it goes on until complete dissolution takes place. As a result, the greater the electric disturbance the greater the decrease in cohesion in all matter occurs and is inversely as to magnetic condition of the matter.

In regard to the application of what has been said to the introduction of electricity into our buildings, the question naturally arises, Has it any harmful effect upon the materials in the construction? We answer, if our theory is correct, Yes, for by induction in all the materials electric excitation is set up, thereby lessening the cohesive force of the atoms of the

materials, and thereby in course of time disintegration takes place. The greater the conductivity of the materials, such as iron and steel, the quicker the process, and the less the conductivity the slower the process, such as all vitrified matter.

Cannot, if these conditions are found to be, some means be found to obviate or prevent the process of disintegration? Under the ordinary conditions of applied electricity we are not aware of any arrangement to prevent it, and can only at the present time make a few suggestions.

As to buildings of the ordinary kind we have nothing to say. Iron and steel is a small factor in the construction. The system of distributing electricity throughout the same for light and power purposes from our present experience may be correct, and the wires and the insulation of the same may be perfect for this class of buildings only.

What we wish particularly to call your attention to is the new class of buildings, those constructed almost wholly of iron and steel, known as the skeleton-constructed buildings. Under the present practice of wiring buildings no difference is made in the material or methods of doing the work. In the ordinary class the induction plays a very insignificant part, while in the steel-constructed buildings it plays a very important part and should be gotten rid of if possible.

The wires as manufactured and their insulating coverings are good in a general way and may be said to be well insulated, but they are not insulated so as to prevent induction, and this is the great problem. Passing wires through metal conduits increases the induction, while the metal conduits are good against mechanical injury to the wires and to accessibility, and on the other hand are bad on account of induction. A vitrified covering seems to offer the best protection both as to non-conductibility and induction.

The columns and posts of iron or steel in the skeleton construction are almost always insulated from the ground by reason of the piers of stone, concrete or brick on which they are built. We think they should have a complete ground connection by means of heavy copper wires, also at all contact places between metals they should be perfectly clean and free from paint of an insulating character, and all isolated structural parts of the frame of steel should be connected by wiring to the main part, thereby forming a connected and continued system of the iron and steel parts, that the same way be well grounded. By this means we think the vibratory forces will at least be reduced to a minimum.

We would suggest that the wiring throughout the building should be done by one firm only, thereby avoiding confusion in the system.

We offer what we have said merely as suggestions; facts can only be brought out by experiment and practice.

This subject of electrical currents on materials in buildings is one of the greatest interest to the profession, and when well investigated will prove to be a very destructive agent, particularly on iron and steel, and may be the primary cause of many accidents that have occurred in the failure of structural pieces in the skeleton construction.

In conclusion we thank you for your attention and ask of you to investigate this subject thoroughly for yourselves, for at this time it is one of the greatest importance as an applied science to the profession; apart from that the study is exceedingly interesting.

GLASGOW INSTITUTE OF ARCHITECTS.

THE newly-elected council of this Institute held their first meeting on the 3rd inst., in the chambers of the secretary (Mr. C. J. MacLean, 115 St. Vincent Street), under the chairmanship of Mr. David Barclay, vice-president. The following office-bearers were elected, viz.:—President, Mr. John James Burnet; vice-president, Mr. David Barclay; hon. treasurer, Mr. Alex. Petrie; auditor, Mr. Campbell Douglas; secretary, Mr. C. J. MacLean. Some reference was made to the work of the past year, and it was stated that the joint occupation of the rooms at 187 Pitt Street by the Institute and the Architectural Association had continued to be of benefit to both societies. Special attention was directed to the fact that no less than nineteen new standard works on architecture had been added by purchase to the joint library. In addition to these, several gifts of valuable architectural books had been received. Reference was also made to the success of the Metalwork Exhibition which had been held during the past session; to the satisfactory results of the educational work done by the Institute during the past year, and to the exhibition of prize drawings of the Royal Institute held in the rooms last April. It was stated that a conference had now taken place between the committee of the council, that had been invited to meet with the Glasgow Corporation regarding the designs for a proposed public hall at Springburn, and that the suggestions of the Institute representatives had been freely adopted by them.

NOTES AND COMMENTS.

THE sum assigned to the Paris Exhibition of 1900 is 100,000,000 francs, the largest amount of money yet applied to such a purpose. The greater part will, of course, be expended on works of construction. The two palaces devoted to art which are in progress in the Champs-Élysées are expected to cost 21,000,000 francs. The large palace in the Champ-de-Mars will require 18,000,000 francs, the buildings on the esplanade of the Invalides 5,000,000, and the small buildings along the quays 1,600,000 francs. Bridges and other communications across the Seine, including the Pont Alexandre III., are put down for 5,000,000 francs, while the works for utilising the river will cost 3,000,000. It is estimated that mechanical and electric power will need 6,750,000. The circular railway is to cost 1,500,000 francs. Contractors will consequently obtain about 62,000,000 for architectural and engineering works. Lighting the buildings and grounds is estimated at 800,000 francs, the fountains will take 1,200,000 francs, and gardening and plantations 1,500,000 francs. The large sum of 5,500,000 is appropriated to fêtes and competitions. For the organisation of retrospective exhibitions 1,500,000 francs is reserved, and for music 1,000,000 francs. The expenses of juries and rewards to exhibitors will also amount to 1,000,000 francs, and a sum of 400,000 francs is set aside for the benefit of workmen who exhibit. So far the estimates reach 73,000,000 francs. In addition, the working expenses will cost 12,000,000 francs, and administration 8,000,000 francs. There is consequently left a sum of 7,000,000 francs as a reserve to meet contingencies. After such sums the outlay on the Great Exhibition of 1851 appears a trifle, for it amounted to about 350,000. But it produced a profit of nearly 50 per cent., and the most sanguine Frenchman dare not hope to see such a return from the mammoth show of 1900.

THERE is the usual difference in the reports of the examiners who officiated for the City and Guilds of London Institute in June. In carpentry and joinery the results are said to prove that the general education of the candidates has not kept pace with their technical education. Considerable improvement in drawing was shown, but there was a striking deficiency of candidates who were qualified to be placed in the first class. There was a high general level obtained in the practical work for the honours grade. The general character of the answers in brickwork and masonry was satisfactory, but some difficulty was found in comparing the results owing to variations in local practice due to the different classes of material. The examiner for plasterers' work said that he did not find anything in the honours grade of sufficient merit to justify him in recommending the award of a first or second prize. He was also surprised to find so little interest taken in sgraffito and other methods of decoration. In the ordinary grade several good papers were prepared. The papers on painters and decorators' work are described as an improvement on those of last year, but if considered as a whole they are weakest "where they touch upon the reasons for using the different materials employed in painting." According to the examiners for woodwork, "the practical work of the candidates taking the first year's examination may be classed as good, as a whole, while that of the candidates in the final examination can only be described as fairly good. The more general faults were inability to read working drawings, and as a consequence inaccuracy in setting out and failure to work to the measurements given." The answers in metal-work by first year students is said to be above the average, all the students obtaining a sufficient number of marks to enable them to pass, and in the final examination only two students failed.

THE subject selected for this year's Rhind lectures on archaeology, which are delivered in Edinburgh, is "The evidence for a Roman occupation of North Britain." It recalls JONATHAN OLDBUCK's "Essay upon Castrametation, with some particular Remarks upon the Vestiges of Ancient Fortifications lately discovered by the Author at the Kaim of Kinprunes," and the famous Prætorium which EDIE OCHILTREE aided in constructing. The lecturer is Dr. JAMES MACDONALD. The efforts of the Germans, who

recently sent two military officers to Scotland to trace remains of Roman fortified lines, must have had much to do with the choice of the subject. Dr. MACDONALD in his first lecture said that the evidence naturally fell under two heads—the literary or historical and the archaeological. The first literary witness to be called was the historian TACITUS, the merits as well as the defects of whose life of AGRICOLA were pointed out. In the course of his northern campaigns AGRICOLA advanced beyond the Forth and Clyde isthmus, finishing them A.D. 84 on the battlefield of Mons Grampius, the position of which is uncertain. The Emperor HADRIAN on his visit to Britain fixed the northern boundary of the province by raising a barrier along the neck of land which separates the Solway Firth from the mouth of the Tyne. The reign of his successor ANTONINUS PIUS saw the Roman army again on the upper isthmus, and the erection there about 141 or 142 of a second vallum or wall by LOLLIVS URBICUS, then Governor of Britain. With reference to the geography of CLAUDIUS PTOLEMY, the lecturer said that PTOLEMY's information regarding North Britain, though wonderfully correct, appeared to have been drawn from some unknown source or sources. A comparison of his lists of place and other names in what is now Scotland with those found in the classical writers threw doubt on the general belief that he was indebted for all of them to Roman authorities. Relief was thus obtained from the hopeless task of seeking to connect more than a very few with those to be found in the classical writers.

THE ruins of the Cour des Comptes in Paris will be replaced by a railway station, but the Union Centrale des Arts Décoratifs will look on the transformation with equanimity. At one time the Union was supposed to be endowed with the ruins, but could not gain enough fortitude to sign the documents by which possession was accepted. The members now believe the hesitation on that occasion was a sort of inspiration, for in 1900 they believe their collections will be installed in no less a domicile than the Pavillon de Marsan, which is a part of the Louvre. The adaptation of the building is to be entrusted to M. REDON, and as it is expected to cost about 1,500,000 francs, we may assume that splendour is sought. But as the Union has hitherto failed to realise the intentions of its guides, Parisians are likely to be sceptical about the probability of gaining another museum until they can see the collections in their places.

THE French Société Nationale des Beaux-Arts, as is well known, is the result of dissension in the Société des Artistes Français, and it is to be feared that the spirit which originated the Society is not entirely extinct. Another split has occurred, and there is more reason for it than appeared to impel the original founders. The Société Nationale has hitherto exhibited in the Champ-de-Mars. But as the building used has to make way for the buildings of the International exhibition, it was decided to construct new galleries in the Bois de Boulogne. The Council gave the commission to M. FORMIGÉ, the architect, who belongs to the rival Society. It is natural that all the architect members of the Société Nationale should feel aggrieved at the choice, and they at once sent in their resignation to M. PUVIS DE CHAVANNES, the president, and it has been accepted. It is now doubtful whether the building will be erected on the proposed site, as there is much opposition to the scheme in the Municipal Council, on the ground that the galleries would change the character of the Bois.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: CRYPT, HALF LENGTH.

SPANISH SYNAGOGUE, SUTHERLAND AVENUE, MAIDA HILL.

PREMIATED DESIGN FOR HOTEL METROPOLE, MORECAMBE.

THE design by Messrs. ESSEX, NICOL & GOODMAN, which we illustrate this week, obtained the second premium in the recent competition. It will be observed from the plans that the arrangement presents some new features, by which the revenue of the property would have been largely increased.



PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.



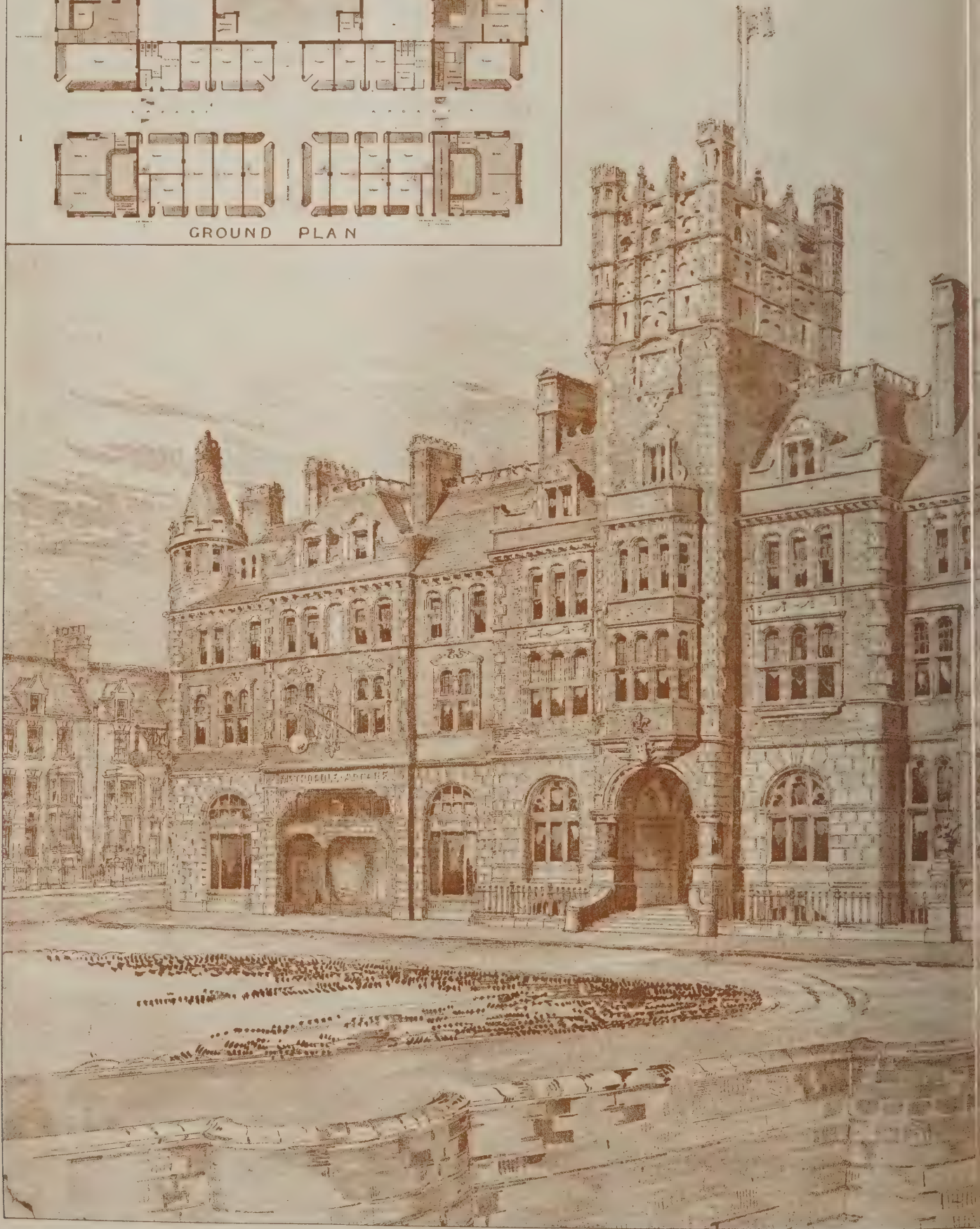
INK-PHOTO, SPRAGUE & CO 4 & 6, EAST HARDING STREET, FETTER LANE, E.C.

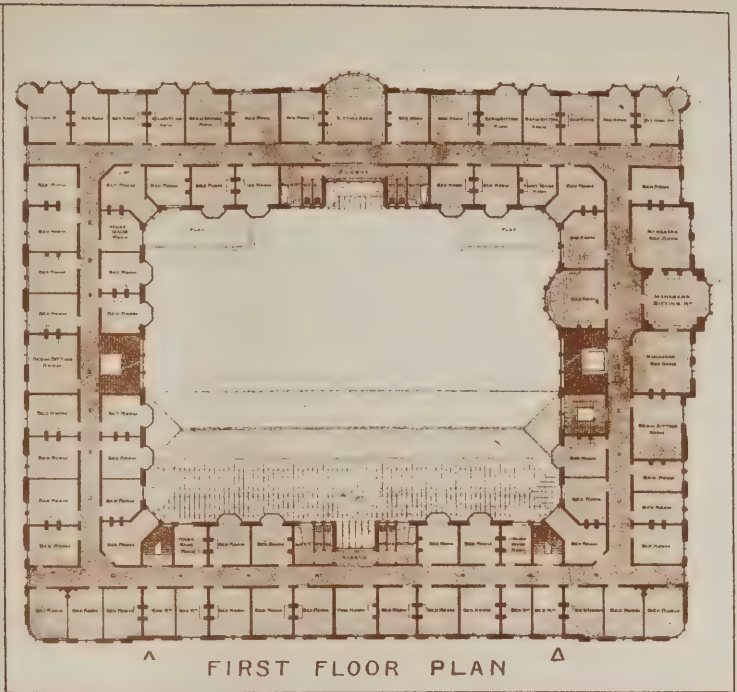


ELEVATION TO PROMENADE

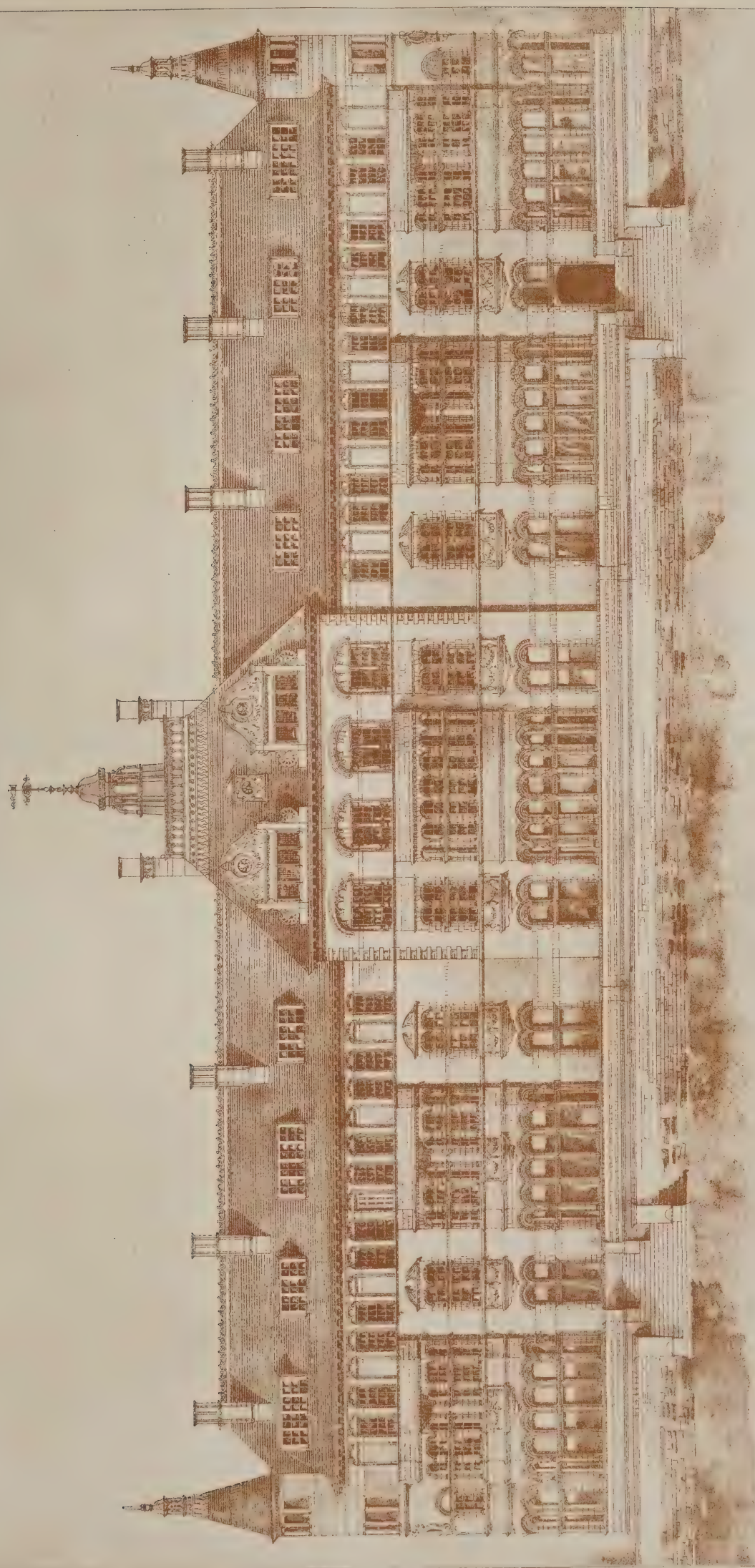


GROUND PLAN





INK- PHOTO. SPRAGUE & CO 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.



ELEVATION TO MARINE DRIVE

PREMIATED DESIGN FOR HOTEL METROPOLE, MORECAMBE.



PHOTOGRAPHED BY BEDFORD LEMERE & CO

SPANISH SYNAGOGUE, SOUTHERN LONDON

Messrs. DAVIS &



11X. PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET FETTER LANE, E.C.

ND AVENUE, MAIDA HILL.

EL. Architects

CHICHESTER CATHEDRAL.

IN the *Chichester Diocesan Gazette* is the following remarkable article on the north-west tower of the cathedral, which it will be observed proposes an innovation without furnishing the name of any architect to sanction the operations:—

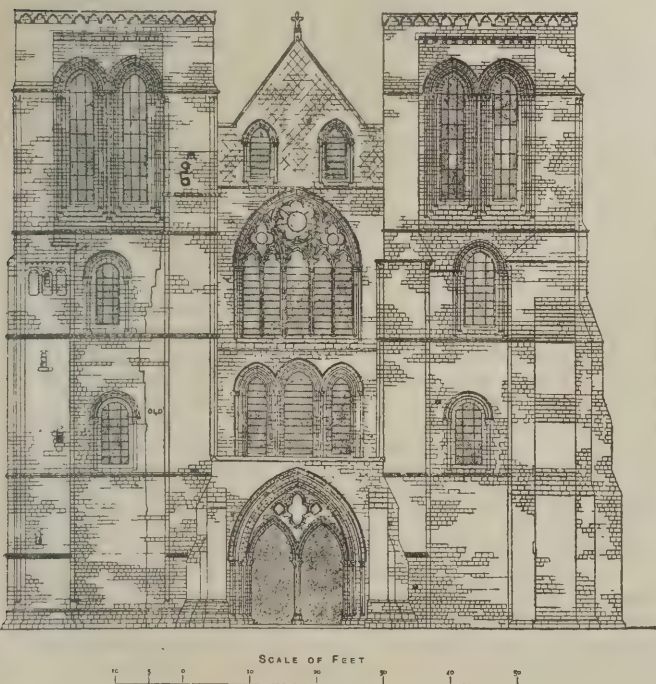
The North-West Tower of the Cathedral.

We give an illustration showing the work proposed to be done at the west front of the cathedral, for the first section of which the contract has just been signed.

In explanation of the design we would first ask our readers to look at the northern tower about 32 feet from the ground line. They will there find the word "old"; and this indicates that the old work to the south of the line indicated by an arrow will be left undisturbed; and the ancient buttress to be preserved reaches, as will be seen, to the middle of the upper window where the word "old" again occurs, 72 feet from the base. It is of the first importance to notice this detail, as the preservation of this buttress intact is essential to the safety of the vaulting of the nave. The design for the remainder of the new tower, as will be seen, does not differ greatly from that of the one still standing. Some will probably prefer the old tower and some the new; but into this controversy we do not propose to enter.

The contract now signed is for the first 46 feet; and by using the scale at the foot of the drawing it will be seen that this part of the work will extend nearly to the centre of the second window. It would obviously be undesirable to end there; but funds have already been contributed since the appeal was issued sufficient to bring the work up to the string-course above the second and below the upper windows.

The first section is by the contract to be completed within twelve months from the present date, and the further portion, to which we have just referred, may also be expected to be completed before the end of 1898. By that time it may be hoped that the remaining 2,500*l.* required will have been raised, for it will be admitted by even those with whom the tower is not in favour that, if began, it would be most unfortunate if it were left unfinished.



It should also be remembered that if the work is not carried on continuously, and the contractor has to remove his plant and bring it back again when the final order is given, this will entail a further expenditure of 250*l.*, and this would be a dead loss, for which there would be nothing to show.

It will not be disputed that the tower will render the vaulting of the nave of the cathedral more secure or that the interior of the building at its north-west corner will be greatly improved, and on these grounds alone the tower has a strong claim on the liberality of Churchmen. We hope therefore that an united effort may be made to raise the necessary funds, and now that a beginning has actually been made the work may be carried on to its completion.

The Secretary to the Society for the Protection of Ancient Buildings, in a letter to the *Times*, says:—

The committee of the Society for the Protection of Ancient Buildings desires that you will kindly give it the opportunity

of making it known to all lovers of Mediaeval architecture that a new north-western tower is to be added to Chichester Cathedral.

In calling attention to this after a contract has been entered into, we would explain that we had not contemplated the possibility of the Dean and Chapter going forward before larger funds were at their disposal.

In 1892 the late surveyor to the cathedral made a long and detailed report, stating what repairs the cathedral church needed, and among other necessary repairs was included strengthening the western bay of the nave. Shortly afterwards it was suggested that a new north-west tower should be built. But very little has appeared in the public press upon the subject except a letter signed "A Sussex Churchman," strongly opposing the scheme, which appeared in the *Times* of September 14, 1897, and elicited no answer.

Our society has now received a copy of the *Chichester Diocesan Gazette* for this month, which contains a drawing of the proposed new tower without any architect's name attached to it. It is to all intent a copy of the existing south-west tower. There is also an article stating that a contract has been entered into for building the first 46 feet of this new tower, which is about half the proposed height.

The south wall will be formed by adding to the height of the western bay of the ancient north arcade of the nave, and its eastern wall by carrying up the western wall of the north aisle of the nave.

It is the opinion of three architects from this society who visited the church recently that the ancient work could, without risk, be repaired and secured, but that to incorporate it into a useless new tower and make it carry additional weight would be unreasonable and dangerous. It must not be forgotten that the magnificent campanile stands within a few yards of the site of the proposed sham Norman tower.

The question therefore arises, Is it desirable to risk the sacrifice of the ancient work—a beautiful example of Norman architecture—for the sake of an imitative tower?

We gather from the drawing referred to that as parts are marked "old" it is suggested that the unknown architect might retain the existing work and build on to it; but it must be pointed out that a common procedure in these cases is to begin on some pretext, and then to put forth supplementary reports saying that the work proves to be so dangerous that, notwithstanding the architect's best intentions, it must be entirely rebuilt.

My committee wishes the alternate proposals for dealing with this angle of the building to be clearly understood.

On the one hand a scheme of repair which they have only just laid before the Dean and Chapter could be carried out without danger or the addition of any imitative work, and large sums of money might be saved towards the general repairs which, according to the cathedral surveyor, are so sorely needed.

On the other hand, these needful repairs may still be neglected and the money spent in a brand new and worthless tower, the attempt to erect which may lead to a large destruction of the original work of the twelfth century.

It must further be pointed out that it was the avowed scheme two or three years since to build this modern tower as a preparation for a spire, and also to add a new spire to the south tower, thus risking the safety of that tower also by the additional weight, and smothering the lovely old work in modern trivialities.

We hope that the opinion of the public will yet lead the authorities to give up their destructive scheme.

On Tuesday, at the Mayor's banquet, the Bishop of Chichester, in his speech, said he could assure the Mayor that in the restoration of the north-west tower of the cathedral the building was not going to be ill-treated, as some people suggested, that a sham tower was not going to be erected, that an unknown architect was not being employed, and that, in fact, they knew what they were about with regard to the sham Norman tower which some people seemed to think they were going to build. He might ask the question whether after the spire of the cathedral fell down, it was a sham spire they built up? Then again, when the north-west tower was built by Bishop Seffrid in the thirteenth century, was it a sham tower? Just what Bishop Seffrid did then, the men in this century were going to do now under direction of one of the most eminent architects of the day. That part of the building was not sufficiently strong at present to bear the north-west end of the cathedral, and unless something was done there would be danger through that end of the building pressing on the space. If it would add to the Mayor's contentment and repose at night, he was glad to tell him they were not going to do anything which could be characterised as an act of vandalism, but intended to restore, as far as they could, line for line and stone for stone the work which Bishop Seffrid did in the thirteenth century.

THE ARCHITECTURAL ASSOCIATION.

A MEETING of the Association was held on Friday evening last, Mr. Hampden W. Pratt, president, in the chair.

The minutes of the last meeting having been read and confirmed, the following gentlemen were elected members:—Messrs. F. G. May, E. O. Payne, W. S. Payne, E. P. Archer, A. C. Stair, C. C. Duggan, R. C. Fry, J. Haslam, C. F. Innocent, E. H. Kent, J. H. Pearson, C. E. Pease, C. M. Quilter and E. R. Taylor. Mr. N. L. Ashburner was reinstated a member of the Association.

The Chairman announced that a *conversazione* would be held at 8 P.M. on November 26 in the *Matinée Theatre*, late St. George's Hall, Langham Place, W. At 8.45 a farce by Mr. F. D. Clapham will be played, entitled "The Broken Contract, or an Egyptian Enigma."

Mr. S. Flint Clarkson read

A Proposal for Classifying Builder's Work.

The proposal is that classes, such as fair (A), good (B), best (C), shall be agreed upon. The committee, realising that I need not be lengthy, thought part of the evening would be sufficient; I hope that we may see our way to rapid progress. The proposal is made in the interest of employers, architects and contractors. It will probably be about equally serviceable to all, as long as contract amounts are settled by competition tendering. Other systems besides competition may be tried with advantage; but at present the greater part of the work is allotted in that method, which seems likely to be kept to also in the immediate future. Drawings, specifications, quantities, competitive examinations, clerks of works and other superintendence, and 5 per cent. are the recognised machinery by which an employer gets exactly what he ought to wish for, and is assured that he is to pay no more than the market price for it. We propose only a minor improvement in the regular machinery. Let us see why it is desirable.

Gradation in quality is as legitimate in builders' work as it is in anything. People know this very well, though they may grumble when gradation takes too wide a range. Proportion is not simply securing the right relation of function and apparent importance. Thorough proportion requires that materials and workmanship shall be varied judiciously by the architect in different buildings and in different parts of the same building. Blunders and wild tendering will account for anything, but there will be smiles, and notes of admiration also, for less outrageous disparities, which might often be traced to misapprehension as to the class of work required. Between work of the highest class and fair work without pretension to excellence there is a wide distance. From work ranking with the best of all time we reach by proper stages the most ordinary work, sound and serviceable, though wanting in fineness of quality and finish, and thence the déclassés may be reached, found in building as in life. Certain contractors lay themselves out for work of a certain kind, selecting workpeople and materials accordingly, and anything out of the usual course meets with less cordial welcome, and is sometimes not competed for with eagerness. The selection of such imperfectly sympathetic contractors accounts for other bad tenders, as also the selection of people who differ a good deal in the class of their business. Classification of work will not help us over all difficulties, but it may be of service in many.

Any decent names of classes will prove better than any others as soon as they are generally accepted. Naming of sub-classes would cause little trouble; every one could do it for himself, or definitions might be agreed upon from time to time, and then used in general practice. There are good precedents. Ships sort themselves into classes. "Best best best" is in general use. There are degrees of merit in timber and other trades; it is, in fact, difficult to find a trade which does not supply precedents. "The Act to facilitate the granting of certain leases" (8 & 9 Vict. c. 124) has supplied for over fifty years specimens of concise forms having much meaning. Fair, good, best; classes 1, 2, 3; ordinary, average, superior; and many other words or forms may suggest themselves, doubtless all with show of reason. There must naturally be two extremes and a mean. The worst work with which an architect could be connected would be at one end, first-rate monumental work at the other, and something better than the one and less excellent than the other between. Let us try:—

Class A.—Nothing special anywhere; the most current things in all trades.

Class B.—Something below the best; special design, adaptation, &c., in the more important parts of the building; good execution, but a keen regard for cost.

Class C.—Excellence in materials and execution; the most finished work of the time; for the best public and private buildings.

Objectors will hint that some contractors might try to supply the least costly work of its class—in fact, the worst work which the architect would pass—instead of what was intended; but the same sort of contractors do that sort of thing now. It will also be suggested that general specifications are not effective,

and that classification might be interpreted by some architects as an encouragement to undue brevity. "The building is to belong to Class B, and is to be completed in all respects accordingly," is the pithiness which is feared; but the passion for detail will keep most architects on the old lines. Old friends in new clothing always come to the front to hinder changes; but this brave self-devotion does not entitle them to special mention.

Hurried, slovenly, and generally inferior specifications (and drawings) should not increase in number, as they are serious evils; but it does not follow that anything which might prevent an inferior specification from failing hopelessly would necessarily be an evil. Hopeless failure results when everything proves adverse; but purses pleasantly full, well-occupied lives and a healthy appetite for compromise, enable many meagre specifications to keep their virtue. Sometimes they are even (in retrospect) looked upon as blessings in disguise. Some employers appreciate low tenders; the architect who has obtained so much for so little is spoken of as skilful and economical; and the contractor, if treated with judicious liberality, does not object to pose as a benefactor who works more cheaply than other people. Contractors are sometimes informed, in suitable language, that they are not to add a large sum per page of specification to their tenders because the specification seems unusually big, and so much per drawing also, because some of the detail drawings, which will form part of the contract, have been prepared in good time instead of later on. Shrewd employers have the same thing in view when they ask whether a specification of 150 pages is really necessary, and hint that explanations about moderation in quality to the builders submitting tenders should be very precise. The mention of a recognised class of work at the beginning of a specification need not lead to the omission of a word from the most thorough specification. The proposed prefatory words would, however, throw a strong light upon every detail.

There are pieces of work which fall to every one of us where time is so all-important that delay of a few days in starting the work may lead to serious reflections on the energy and resource of the architect. These are, happily, exceptional cases, though apparently on the increase, and should not influence ordinary practice conducted under better conditions. But an architect thus pressed for time, after describing all special items and throwing the rest of the work into one of the proposed classes, might feel solid ground under his feet in carrying through a contract.

The classification would frequently be in effect a record of the result of negotiations, such a record as ought to be in writing, in view of the uncertain future—for general understandings are frequently misunderstood, memory fails, or ill-will and bad blood distort it, and much else; or parties die and give no sign. A specification may call in conventional terms for the best materials and labour of their respective kinds, and describe the respective kinds, and still leave a good deal to the discretion of the architect. People who can get on with very imperfect specifications manage to struggle through with more perfect ones. Difficulties arise when a contractor tries to supply a good deal less, and an employer, at the same time, asks for a good deal more than the discreet architect considers that the contract provides. The employer who anxiously suggested explanations to the contractors as to a moderate sum and a good deal of work for it, may find that events before the contract was signed, after a busy interval, become more and more shadowy. He then prayed, as a favour, for mediocre work; now he and his friends read the specification with much care, and interpret conventional phrases literally and liberally—and there is perhaps assistance for them from legal minds. If the contract made it quite clear that work of Class A was intended, such an employer might be disposed to leave things alone. An architect selected because he has a reputation for thoroughness and work of high quality; an appeal by the employer for the mildest treatment such a reputation will permit; resolute bargaining and a low contract sum; and in the sequel a tender solicitude for the keeping up of the architect's reputation, might thus, in the future, be treated by a playwright as one of the dramatic situations possible only in the elder days.

It happens too frequently that Fate rewards a fair-minded architect with more than adequate retribution for other people's faults. The same post may bring him remonstrances both from contractors and employers. One contractor cannot find in the one-eighth scale drawings several mouldings for which he has received full sizes; another finds too many check grooves and tongues in the joinery and unlooked-for stoolings in stonework; another suggests vigorous reductions (or extras), and something nearer a freeman's liberty as to materials. Employers, on the other hand, say their say. Pleasant-minded architects have remarked that, if there is an ambient atmosphere of imperfect satisfaction while the works are in progress, there will not be very much cause for grumbling at the end. But would not things go more smoothly in many cases if everybody had the help of the proposed classification?

It should be added that no minor change will prove a panacea for all building ills. A trial of classification is only a modest little practical proposal. It could be easily introduced, and should be generally accepted in a short time.

The Chairman, opening the discussion, said the matter at first sight appeared to be a simple one, but the more they went into the question the more difficult it became. It would not always be easy to say that the building one was going to erect should belong to one special class, and even if they could the builder might raise an objection to the job if it was to be of a poor class. He did not quite see how the arrangement would work, and it was therefore more a question for builders to discuss. As architects they had always to see that the materials used were of the best kind.

Mr. W. H. Seth-Smith said that as two-thirds of the cost of the building was workmanship, this was a point on which the classification must depend. The materials were defined by it. Perhaps it would be of more value between architects and clients than between builder and client. The client could thus be told that certain expensive materials which he wished to have in the building could not be used. Although interesting, the subject seemed impracticable.

Mr. H. J. Leaning disagreed with the conclusions in the paper. He thought, too, it would have been better if the proposal had been in the form of a resolution rather than as a paper; evidence might then have been obtained as to the feelings of the profession on this important question. The subject was an undercurrent, as it were, in an architect's life. The architect felt that, do what he might, he could not always get what he wanted, and yet he could not reject everything in a contract, whereas the builder seemed to look forward to and expected some advantage, therefore architects felt some reluctance in getting the last penny from him. Restrictions and obligations were relaxed and in the case of a job not of the highest class there was still more leniency. The quality of a building was determined, apart from any questions of plan or design, (1) by the fitness and efficiency of the various parts, which were determined entirely by the specification and drawings, (2) by the quality of the materials used and the style and finish of the workmanship. There seemed to be a confusion of ideas in Mr. Clarkson's definitions. He said class B, special design, adaptations, &c. Did this mean that the builder was tendering from one-eighth scale drawings, and that he must allow for some special mouldings and architectural efforts which came in the first category, although not shown or specified, or did it mean that for the class of buildings in which such things are to be found, class B is the most suitable? Class C reverted to the second category, and read "Excellence in materials and execution." Therefore the classification could only be made to apply to the quality of materials and workmanship, and not to the drawings and details. The latter were dealt with by the quantities, and if varied would be adjusted. Mr. Clarkson did not mention quantities, but alluded to contractors tendering at so much per detail and so much per page of specification. The speculating builder was able to produce a house for so much less than the architect largely by economies effected in the first category, such as thinner inner walls, omission of roof-boarding and felt, use of zinc instead of lead, &c. This was quite distinct from any general saving in quality of materials and workmanship, and was capable of clear and easy definition by drawings and specification. Even so in the second category. The speculating builder saved by the use of inferior bricks, employment of promoted labourers to build, payment by piecework, which meant the minimum of labour everywhere; use of stale lime, foreign steel, light lead pipes, &c. But here as regarded materials the architect was able, without much trouble, to bind the builder hand and foot. The maker of his facing bricks could be specified, as also the lime and cement, quality of sand, and whence to be obtained. The classification would be very well if applied to separate articles, but when applied to a collective mass it ceased to have any meaning. If the suggestion had been one for the formation of three or four model specifications it would have been far more useful and of greater service to the average architect.

Mr. H. Lovegrove proposed a vote of thanks to Mr. Clarkson, seconded by Mr. F. J. Osborne Smith. Mr. Douglas and Mr. Max Clarke also took part in the discussion.

In returning thanks, Mr. Clarkson said many of the remarks were valuable, although they did not come as a revelation to him. He was disappointed to find that more people did not find it desirable.

Mr. H. D. Searles-Wood then read his paper on

Some New Building Materials.

The two materials that I propose to deal with to-night are asbestic and petrified. I do not pretend to have any experience in the use of either, but they having come under my notice, and striking me as of very great importance, I thought that the members of this Association might like to have their attention called to them.

Mr. Harbott, the secretary of the Asbestic Company, is here to answer any question relative to that material, and Mr. G. F. Seddon, the engineer to the Petrified Company, will explain what the possibilities of petrified are.

Asbestic comes to this country from Lower Canada, and is a name given to a by-product from the manufacture of asbestos from serpentine. After the fine white fibrous asbestos has been extracted by machinery, this sand is left, and it is the various uses to which this can be put that I propose to call your attention. Large quantities of this material have recently been used in the United States and Canada in the form of plaster.

It is claimed for plaster made with ordinary lime and asbestic (the proportion recommended being 3 cwt. of lime to 1 ton of asbestic) that it is absolutely fireproof, and being fibrous and possessing very great elasticity, there is no cracking, chipping or crumbling away, and nails driven into it enter in the same way as into a pine board, and can be easily withdrawn. This plaster is also a perfect non-conductor of heat, and rooms plastered with this substance keep an even temperature much longer than rooms plastered with other materials. It is stated that this plaster, being a perfect non-conductor of sound, has a curious effect on the room or hall where it is used, making them much easier for singing or speaking in.

For the protection of metals this substance has a great future. An elaborate series of experiments were carried out by General Povey Smith, when he found that asbestic not only protected the metal against fire, but at the same time preserved it from any corrosion.

The covering properties of the asbestic plaster are about 40 per cent. more than those of ordinary plaster, and it is 40 per cent. lighter to handle; the mixing and application are so much easier that there is a saving of 25 per cent. in actual labour.

The directions for use are given as under:—For rough coat: Slack about 3 cwt. of lime, and while liquid run it through a sieve into a box large enough to hold one ton of asbestic. Mix thoroughly, adding the requisite amount of water. After the lime and asbestic are thoroughly mixed, the plaster should be allowed to stand at least twenty-four hours before being used.

For finishing coat: Mix two parts of lime to one of asbestic finish, and gauge with plaster-of-Paris.

No hair or sand is required.

The price of the asbestic, per ton of 2,240 lbs., is 3*l*.; asbestic finish, 5*l*.

The sole agents for London are Messrs. Witty & Wyatt, of 88 Leadenhall Street, E.C., where numerous samples can be seen.

The foregoing information I have obtained from the trade circular.

The plaster takes about three weeks in setting to get thoroughly hard, and it gradually toughens after that time.

The asbestic is now being made up in slabs about $\frac{1}{4}$ inch thick; these can be worked as easily as wood, and as non-conductors of heat and cold they can be utilised for walls, ceilings, cornices, mosaics, &c., and can be used out of doors and coloured as required. In hot climates it will resist the attacks of the termite or white ant. A bungalow constructed with an outer and inner skin of this material and a confined air-space between would have a low temperature in the hottest weather. It can be moulded to any shape and fixed in position by nails, screws or cement. This material is far more suitable for buildings in new countries such as Africa or West Australia than corrugated iron or Hessian (that is, canvas and framing that does duty for walling in many of the new townships in those countries). A friend of mine who has just returned from West Australia particularly complained of the discomfort of the Hessian built hotels. Picture to yourselves an hotel constructed entirely of canvas in which there were five bars, and all of them filled with miners, whose panacea for every ill is whisky. The non-conducting property of asbestic plaster would in this building be of great value.

In America and Canada asbestic roofing is largely used; it forms a light roofing material that is absolutely incombustible, and being a non-conductor, keeps the building of an even temperature.

For hot countries glazed asbestic tiles are being made for roofing purposes.

In the manufacture of paper asbestic is being largely used. Paper 130 inches in width is being produced in one factory for building purposes. Asbestic has been recently selected by the London County Council as one of the fireproof materials that may be used in the alterations at Olympia.

Talking over the subject of this paper with Mr. Drew, when we were at Furness Abbey, I asked him what new material in his opinion was most wanted. He replied, "An artificial slate." By the kindness of the proprietors of the two materials I am describing to-night, I have made some artificial slates which I think will meet this want. The samples were only made yesterday and so are not yet fit for experiments, and the surface is smoother than I intended; but I think that they show that a good roof covering can be made in this way. They would be light, non-combustible and non-conducting. These

samples are self-coloured and are a dark grey, but they could be made to any shade of colour.

Petrifite is a white cement which appears to have the power of binding together almost any material that can be thought of. The principle of the invention was discovered in 1891, but it was not until some years later that a cheap and practical method of making petrifite was worked out and patented, and even now it is not practically on the market, though I am informed that it is hoped it may be by the 15th of this month.

During the lapse of time from its discovery a large series of exhaustive and interesting experiments have been made, and some wonderful results obtained.

Messrs. David Kirkaldy & Son have reported on the following experiments:—

	Result.
25 per cent. Portland cement and clean pit mud, petrifite and ordinary sea sand	Petrifite eleven times the strength.
Petrifite and common earth	Nearly four times the strength.
Natural Bath stone: 10 per cent. petrifite and ordinary sea sand.	Nearly twice as strong.
Natural Portland stone: 25 per cent. petrifite and ordinary sea sand	Stronger when only thirty days old.
Marble Carrara blocks: 50 per cent. dust from the same with petrifite	8 per cent. stronger.
Tensile strength: 25 per cent. Portland cement and clean pit mud, 25 per cent. petrifite and clean pit mud	Over five times as strong.
Tensile strength: 25 per cent. petrifite, sea mud and powdered chalk	Over seven times as strong.
Porosity: 25 per cent. Portland cement and clean pit mud, 25 per cent. petrifite cement and clean sea sand	Nine times less porous.

In a further report made by Messrs. Kirkaldy in May 1897, as to the effect of immersion in water, it was found to reduce the ordinary petrifite 25 per cent. in strength, as against 10 per cent. in natural Portland stone and 20 per cent. in natural Bath stone; but samples made with hydraulic petrifite, which is ordinary petrifite mixed with from 5 to 10 per cent. of inexpensive materials, the diminution in strength is slight.

As regards hardness of surface and hardness internally, there is hardly any appreciable difference between 2 to 1 Portland and 6 to 1 or 9 to 1 petrifite.

A backing of 6 to 1 petrifite, faced with 3 parts plaster of Paris to 1 of petrifite, yields a hard and smooth surface very suitable for walls.

The tests made to ascertain the relative adherence of petrifite mortar show that 6 of sand to 1 of petrifite adheres as well to the face of rough bricks as good Portland cement mortar mixed 3 to 1. In the case of bricks with rather smooth surfaces, petrifite mortar gave nearly four times the adhesive strength.

Petrifite mortar mixed 3 to 1 with smooth bricks had ten times the adhesive strength of the same proportion of Portland cement mortar. Another feature of petrifite is that it adheres to wood.

Messrs. Kirkaldy summarise their two reports by stating that petrifite has the following valuable properties:—

1. Its combinations have great crushing and tensile strength and adhesive qualities.
2. It will solidify unclean materials, the presence of which, even in small quantities, would be fatal to the setting of Portland and other cements, and bind together into useful blocks many substances which cannot now be utilised.
3. Dirty or unwashed materials can be used, which is not the case with other cements.
4. Its compounds do not sweat or effloresce, thus enabling sea sand to be used.
5. It will adhere perfectly to wood or iron.
6. As ordinarily used it solidifies slowly, so that work need not be hurried; it then dries and sets hard with great rapidity.
7. It is so powerful that a much smaller quantity suffices, considerably reducing the cost of freight and transport.
8. After setting has commenced, it can be still used again, as but little deterioration takes place, unlike other cements, when small quantities have to be mixed for immediate use.
9. It does not become inert after exposure to a damp atmosphere.
10. It may be used when quite freshly made, without fear of failure.

Messrs. Slunger & Blount's report states that petrifite, when mixed with a suitable aggregate, *e.g.*, sand, expands on setting to about the same extent as Portland cement. This expansion is not likely to be perceptible in ordinary use.

Mr. G. F. Harris, stone and quarry expert, summarises his very interesting report on petrifite sandstone, that the Petrifite Company can deliver a first-class dressed building stone in London at a price under half that of dressed natural building stone, and of a superior quality.

As a plaster, petrifite has been reported on by Mr. Marson. Its advantages over Portland cement are that it can be used

with sea sand without risk of efflorescence, and the surface is harder and closer than when Thames mud is used. Thus the labour of screening and washing the mud is saved. Petrifite grips the whole surface, both smooth and rough places, and being "fatter" than Portland cement can be laid more easily, and does better. Compared with Keene's cement, it has the advantage of being non-porous, much harder when set and can be worked much more quickly. If petrifite compounds are painted whilst wet the paint sinks into the soft material. It takes no longer to dry than ordinary paint put on woodwork. In twenty-four hours a room can be finished and ready for occupation. With colouring matter, petrifite and water is a first-class substitute for ordinary distemper. In moulding all difficulty of allowance for contraction is avoided, and for making the moulds for casting repeats petrifite mixed with plaster of Paris or sand is a perfect material.

Plaster slabs made of petrifite are much stronger than the ordinary slabs, which are going out of use, as they are not strong enough, although of great convenience.

As a cement for iron an ordinary galvanised iron building can be covered with petrifite plaster and it will adhere perfectly.

Petrifite has one special quality, viz. that the water which is added does not evaporate but enters into a chemical union with the cement. The hardening process takes a very short time; it may be delayed by cold weather, which has a bad effect on all other cements and lime, but the setting is not stopped. A wall coated with petrifite mortar will not crack if done in hot weather. Petrifite cement may be used in any climate and at any season of the year.

Used as artificial wood, petrifite mixed with sawdust has the following advantages over ordinary wood.

1. It is one-quarter the price of hard wood.
2. It does not expand or contract as natural wood does.
3. It does not split, nor crash, nor warp.
4. Uninflammable.
5. Free from the ravages of white ants.

Two tables at the works of the company, about 12 feet long by 3 feet broad, made of sawdust are faultless, although they have had rough usage for about three years.

This artificial wood can be cast into any shape or size and can be worked with the same tools as ordinary wood. It also has the advantage that it can be made in large masses, uniform in quality and strength throughout. For flooring it can be made in an unbroken sheet. It can be made as to be easily sawn at any time, or else it can be made as hard as stone and can be coloured to any shade.

Two artificial stones made of sawdust and petrifite have been tested for four years, one as a step outside the main entrance of the Landsberg factory and the other as a flagstone at the entrance gate of a flour mill at Landsberg; both of these stones show little signs of wear although they have had very hard usage.

At the offices of the Petrifite Company, 10 Walbrook, there is a very interesting collection of specimens of a great variety of waste materials, such as road sweepings, ashes and clinkers from the destructors, made into bricks by the City Commissioners of Sewers by being mixed with 25 per cent. of petrifite; and some really beautiful slabs made of waste paper pulp, and some slabs of polished plastic made of marble dust, even the sawdust and petrifite blocks being capable of taking a polish, the grains of wood being so indurated with the petrifite. The sawdust blocks also are practically incombustible. But it is not as an artificial stone, marble or wood that I bring this before you to-night, but as a new material to take up its own ground. And I think that this is the direction in which any discussion might be most usefully turned. Here are two materials of a highly plastic nature, and what is the legitimate treatment for them from an architectural point of view?

Petrifite can be run, moulded or worked by a tool; either moulded and built in the walling in blocks, or run and modelled *in situ*.

Much remains to be done to develop the proper treatment of cement work. Within its own limits, stucco is as legitimate a building material as stone or brick.

The President, Mr. Brodie, Mr. Seth-Smith, Mr. E. H. Sim and Mr. J. D. Matthews offered some remarks on the paper. In reply, Mr. G. F. Seddon recapitulated some of the results of the tests on the strength of petrifite, and which prove its utility for many purposes.

EDINBURGH ARCHITECTURAL SOCIETY

THE thirteenth meeting of the session was held on the 3rd inst., Mr. J. A. Williamson, president, in the chair. Mr. A. N. Paterson, Glasgow, delivered a lecture, entitled "Evolution of the House," which was largely illustrated by diagrams. Mr. Paterson first treated of the earliest developments of domestic dwellings, and then described, in historical order, the houses of the Greeks and Romans, the Saxon hall and Norman castle, the grange and the monastery, the early town house and the mansions of Elizabethan and Jacobean

times. He traced the special Scottish developments from the fifteenth to the seventeenth centuries, and gave a short description of the Palladian type of house, and the house of Queen Anne and the Georges.

ROMAN ORDERS OF ARCHITECTURE.*

VITRUVIUS, one of the earliest writers on this subject, enumerates five orders of architecture, and modern architects have accepted his enumeration and classification. The five orders of architecture which we shall, for the sake of the argument, call the Roman orders of architecture, are named as follows:—Tuscan, Doric, Ionic, Composite and Corinthian, not one of which, except the Composite, originated in Rome. The Tuscan was a native product of Etruria; the Doric, Ionic and the Corinthian, as their names imply, originated in Greece, while the Composite, as its name implies, was a hybrid production being composed of some of the peculiarities belonging to both the Ionic and the Corinthian orders. The Roman architects and artisans in their treatment of the Tuscan and Grecian orders made some important changes in the details, and it is to consider some of these changes that the present paper has been prepared. While we may enter quite largely into a technical explanation of the several parts of these different orders, yet we may have to refer to the architectural history of the centuries, especially that of Etruria, in order to clearly understand our subject.

Another architectural feature quite foreign to the orders of architecture when considered simply as orders, but which enters into and forms an important part in Roman architecture, and is therefore almost inseparably connected with the subject under consideration, is the use of the arch; we cannot well discuss the Roman orders of architecture without also discussing the use of the arch as practised by the ancient Romans.

The ethnographical history of art in Italy, says Fergusson, is in all its essential features similar to that of Greece, though arriving at widely different results from causes the influence of which it is easy to trace. Both are examples of Aryan development based on a Turanian civilisation which it has superseded. In Greece the traces of the earlier people are indistinct and difficult to seize. In Italy their features are drawn with a coarser hand and extend down into a more essentially historic age. It thus happens that we have no doubt as to the existence of the Etruscan people; we know very nearly who they were and cannot be mistaken as to the amount and kind of influence they exerted on the institutions and arts of the Romans.

The earliest inhabitants of Rome were an Aryan or Indo-Germanic race who established themselves in a country previously occupied by Pelasgians. Their principal neighbour on one side was Etruria, a Pelasgian nation. On the other hand was Magna Grecia, which had been colonised in very early ages by Hellenic settlers of a kindred origin. It was therefore impossible that the architecture of the Romans should not be in fact a mixture of the styles of these two peoples.

Throughout the Roman period the two styles remain distinct, and there is no great difficulty in referring almost every feature in Roman architecture to its origin. As a transition order it was only a juxtaposition of both styles, the real fusion taking place several centuries later. The Romans were borrowers of architectural forms, not inventors. From the Greeks they borrowed the rectangular peristylar temple, with its columns and horizontal architraves, though they seldom, if ever, used it in its perfect purity, the cella of the Greek temples not being sufficiently large for their purpose. The principal Etruscan temples were square in plan, and the inner half occupied by one or more cells, to the sides and back of which the portico never extended. The Roman rectangular temple is a mixture of these two; it is generally, like the Greek temples, longer than its breadth, but the colonnade never seems to have entirely surrounded the building. Sometimes it extends on the two sides as well as the front, but more generally the cella occupies the whole of the inner part, though frequently ornamented by a false peristyle of three-quarter columns attached to its walls.

Besides this the Romans borrowed from the Etruscans a circular form of temple unknown to the Greeks, but which to their tomb-building predecessors must have been not only a familiar but a favourite form. A more important characteristic which the Romans borrowed from the Etruscans was the circular arch. It was known, it is true, to the Egyptians, Assyrians and Greeks, yet none of these people, perhaps, excepting the Assyrians, seem to have used it as a feature of their ornamental architecture, but the Etruscans appear to have had a peculiar predilection for it, and from them the Romans adopted it boldly, and introduced it into almost all their build-

ings. It was not at first used in temples of Grecian form, nor even in their peristylar circular ones. In the civil buildings of Rome it was a universal feature, but was generally placed in juxtaposition with the Grecian orders. In the Coliseum, for instance, the whole construction is arched.

The exterior being composed of three orders of architecture, superimposed with columns engaged, and one order with pilasters only, the orders represented in the structure are the Doric, the Ionic and the Corinthian and the upper storey is decorated with Corinthian pilasters. In this instance, at least, the purity of the several orders is not maintained, and Mr. Fergusson characterises the whole as a "useless network of ill-designed and ill-arranged Grecian columns and entablatures." Having briefly alluded to the disposition of the Roman architects to borrow or rather appropriate the architecture of other countries to their own uses, we will now turn to the consideration of the five orders of architecture as practised by the Romans.

The first thing that strikes the student in attempting to classify the numerous examples of Roman architecture is the immense variety of purposes to which it is applied as compared with previous styles.

In Egypt architecture was applied only to palaces, temples and tombs; in Greece it was almost wholly confined to temples and theatres; in Etruria to tombs. It is in Rome that we first feel that we have not to deal with either a theocracy or a kingdom, but with a great people, who for the first time in the world's history rendered architecture subservient to their myriad wants. It thus happens that in Roman cities, in addition to temples, we find theatres and amphitheatres, baths, palaces, tombs, arches of triumph and pillars of victory, gates, bridges and aqueducts all equally objects of architectural skill. The best of these, in fact, are those which from previous neglect in other countries are here stamped with originality. These would have been noble works indeed had it not been that the Romans unsuccessfully applied to them those orders and details of architecture which were intended only to be applied to temples by other nations.

Of the first of the five orders of architecture commonly called the Tuscan, from its supposed origin in ancient Etruria, very little can now be said. The first instructions which the Romans received in the art of building came from Etruria, which probably did not occur before the time of the Tarquins, when their edifices began to be constructed on fixed principles and to receive appropriate decoration. The first Tarquin was a native of Etruria, and during his reign much was done towards the improvement of Rome; solidity of construction was a prominent feature in Etruscan architecture.

Their cities were surrounded by walls consisting of enormous blocks of stone and usually very high. Remains of them are still to be seen at Volterra, Cortona and Fiesole. In the walls of Cortona some of the stones are upwards of 22 Roman feet in length and from five to six feet high, and in them neither clamps nor cement appear to have been employed. The walls of Volterra are built after the same gigantic fashion.

It appears from the foregoing that whatever of stability characterised Roman architecture was borrowed from Etruria, and with it came what is commonly called the Tuscan order.

There are no remains of a complete Tuscan order among the relics of antiquity; the present delineations of the orders being determined by the interpretations which different architects have put upon a passage in Vitruvius in which it is described. As this description is somewhat obscure it is only natural that very different conclusions have been arrived at upon this subject; thus the celebrated Italian architects, Palladio, Vignola and Scamozzi, have each produced a different design and each claiming it to be Tuscan. Although there exists no ancient remains of a perfect Tuscan order, yet there are examples of Tuscan columns, among the more noted of which stands Trajan's column at Rome.

Vitruvius does not speak of this as a distinct order, although he alludes to the construction of Tuscan temples. He makes the column 6 diameters in height with a diminution of one-quarter of a diameter; the base and capital he makes each half a diameter in height. He decides no height for the architrave or cornice, omits the frieze, but places mutules over the architrave which are to project one-fourth of the total height of the column, including base and capital. He does not provide a pedestal.

Palladio makes the total height of the order $9\frac{1}{2}$ diameters, of which he gives 6 to the column, the base and capital each measuring half a diameter. He provides no pedestal, but places the column on a plinth whose height is equal to 1 diameter of the column.

Serlio makes the height of the architrave half a diameter, and gives an equal height to the frieze and cornice. He places the column on a pedestal which consists of a plinth and base, a die and cymatium, the whole being one-third the height of the column.

Scamozzi assigns as the height of the entablature one-fourth of the total height of the column, less half a diameter, and

* A lecture by Mr. Cyrus K. Porter, published in *Stone*.

makes his pedestal the same height. He also places a sort of triglyph in the frieze.

Normand's "Parallels," published 1819, gives the proportions as follows:—Column 7 diameters, entablature $1\frac{3}{4}$ diameter, making the order $8\frac{3}{4}$ diameters in height. Our architects usually make the order 9 diameters high, 7 of which are given to the column, of which 30 minutes are given to the base, 36 to the capital and the remainder to the shaft. The entablature is given 2 diameters, of which the architrave gets 35 minutes, the frieze 40 minutes and the cornice 45 minutes.

All of the mouldings are of a plain and substantial character, have the appearance of great solidity and strength, and the order is eminently qualified for the position usually assigned it by modern architects as the representative of strength and durability.

Aside from the character for strength which the Tuscan possesses to an eminent degree, there is but little reason for regarding it as a separate and distinct order of architecture, for indeed it is little more than a variation of the Roman Doric order, which divested of its enrichments is to all intents and purposes Tuscan. It has, however, secured recognition among architects as an order of architecture, and will no doubt in the future, as in the past, be adopted in situations where great strength and durability are required.

Adopting the usual classification, the next order for us to consider is what is usually termed the Roman Doric. This style takes a place about half-way between the Tuscan wooden posts and the noble simple order of the Greeks. It was no doubt a great improvement on the former, but for monumental purposes greatly inferior to the latter. It was, however, more manageable, and for forums or courtyards, or as a three-quarter column between arcades, it was better adapted than the severe Greek style, which, when so employed, not only loses almost all its beauty, but becomes more unassuming than the Roman.

This fact was apparently recognised, for there is not, so far as known, a single Doric temple throughout the Roman world. It would in consequence be most unfair to institute a comparison between a utilitarian prop used only in civil architecture, and an order which the most refined artists in the world spent all their ingenuity in rendering the most perfect, because it was devoted to the highest religious purposes. The addition of a base made the order much more generally useful, and its adoption brought it much more into harmony with the other two existing orders, which would appear to have been the principal object of its introduction.

The keynote of Roman architecture was the Corinthian order, and as from the necessities of their tall many-storeyed buildings the Romans were forced to use three orders together, often one above the other, it was indispensable that the three should be reduced to something like harmony. This was accordingly done, but at the expense of the Doric order, which, except when used in combination, must be confessed to have very little claim to our admiration.

The Roman Doric is even a ruder imitation of the Grecian original than the mean and tasteless deterioration of the venerated Ionic is of the graceful Athenian examples. The example of it which is considered preferable to others is the Theatre of Marcellus at Rome. In this example the columns are nearly 8 diameters in height; it consists of a shaft and capital only, a portion of the cornice having been destroyed. The height of the entablature cannot be correctly ascertained, but from analogy it may be taken with the bed-mould, part of which exists at about two-thirds of a diameter, making with the architrave and frieze an entablature of about 2 diameters in height. Of this the architrave is exactly half a diameter. Three-tenths of its depth are unequally occupied by the *tænia*, *regula* and *guttæ*, the last of which are six in number, and truncated semi-circles in form.

The rest of the surface of the architrave is plain and vertical, impeding a point within the superior diameter of the column. A fascia one-eighth its own height bands the frieze above the triglyphs; the rest of its surface is plain vertically, but horizontally it is divided into triglyphs half a diameter in width, placed over the centres of the columns. The space between the triglyphs is equal to the height of the frieze without its band and fascia, making in effect perfectly square metopes. All that can be traced of the cornice is a small *cyma-reversa*, immediately over the frieze, and a square member with dentils on it. In the example published the cornice is completed from that of the Doric of the Coliseum.

The temple at Cora presents a singular example of the Doric order, evidently the result of an examination of some Greek examples, but moulded to the Roman proportions and to Roman tastes. The columns are enormously tall, but the shafts are partly fluted and partly chamfered for fluting, like the Greek. The capital is ridiculously shallow, but the abacus is plain and the echinus somewhat of the Hellenic form. The entablature is very little more than a diameter and a third in height, and the architrave of it even shallower than the capital; but the frieze and the cornice are tolerably well proportioned, though the triglyphs are meagre, narrow slips and

the latter is covered by a deep widely projecting cavetto, that would be injurious to even a better composition. Instead of the regular mutules with *guttæ*, the whole of the plancere is studded with the latter; but like the Greek, the triglyph over the angular column extends to the angle of the architrave, which does not appear to have been the practice of the Romans; yet the reason for this does not appear to have been understood, for the external intercolumniations are the same as the others.

As far as we have the means of judging the Romans made the *antæ* of their Doric similar to their columns, only that they were of course square instead of round, though, indeed, an attached column appears to have been preferred.

It is, however, to be remembered that of these two orders the Doric and Ionic of the Roman school ought hardly to be considered as belonging to the architecture of the Romans. They are merely coarse and vulgar adaptations of the Greek originals, of which we now possess records of the finest examples.

(To be continued.)

GLASGOW ARCHITECTURAL ASSOCIATION.

THE usual monthly meeting was held in the rooms, 187 Pitt Street, on Tuesday, 2nd inst., at 8 o'clock P.M., when Mr. James Salmon delivered a paper entitled "Design in Construction." The lecturer divided his paper into two parts—the æsthetic and the practical. In the former he satirised in a racy fashion the common practice of everyday architectural design, where features of old work were selected and strung together either inflated or shrunk down as the case required. The same principle was acted upon in construction, the stock forms of the text-books being reproduced without any consideration of their applicability or attempt at fulfilling the same requirements by independent thought. This state of things Mr. Salmon blamed as the recognised system of stuffing students with dull rule of thumb details instead of endeavouring to direct their minds to grasp the general principles and think independently.

This was demonstrated by showing in drawings and on the blackboard modes other than those generally in use for carrying out a few of the commonest pieces of construction.

DEVON AND EXETER ARCHITECTURAL SOCIETY.

AT the Athenæum, Exeter, the Rev. Oswald J. Reichel, M.A., B.C.L., F.S.A., delivered on Thursday last an exceedingly interesting and able lecture on "Churches and Chapels: their Differences in Objects and Construction." He stated that there is, and always has been, in the use of the term church, applied to buildings, a broad distinction between public churches and private churches. Public churches, or ancient minsters, were those provided with a staff of clergy capable of handing down tradition and exercising public discipline; private churches were praying places for the living or memorial places for the dead. Intermediate between public and private churches were parochial churches, the majority of which were originally private chapels, but were constituted in a certain sense public churches and endowed as such between the eleventh and thirteenth centuries in this country. The chair was taken by the Rev. W. Hope.

TESSERÆ.

Charlatans in Painting.

IN the early years of the present century artists and amateurs were astonished by the proposals of a very young lady, scarce in her teens, for unveiling her Venetian secret and teaching Royal Academicians to colour, at five guineas a head, by which young and old, learned and unlearned, were equally captivated, and Malone was so dazzled as to lament most piteously the great misfortune of Reynolds in being cut off before he had had an opportunity of purchasing her inestimable and cheaply proffered favours. At another time still more wonderful recipes were announced for making Titians and Correggios by a chemical process, or for producing fine pictures without the help of science, genius, taste or industry. Oil, water, varnish, gums, wool, worsted, pokers, chalk, charcoal and brick-dust have had their several advocates. All which might well be laughed at if it had not the mischievous effect of diverting the student's attention from the end to the means, disposing him to the worst kind of idleness and filling his head with a farrago as pernicious and nugatory as the pursuit of the philosopher's stone or the perpetual motion, and as little connected with the real essence of painting as writing with red or

black ink, or upon crown, double elephant or foolscap paper is with that of poetry. Sir Joshua Reynolds seems particularly anxious to guard the young practitioner against such vain pretenders and wonder-mongers, by exposing the danger of his fancying the art to consist of anything like the tricks of a juggler, or imagining that excellence is to be obtained any otherwise than by incessant practice and well-directed study. "Labour," says he, quoting from the ancients, "is the price which the gods have set upon everything truly valuable."

John Glover.

Glover's style of execution in water-colours was hailed as a novelty in art; it excited more astonishment the more it was seen, it was not one of those nine-day wonders that was followed with the blind furor of fashion and soon forgot, it rather excited increasing curiosity and a desire of imitation in a thousand admirers. The apparently careless scramblings of black and grey, the absence of defined forms, the vapourish appearance of the clouds, the mountains and the distances, the distinct unbroken patches of yellow, orange, green, red, brown, &c., which upon close inspection made up the foreground, middle-grounds and off-skip in his compositions, seemed entirely to preclude all necessity for the labour of previous study. Correctness of drawing, carefulness of shadowing, precision of handling, blending of colouring—requisites which had appeared so indispensable heretofore as components of a picture—were by many supposed no longer necessary. The amateur, enraptured at so happy a discovery, no less than that of painting the most beautiful effects of romantic scenery without labour, reflection, science, and with nought but mere dexterity of hand and washing and sponging, set about making huge drawings in the style of Glover; but the secret remained with the inventor of the style and reams of atlas and elephant were used but to prove, although in a different acceptation, the axiom of the sagacious poet, that it requires an extensive knowledge of art indeed to know how "discreetly to blot." The ingenuity of the inventor and the extraordinary dexterity with which he has applied his discovery in depicting the vast range of landscape and marine scenery could not fail to excite the wonder and applause of all admirers of the elegant discoveries of human genius; for certainly the effects produced by Glover in this style of execution, as exhibited in some of his happiest compositions, when viewed at the distance of a few feet from the subject, are as nearly allied to reality as any scenes that ever were imitated by graphic means, by the most accomplished hand, directed by the most observant eye. Who that had not seen this eminent artist at his easel could have supposed the possibility of twisting camel-hair brushes together, spreading them to the apparent destruction of their utility, yet dipping them in jet black Indian ink, or grey, or such tints as suited his purpose, and by a rapid and seemingly adventitious scrambling over the surface of his design, prepare the light and elegant forms of the birch or willow, the graceful sweepings of the branches of trees of larger growth and the vast masses of woods and groves, sparkling in their various foliage, in all the brightness of a morning sun, or under the influence of the solemn repose of evening shade? Yet his works display these effects with exquisite feeling and with a vigour and spirit that no style of art could excel.

Egyptian Obelisks.

It is said by Ammianus Marcellinus "that an obelisk is a very rough stone in the shape of a kind of landmark or boundary stone, rising with a small inclination on all sides to a great height; and in order that it may imitate a solar ray by a gradual diminution of its bulk, it terminates in a prolongation of four faces united in a sharp point. It is very carefully smoothed." Most ancient writers consider obelisks as emblematic of the sun's rays. An obelisk is properly a single block of stone cut into a quadrilateral form, the sides of which diminish gradually but almost imperceptibly from the base to the top of the shaft, but do not terminate in an apex upon the top, which is crowned by a small pyramid, consisting of four sides terminating in a point. The Egyptian obelisks were mostly made of the red granite of Syene, from which place they were carried to the different parts of Egypt. They were generally placed in pairs at the entrance to a temple, and occasionally in the interior, and were usually covered with hieroglyphical inscriptions. Obelisks were first transported to Rome under Augustus, who caused one to be erected in the Circus and another in the Campus Martius. The former was restored in 1589, and is called at present the Flaminian obelisk. Its whole height is about 116 feet, and without the base about 78 feet. The obelisk in the Campus Martius was set up by Augustus as a sundial. It stands at present on the Monte Citorio, where it was placed in 1792. Its whole height is about 110 feet, and without the base about 71 feet. Another obelisk was brought to Rome by Caligula. It stands at present in front of St. Peter's, where it was placed in 1586, and its whole height is about 132 feet, and without the base and modern ornaments at top about 83 feet. But the largest

obelisk at Rome is that which was originally transported from Heliopolis to Alexandria by Constantine, and conveyed to Rome by his son Constantius, who placed it in the Circus Maximus. Its present position is before the north portico of the Lateran church, where it was placed in 1588. Its whole height is about 149 feet, and without the base about 105 feet. There are eight other obelisks at Rome besides those mentioned above, but none of them are of historical importance. There are also obelisks in various other places, as at Constantinople, Arles, Florence, Catania in Sicily, &c., some of which are works of Egyptian art and others only imitations.

The Facial Angle.

It is reasonable to suppose that in endeavouring to form a standard or a canon of proportion for the human figure, the Greeks began with the head, its form, its position, the manner in which it is attached to the trunk. They found that man alone carries his head erect, and that thence he derives a face and a countenance. Of all the brute creation, what is called the head is only an extremity of the horizontal body, whose under parts are shoved forward to seek food or seize prey; front and upper part are driven back, are shortened, and, in more than one genus, hardly perceivable. The more the brute is raised before and erects the neck, the more it gains variety of aspect; still it hangs forward, an appendix to the trunk. It cannot be properly said to have a head; the etymology of the word implies an erect position. A head, strictly speaking, is the prerogative of a man, formed beneath a skull which rounds the forehead and determines the face. The more the front recedes and inclines to the horizontal, so much the nearer a head approaches the form of a brute; the more it inclines to the perpendicular, the more it gains of man. This observation has been demonstrated in the least fallible manner by Camper, the anatomist, who, by a contrivance equally ingenious and unequivocal, appears to have ascertained not only the difference of the *facial* in animals, but that which discriminates nations. Placing the skull or head to be measured into a kind of sash or frame, pierced at equidistant intervals to admit the plummet and horizontal and perpendicular threads, he draws a straight line from the aperture of the ear to the under part of the nose, and another from the utmost projection of the frontal bone to the most prominent part of the upper jaw. The whole is divided into ninety, or even one hundred degrees, from the actual maximum and minimum of nature to those of art. Birds describe the smallest angles, which widen in proportion as the animal approaches the human form; the heads of apes reach from forty-two to fifty degrees, which last approaches man. The negro and Kalmuck reach seventy, the European eighty, the ancient Roman artists ascended to ninety-five, the Greeks raised the ideal from ninety to one hundred degrees. What goes beyond this line becomes portentous; the head appears misshapen, and assumes the appearance of a hydrocephalus. It is the limit set by art and established on this physical principle, that the more the form of the head reclines to the horizontal or overshoots the given perpendicular, the more the maxillæ are protruded or the more the front, the less it retains of the true human form, and degenerates into brute or monster.

Early Fresco Painting.

Fresco was probably little employed by the ancients for works of imitative art, but it appears to have been the ordinary method of simply colouring walls, especially amongst the Romans. The walls were divided into compartments or panels which were termed *abaci*; the composition of the stucco and the method of preparing the walls for painting is described by Vitruvius. They first covered the wall with a layer of ordinary plaster, over which, when dry, were successively added three other layers of a finer quality mixed with sand; above these were placed still three layers of a composition of chalk and marble dust, the upper one being laid on before the under one was quite dry, and each succeeding coat being of a finer quality than the preceding. By this process the different layers were so bound together that the whole mass formed one solid and beautiful slab resembling marble, and was capable of being detached from the wall and transported in a wooden frame to any distance. Vitruvius remarks that the composition of the ancient Greek walls was so excellent that persons were in the habit of cutting away slabs from them and converting them into tables, which had a very beautiful appearance. This colouring *al fresco*, in which the colours were mixed simply in water, as the term implies, was applied when the composition was still wet, and on that account was limited to certain colours, for no colours except earths can be employed in this way that have not already stood the test of fire. Pliny mentions those colours which could not be so employed: *purpurissum*, *indicum*, *caeruleum*, *melinum*, *auripigmentum*, *appianum* and *cerussa*; instead of *melinum* they used *parætonium*, a white from Egypt, which was by the Romans considered the best of whites. The care and skill required to execute a work in fresco and the tedious and expensive process of pre-

paring the walls, must have effectually excluded it from ordinary places. The majority of the walls in Pompeii are in common distemper, but those of the better houses, not only in Pompeii but in Rome and elsewhere, especially those which constitute the grounds of pictures, are in fresco. All the pictures, however, are apparently in distemper of a superior kind, or a guazzo, but the impasto is of various qualities; in some it appears to have the consistency of oil-painting without its defects, in others it is very inferior. Ordinary distemper, that is, with glue or size, is probably the most ancient species of painting; many of the ancient ornamental friezes and painted bassi-relievi in the temples and ruins in Egypt, and also many of the most ancient remains in Italy are painted in this manner. The fresco walls when painted were covered with an encaustic varnish, both to heighten the colours and to preserve them from the injurious effects of the sun or the weather. Vitruvius (vii. 9) describes the process as a Greek practice, which they termed kausis. When the wall was coloured and dry, Punic wax, melted and tempered with a little oil, was rubbed over it with a hard brush (*seta*); this was made smooth and even by applying a *cauterium*, or an iron pan, filled with live coals over the surface, as near to it as was just necessary to melt the wax: it was then rubbed with a candle (wax?) and a clean linen cloth, in the way that naked marble statues were done. The Abate Requeno supposes that the candles were used as a species of delicate cauterium, simply to keep the wax that it might receive a polish from the friction of the linen, but it is a subject that presents considerable difficulty. This kind of varnish was applied apparently to plain walls only, for Sir Humphry Davy discovered no remains whatever, in the Baths of Titus, of an encaustic varnish upon paintings, although the plain walls had generally traces of a red varnish of this description. Neither Pliny nor Vitruvius mention anything about colour, but this is evidently a most simple addition and does not interfere at all either with the principle or the application of the varnish. Paintings may have possibly been executed upon the walls after they were thus varnished.

Latin Inscriptions.

Inscriptions have been found in great numbers at Rome, in Italy, and all the countries which were once subject to Rome. They embraced the same variety of subjects as the inscriptions in Greece, and if only the principal ones had been preserved the early constitution of Rome would be comparatively clear, whereas now there are a vast number of questions to which we can only answer by conjectures. Some of the Roman writers have, it is true, made use of the most important inscriptions for the early history of Rome, but not by any means to that extent which we could wish. The attention of Roman writers does not appear to have been so much directed towards this source of information as that of the Greeks, for there is no instance of any collection having ever been made by the Romans themselves, although some of them were of the very highest importance in a constitutional as well as legal point of view. At the time of the overthrow of the Western Empire thousands of inscriptions must have perished, especially those engraved on metal, as the material attracted the avarice of the barbarians. But a great number was still preserved in Rome and Italy, which attracted the attention of the learned even in the early part of the Middle Ages. The oldest collection of inscriptions found at Rome exists in the monastery of Einsiedeln; it is written on parchment, and probably belongs to the tenth or eleventh century. It is printed in Mabillon. At the time of the revival of letters the attention of the learned was chiefly directed towards the authors of antiquity, but ever since the fifteenth century attention has also been bestowed upon inscriptions. The man who first formed the idea of a comprehensive collection was Cyriacus of Ancona, who undertook his travels at the request and the expense of Pope Nicolas I.

Association of Ideas.

The architect should guard against the dreamy pleasure excited by what is termed the association of ideas. From this blinding cause have arisen many of the poorest imitations of the day. However much the artist may delight in identifying himself with the past, he should remember that it is past, that the public, that the world has its tastes, habits, ideas, character and life as strongly shown and determined as they ever were in the history of mankind, and that he cannot drive us back to a period which, however it may suit his individual taste, is not our period. In vain shall a modern Deucalion cast stones behind him to vivify the dead; they will remain lifeless. In vain did revolutionary France adopt the names and dress of dead Rome; in vain does this or that man call us back to the days of a Henry or Charlemagne. We will adopt the garments of no past age or nation, as we are we are. Whereof are we ashamed? Is it of the spirit of the age? It should be our glory and thanksgiving to have lived in this time, a time our fathers longed to see, for which our great men wrote and fought and suffered, and of which our architecture should be a type.

What do such men seek in the past which the present may not afford them? But they turn their backs on us as dull and matter-of-fact, and carry that strength to the imitation of the past which should be used for the development of the present. The future historian will judge of these aright when he shall say that those who might have evoked the true spirit of art in these times wasted their knowledge in the raising of lifeless ghosts.

Correggio.

The soft transitions from the convex to the concave line, which connect grandeur with lightness, form the style of Correggio; but using their coalition without balance, merely to obtain a breadth of demi-tint and uninterrupted tones of harmony, he became, from excess of roundness, oftener heavy than light and frequently incorrect. It is not easy, from the unaccountable obscurity in which his life is involved, to ascertain whether he saw the antique in sufficient degrees of quantity or beauty; but he certainly must have been familiar with modelling and the helps of sculpture, to plan with such boldness and conquer with such ease the unparalleled difficulties of his foreshortenings. His grace is oftener beholden to convenience of place than elegance of line. The most appropriate, the most elegant attitudes were adopted, rejected, perhaps sacrificed to the most awkward ones, in compliance with his imperious principle: parts vanished, were absorbed or emerged in obedience to it. The *Danae*, of which we have seen duplicates, the head excepted, he seems to have painted from an antique female torso. But ideal beauty of face, if ever he conceived, he never has expressed; his beauty is equally remote from the idea of the *Venus*, the *Niobe* and the best forms of nature. The *Magdalen*, in the picture of San Girolamo at Parma, is beholden for the charms of her face to chiaroscuro, and that incomparable hue and suavity of bloom which scarcely permit us to discover the defects of forms not much above the vulgar. But that he sometimes reached the sublime, by hiding the limits of his figures in the bland medium which inwraps them, his *Jupiter* and *Io* proves.

Origin of Museums.

Museum was the name given to an institution founded by Ptolemy Philadelphus about B.C. 280 for the promotion of learning and the support of learned men. We learn from Strabo that the museum formed part of the palace, and that it contained cloisters or porticoes, a public theatre or lecture-room, and a large hall where the learned men dined together. The museum was supported by a common fund, supplied apparently from the public treasury, and the whole institution was under the superintendence of a priest who was appointed by the king, and after Egypt became a province of the Roman Empire by the Caesar. Botanical and zoological gardens appear to have been attached to the museum. The Emperor Claudius added another museum to this institution.

GENERAL.

The Queen has been pleased to bestow one of the silver Jubilee medals upon Professor G. Aitchison, A.R.A., president of the Royal Institute of British Architects.

Mr. Henry Ives Cobb, of Chicago, Ill., has been selected as architect of the new Pennsylvania State Capitol, the building which is the subject of litigation by competing architects. Mr. Cobb designed the Fisheries building at the World's Fair, and is at present supervising architect of the United States Post Office building at Chicago.

Mr. Astor's Huge Table, made of a single sectional piece cut out of a Californian redwood tree, has arrived at Cliveden. The slab weighs 13½ tons and stands 16 feet high.

The Marble Bust of Faraday, which has been presented by the Royal Institution to the Michael Faraday School, Faraday Street, Walworth, which is to be publicly unveiled next Monday afternoon, is a copy of the one which was executed by Matthew Noble. It will be placed in the hall of the boys' department upon a pedestal of red granite, which has been provided by the London School Board. To this a plate will be affixed, recording the fact that the distinguished philosopher and chemist was born in the parish of Newington.

Mr. James Paton delivered a lecture in Glasgow this week on Cimabue and Giotto.

The Sanitary Institute.—A sessional meeting of the Institute will be held at the Parkes Museum on Wednesday, November 17, at 8 P.M., when a discussion will take place on "The Pollution of Water-supplies by Encampments of Hop-pickers, Casual Workers, Tramps, &c." To be opened by Professor W. H. Corfield, M.A., M.D. (Oxon), F.R.C.P., in reference to the dangers of pollution of municipal water supplies, and by Miss M. A. Chreiman in reference to the sanitary control of hop-pickers, &c. The chair will be taken by Sir Douglas Galton, K.C.B., D.C.L., LL.D., F.R.S. (vice-president and chairman of Council).

The Architect.

THE WEEK.

THE death of the late JOHN BAGNOLD BURGESS, R.A., who died on Sunday last in his sixty-seventh year, will cause a blank in the exhibitions of the Royal Academy. His Spanish pictures were not only agreeable to visitors, but they were the only representatives of the influence of the revolution which was attempted by WILKIE when he courageously demonstrated that a painter could survive a journey to Spain and come back improved. Some time elapsed before JOHN PHILLIP and W. HURLSTONE attempted a venture so far, and they were succeeded by EDWIN LONG and BURGESS. HURLSTONE was too faithful to Suffolk Street to gain patronage from the public, for there is little hope for anyone who exhibits in the unlucky rooms. PHILLIP was, however, spoiled by favour, and his pictures were valued at sums that bore no relation to their value. LONG's best work will be found in his Spanish scenes, although to the dealers it was more advantageous to recommend to him the production of classic and Biblical scenes. BURGESS was therefore left to exhaust Spanish subjects if he could. He gave refined versions of Spanish life, and there is not much of the fierce passion of the South suggested in his works. BURGESS was gentle in disposition, and he liked to paint scenes in which he could take part, with enjoyment to himself. His colouring was bright, but there was not much daring in any of his attempts, and his figures were carefully modelled although without much force. In any international collection one of his works would be immediately recognised as English. Mr. BURGESS was the son of a landscape painter. He was taught in the Academy schools, and he was so imbued with the *genius loci* that the works of VELASQUEZ and MURILLO were powerless to work any effect upon him. In Spain he found subjects rather than style.

THE trees introduced along suburban roads are gratifying to all eyes in summer, but they cost more than is paid for planting and watching them. In his report to the Willesden District Council, Mr. O. CLAUDE ROBSON, the engineer and surveyor, says "that unless discretion be used in the choice of streets for the trees, trouble will be encountered in the future as the trees mature. Already the paving and adjoining forecourt walls in the Willesden district are showing signs of disturbance by the roots of some of the older trees, and when it be remembered that upwards of 3,000 young trees have been planted since 1890, it will be gathered that there is a possibility of considerable damage occurring in future years where these trees are planted in narrow streets with the houses closely abutting upon the pathway. Very careful consideration should therefore be given to the numerous applications made for trees to be planted, and no sanction accorded except in roadways of sufficient width to ensure immunity from damage to property, and light and air to the road and the trees themselves. In Acton Lane, near to Bramshill Road, owing to alleged nuisance, it was found necessary to remove some of the old trees that were left in the path when the road was widened. Objection was made by some persons as to their removal, but, says Mr. ROBSON, the complaints received from others as to the insanitary nuisance created by them justified the Council in their removal." As trees are sometimes planted as if they could compensate for jerry-built houses on new estates, the experience in Willesden is enough to excite alarm.

ALTHOUGH a Republic, there is no country in Europe where the rights of nobles and of all who are possessed of the privilege to emblazon arms are more strongly asserted than in France. The Baronets' Committee would flourish there. A French judge should now be master of all the delicate points which are concerned in family history and the etiquette of rank. A case which lately was heard in the high courts, and which is of moment to aristocrats, is worth mentioning, for it recalls a writer who cared little for rank, and who laughed boisterously when an antiquary made out

that he was descended from a Border baron. Every reader of CARLYLE's "French Revolution" will remember the fun which he made out of the Supreme Usher of LOUIS XVI., the Marquis de BRÉZÉ, who is "doomed to survive long ages with tremulant white rod." That functionary was tortured by the Third Estate; it is his living successor's fate to have a nephew no less unbearable through his irreverence. The name of M. ROBERT DE DREUX sounds well, but he insists that by law and heraldry he is entitled to call himself, and to be known by all the world, as Vicomte de BRÉZÉ. The Marquis HENRI-SIMON-CHARLES DE DREUX-BRÉZÉ invoked the interference of the Tribunal of Mans, on the ground that the title Vicomte was comprised in that of Marquis, and, as IAGO says, to filch one's good name was to leave the owner poor indeed. The tribunal decided in favour of the uncle, but the Court of Appeal at Angers reversed the judgment. It was laid down that all the descendants of the family were entitled to call themselves DREUX-BRÉZÉ if they wished, and as to the assumption of Vicomte, that was an affair for the Chancellerie, and not for a law court. The case was brought before the Cour de Cassation in Paris, but the Marquis failed to establish his right to any monopoly of name or title. The Supreme Usher thought he could keep out the tide of democracy by opening only one of the folding doors to the commons, while *noblesse* and clergy passed through two. It would now appear there is nothing can stem the host of DE BRÉZÉS who will invade the family circle as a consequence of the judgment. But how is the archæology of the family and the individual to be followed by experts if Courts will be as lax as those of Angers and Paris? Archæologists at least will side with the Marquis.

THE question, "What is a work of art?" has had to be considered by the Board of United States General Appraisers, who have to determine under what class importations on which duties are to be levied should be assessed. It arose out of two classes of sculpture, viz. a reredos for a church, which came from France, and a case of reproductions of the *Venus of Milos*, *The Graces*, *Diana*, &c. One of the witnesses who described the reredos as an "architectural production," and therefore not a work of art, qualified his statement by saying: "It is difficult to define a work of art or to say just where a work of art begins or where it ends. In a large sense everything, from the commonest design on a cheap cast-iron stove to the frieze of the Parthenon, can be included in the expression 'works of art.' There is no established line; every man draws his own line. The nearest I can get to it is that what is generally understood by artists as a work of art purely is only such as is produced by a professional artist in his own studio, either wholly by himself or with such assistance as he needs, under his own immediate direction and supervision. According to my understanding, this is distinctly and only what was meant by the words 'works of art' in the phraseology of the law." The board, however, asserted that to the general appraisers works of art were the inspired creations of the artist, rather than the works of artisans or mechanics; and were of marble, stone or other solid substance, such as were the professional productions of statuary or sculptors only, and not products of the factory or workshop. Congress, when it allowed free admission to works of art, was endeavouring to aid in the education of the country and the encouragement of fine art, but that object would be defeated if the productions of foreign industrial establishments, although executed from the designs of American artists, were placed in the same class. The altar and reredos was therefore charged with duty, as "dressed Caen stone." As to the copies of antique statues, they were treated as mechanical productions. According to the board, the only statutory that is entitled to classification under the law as the professional productions of a statuary or sculptor is such as is produced by a professional sculptor in his own studio, either by his own hand or by others under his direction and supervision, and to which he has himself given the final chasing or finishing touches and expression, including (1) the original, from his own design or conception; (2) a replica or copy thereof; or (3) an artistic copy of a work, a masterpiece, of another artist. The object must be his professional production.

ROBERT BURTON AS A SANITARIAN.

IT has been the fate of the author of the "Anatomy of Melancholy" to have only extremists for his critics. To CHARLES LAMB he was a scholar to be worshipped; to HENRY HALLAM he was a mere sweeper of miscellaneous literature from the Bodleian Library. Dr. JOHNSON declared that BURTON'S book was the only one that ever took him out of bed two hours sooner than he wished to rise, while BYRON said that a man would be more improved by it than by any twenty other works. Modern readers are likely to be found in the camps of the idolaters or of the snarlers, therefore it is almost impossible to obtain an impartial judgment on ROBERT BURTON. We have no wish to undertake the task of assessing his merits and defects; we simply are eager to consider him from a standpoint which hitherto was overlooked, but it will be necessary in the first place to say a few words about the man.

ROBERT BURTON is supposed to have been born in 1576-77 at Lindley, in Leicestershire, where his father owned an estate. He was taught in the school of Sutton Coldfield, a town which he described as having an excellent air and as full of all manner of pleasures. In 1593 he entered Brasenose College, Oxford. In 1599 he was elected student at Christ Church. He obtained in 1614 the degree of Bachelor of Divinity, and two years afterwards he became vicar of St. Thomas's, Oxford. The rectory of Segrave was presented to him in 1630. He seems to have given attention to his ministerial duties, but he passed as much time as possible in Oxford. He died in 1640, and a legend arose that he had poisoned himself in order to prove the accuracy of his astrological calculations concerning himself. A year before his death he described himself as being in perfect health of body and mind.

There is so much kinship between all branches of old world learning that many a scholar in Oxford, if he had taken up the subject of melancholy, would have gathered round it a great many of the allusions which are found in BURTON'S book, but he does not always write as a scholar alone. It is reasonable to conclude that he investigated the symptoms of melancholy and sought out the remedies for it, because he himself was a sufferer. It is the personal element which is one of the causes for the survival of BURTON'S treatise while so many contemporary works have gone their way to oblivion. Melancholy, indeed, seems to have been a common disease of the period. Men had anticipated that the new philosophy was to bring new happiness, but just as we find that machinery, evolutionary philosophy, strange forms of government and various other influences all foster pessimism, so in the sixteenth and seventeenth centuries men discovered that there was very little difference between them and their unscientific forefathers. In BURTON'S book we have combined the ancient and the modern. He admired "our noble and learned Lord VERULAM," and describes him as "an honourable man;" he was familiar with all his writings, but he was not prepared to sacrifice to them the books of the ancient worthies with all their *idola*.

The combination of past and present is curiously exemplified in that part of his book which relates to what would now be called sanitary surroundings. BACON loved comfort, and he wished to have houses which were safe to live in as well as agreeable to the sight. BURTON says more about the advantages of suitable air, water and site than BACON or any of the physicists of that time, but he could not forget that hundreds of his predecessors also treated of the subject. He tells us that having come into the ample fields of air, he intends to "freely expatiate and exercise myself for my recreation, awhile rove, wander round about the world, mount aloft to those ethereal orbs and celestial spheres, and so descend to my former elements again." No long-winged hawk could be more discursive. But his efforts were nothing if compared with his aspirations. BURTON regrets that he cannot observe all the secret operations of nature. The sea is a mystery to him; he cannot discover the cause why the ocean, which in one place was supposed to be always pacific, should become in our British seas most violent, whilst elsewhere it is vehement, irregular and diverse. He wishes also to have a glimpse of the great American city of El Dorado, where the highways are as much beaten as those between Madrid and Valladolid. "I

would find out," he says, "with TRAJAN the fountains of Danubius, of Ganges, Oxus, see those Egyptian pyramids, Trajan's Bridge, Grotta de Sibylla, Lucullus's Fishponds, the Temple of Nidrose, &c." We find, in fact, in BURTON that craving for an exact knowledge of nature which no books could then afford, and it cannot be said that all the questions he raised about the earth and its inhabitants are yet solved.

However high he might soar, BURTON was compelled to come back to melancholy. He could not understand why there should be varieties of air, but he maintained that "as the air is, so are the inhabitants, dull, heavy, witty, subtle, neat, cleanly, clownish, sick and sound," and he asks, Is not a great difference manifested between Surrey, Sussex and Romney Marsh, the wolds in Lincolnshire and the fens? The conclusion he draws is that whoever loves his health, if his ability will give him leave, "must often shift places and make choice of such as are wholesome, pleasant and convenient. There is nothing better than change of air in this malady, and generally for health to wander up and down, as those Tartari Zamolhenses that live in hordes, and take opportunity of times, places, seasons." Then, in support of his theory, he goes back to the practice of the ancient Persians and the Romans and the great Turk, who, from what BURTON says, was always a very wise man. It was probably with philosophic envy he recorded that "the Bishop of EXETER had fourteen several houses all furnished in times past." In England, however, he maintained that the best soil commonly yields the worst air, and that a dry, sandy plot is fittest to build upon. BURTON recognised that every man could not select a favourable site, and then he recommends the reader to make the best of what is attainable. He writes:—

If the air of the dwelling may not be altered, yet there is much in choice of such a dwelling or room, in opportune opening and shutting of windows, excluding foreign air and winds and walking abroad at convenient times. Crato, a German, commends east and south site (disallowing cold air and northern winds in this case, rainy weather and misty days), free from putrefaction, fens, bogs and muck hills. If the air be such, open no windows, come not abroad. Montanus will have his patient not to stir at all if the wind be big or tempestuous, as most part in March it is with us; or in cloudy, lowering, dark days as in November, which we commonly call the black month; or stormy, let the wind stand how it will, and he must not open a casement in bad weather or in a boisterous season; he especially forbids us to open windows to a south wind. The best site for chamber windows in my judgment are north, east, south, and which is the worst, the west. Levinus Lemnius attributes so much to air and rectifying of wind and windows that he holds it alone sufficient to make a man sick or well, to alter body and mind. "A clear air cheers up the spirits, exhilarates the mind; a thick, black, misty, tempestuous air contracts and overthrows." Great heed is therefore to be taken at what times we walk, how we place our windows, lights and houses, how we let in or exclude this ambient air. The Egyptians, to avoid immoderate heat, make their windows on the top of the house like chimneys, with two tunnels to draw a through air. In Spain they commonly make great opposite windows without glass, still shutting those which are next to the sun. So likewise in Turkey and Italy (Venice excepted, which brags of her stately glazed palaces), they use paper windows to like purpose, and lie *sub dio* on the top of their flat-roofed houses, so sleeping under the canopy of heaven. In some parts of Italy they have windmills to draw a cooling air out of hollow caves, and disperse the same through all the chambers of their palaces to refresh them; as at Custozza, the house of Cesareo Trento, a gentleman of Vicenza, and elsewhere. Many excellent means are invented to correct nature by art.

If the accounts of foreign practice in building seem to be ridiculous, we must remember there were no facilities for travel in the seventeenth century, and an Oxford scholar, although possessed of two livings, was compelled to accept the wonders of the world abroad on hearsay. What is said makes it plain that BURTON and his contemporaries were not entirely satisfied with the houses of the time and that a remedy was considered desirable. He expressed what was probably the earliest appeal on behalf of sanitation.

BURTON was too much of an Englishman not to love comfort, and however light might be the air which was about his dwelling, it would not satisfy him unless there was also a cheerful interior. He tells us that "of colours it is good to behold green, red, yellow and white, and by all

means to have light enough, with windows in the day, wax candles in the night, neat chambers, good fires in winter, merry companions; for though melancholy persons love to be dark and alone, yet darkness is a great increaser of the humour." It is remarkable to find the influence of colours so well expressed at that time. According to FEUCHTERLEBEN, colours produce an effect on the mind. The positive colours, red, yellow, &c., are supposed to be exciting, blue and negative colours charm it. BURTON's patient, who was probably himself, was, we suppose, too calm, and therefore blue is omitted from his list. This is not the only case in which he appears to anticipate the experience of our time.

Merry companions in those days were not renowned for water-drinking, and BURTON acknowledges his love of good wine. The necessity of a supply of pure water was, however, recognised by him, and he recommended those whom Melancholy marked for her own to make use of it. In one passage he says:—

Pure, thin, light water by all means use, of good smell and taste, like to the air in sight, such as is soon hot, soon cold, and which Hippocrates so much approves, if at least it may be had. Rain water is purest, so that it fall not down in great drops, and be used forthwith, for it quickly putrefies. Next to it fountain water that riseth in the east and runneth eastward, from a quick-running spring, from flinty, chalky, gravelly grounds; and the longer a river runneth, it is commonly the purest, though many springs do yield the best water at their fountains. The waters in hotter countries, as in Turkey, Persia, India, within the tropics, are frequently purer than ours in the North, more subtle, thin and lighter (as our merchants observe) by four ounces in a pound, and some of them, as Choaspes in Persia, preferred by the Persian kings before wine itself. Many rivers, I deny not, are muddy still, white, thick, like those in China, Nile in Egypt, Tiber at Rome; but after they be settled two or three days, delicate and clear, very commodious, useful and good. Many make use of deep wells, as of old in the Holy Land, lakes, cisterns. When they cannot be better provided they fetch it in carts or gondolas, as in Venice, or on camels' backs, as at Cairo in Egypt; Radzivilius observed 8,000 camels daily there employed about that business. Some keep it in trunks [tanks, bowlees,* or reservoirs] as in the East Indies, made four square with descending steps, and it is not amiss; for I would not have any one so nice as that Grecian Calis, sister to Nicephorus, Emperor of Constantinople, and married to Dominicus Silvius, Duke of Venice, that out of incredible wantonness would use no vulgar water; but she died of so fulsome a disease that no water could wash her clean. Plato would not have a traveller lodge in a city that is not governed by laws or hath not a quick stream running by it; one corrupts the mind, the other the body. But this is more than needs, too much curiosity is naught; in time of necessity any water is allowed. Howsoever, pure water is best, and as Pindar holds, is better than gold; an especial ornament it is, and very commodious to a city (according to Vegetius), when fresh springs are included within the walls, as at Corinth, in the midst of the town almost, where was a goodly mount full of fresh-water springs; "if nature afford them not they must be had by art."

Living in Oxford, where he was surrounded by fine Mediæval buildings, BURTON could hardly help concluding there was no better way to express appreciation of anything than through the medium of the best architecture that was procurable. Repeatedly we find him referring to buildings as if they were incontrovertible evidence of the truth of his conclusions; consequently he seems to exult in the ancient efforts to bring water as if it were a treasure to cities, although at the same time he is not oblivious of the advantage of the unassuming works of his contemporaries MYDDELTON and NICHOLSON. We give one extract:—

It is a wonder to read of those stupend aqueducts, and infinite cost hath been bestowed in Rome of old, Constantinople, Carthage, Alexandria, and such populous cities to convey good and wholesome waters. That aqueduct of Claudius was most eminent, fetched upon arches 15 miles, every arch 109 feet high. They had fourteen such other aqueducts,

besides lakes and cisterns, 700, as I take it; every house had private pipes and channels to serve them for their use. Peter Gillins, in his accurate description of Constantinople, speaks of an old cistern which he went down to see, 336 feet long, 180 feet broad, built of marble, covered over with arch-work, and sustained by 336 pillars, 12 feet asunder and in eleven rows, to contain sweet water. Infinite cost in channels and cisterns, from the Nile to Alexandria, hath been formerly bestowed, to the admiration of these times; their cisterns so curiously cemented and composed that a beholder would take them to be all of one stone; when the foundation is laid and cistern made their house is half built. That Segovian aqueduct in Spain is much wondered at in these days, upon three rows of pillars, one above another, conveying sweet water to every house; but each city almost is full of such aqueducts. Among the rest he is eternally to be commended that brought that new stream to the north side of London at his own charge; and Mr. Otho Nicholson, founder of our waterworks and elegant conduit in Oxford. So much all times attributed to this element, to be conveniently provided of it. Although Galen hath taken exceptions at such waters which run through leaden pipes, for that unctuous ceruse which causeth dysenteries and fluxes, yet, as Alsarius Crucius of Genoa well answers, it is opposite the common experience. If that were true, most of our Italian cities, Montpelier in France, with infinite others, would find this inconvenience, but there is no such matter.

BURTON does not forget that in many ways a gentleman who is melancholy can aid in overcoming the disease by ministering to himself. He advises the patient to oversee his workmen, but in our days that would be likely to make the soundest man become melancholy. To build, plot, project, to make models, &c., are also suggested as remedies. About the influence of works of art upon the mind that is diseased, BURTON has no doubt. He has the golden-lipped bishop on his side, for, as he says, "CHRYSOSTOM thinketh if any man be sickly, troubled in mind, or that cannot sleep for grief, and shall but stand over against one of PHIDIAS's images, he will forget all care or whatsoever else may molest him in an instant." And yet the Parthenon room in the British Museum is deserted. The paintings of MICHEL ANGELO, RAPHAEL, FRANCESCO FRANCESCA, and some by Italian and Dutch masters are recommended. It is true BURTON admits pictures are mere toys, and can afford only temporary pleasure; but who, he asks, will not be moved with them for the present? Everything is fleeting, even pleasure that is intellectual; but "Carpe diem" should be the melancholy man's motto. BURTON recalls how, "when ACHILLES was tormented and sad for the loss of his dear friend PATROCLUS, his mother, THETIS, brought him a most elaborate and curious buckler made by VULCAN, on which were engraven sun, moon, stars, planets, sea, land, men fighting, running, riding, women scolding, hills, dales, towns, castles, brooks, rivers, trees, &c., with many pretty landscapes and perspective pieces, with sight of which he was infinitely delighted, and much eased of his grief." Art is a consoler, as the Olympians knew, and BURTON was wise in treating it as a medicament. Modern sanitarians would do well to follow his example, for a sewage policy is not enough to make us all happy.

ELECTRIC TRAMWAYS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Concluded from page 308.)

The Central Station (continued).

THE use of accumulators is extending rapidly in connection with the generating plant for electric tramway stations. The accumulators are usually placed at the distant portions of the line, and serve the double purpose of keeping the pressure fairly constant and of taking up any great fluctuations in the demand. The reasons that an accumulator will take up a load, or supply a high current without allowing a large change of pressure, are that the back pressure of an accumulator is practically independent of the charging current, and that the internal resistance of the accumulator is extremely low. It follows, then, that if the right number of cells are employed for the back pressure

* In Fergusson's *Indian and Eastern Architecture* it is said:—"To persons not familiar with the East such an architectural object as a bowlee may seem a strange perversion of ingenuity, but the grateful coolness of all subterranean apartments, especially when accompanied by water, and the quiet gloom of these recesses, fully compensate, in the eyes of the Hindoo, for the more attractive magnificence of the ghâts. Consequently the descending flights have often been made more elaborate and expensive pieces of architecture than any of the buildings above ground found in the vicinity."

to equal the pressure on the mains, the amount of current taken into the cell if the pressure is raised a little, or given out if the line pressure is lowered a little, will be large, and will depend chiefly upon the internal resistance. By this means the pressure on the mains can be kept nearly constant, while a great portion of the starting strain is taken by the accumulators instead of the engine. In cases where the pressure is liable to vary much, but not quickly, an automatic regulator is often used, which inserts or cuts out (accumulator) cells, so keeping the voltage constant.

There are instances where the motive-power employed in a tramway station is gas, one example being at Lausanne, where two 130 horse-power gas-engines are run for about eighteen hours per day, producer gas being employed. The amount of fuel used is about $4\frac{1}{2}$ lbs. per car mile. There have not up to the present been many of these plants in operation, and it is difficult to say whether they will be a success ultimately or not; but in general the gas-engine is not suited for heavy overloading. However, a large battery is generally used, and this takes up the fluctuations and acts as a reserve.

The question of the steam-engine has been gone into fully because there is an impression that ponderous slow-speed engines are necessary, with belt drives.

Combination Schemes.

It is evident even with electric traction that the engines are not always fully loaded, and there is spare power at some part of the twenty-four hours which might be used for some other purpose. The view that power can be spared is, however, as a rule an incorrect one, because the idle hours are often used for charging batteries of accumulators situated at distant portions of the line. It is therefore fairly evident that as the load factor, *i.e.* ratio of power delivered to the possible power that could be delivered if full load had been on the whole time, is about 50 per cent., and that the engines work very economically at this load, but there is very little economy to be gained as far as the tramway is concerned by combining it with any other work or works. Now, although this is the case, there are other concerns which are only too pleased to obtain the tramway load in order to improve their load factor. The most important case is that of an electric-lighting station, and this is the one I will consider most fully.

The condition of running in an electric-lighting station is that if the load were only on steadily throughout the twenty-four hours the maximum plant used in the evening even in winter would usually supply ten times the amount of electricity that is supplied. It is this fact which has held back electric lighting for many years. It has been shown that electricity can be supplied for tramways at 1*d.* per unit with a profit, but there is no electric-light station which can do this, on an average, for electric lighting at less than $4\frac{1}{2}$ *d.* per unit.

The reason for this difference has already been mentioned in previous articles. It is because the mains and plant are only used for an hour or so out of the twenty-four. The capital outlay is large in proportion to the number of units generated, and it is found that the fixed charges are, as a rule, about three-fourths of the whole cost. That is to say, this 75 per cent. has to be expended whether many or few units are sold, and only about one-fourth of the expense is proportional to the number of units sold.

Thus it may easily be seen that, for a given plant running three hours a day at say half the maximum load, the cost is much more per unit generated than if running for fourteen or fifteen hours a day at half the maximum load.

The case of the lighting works is this:—We have enough plant here to supply the tramways, it is standing idle all day, why not use it? The tramway undertaking will be saved from the necessity of erecting works, and we can supply the electricity as cheaply from our station as it can be supplied from a traction station. There is a great deal to be said for a combination scheme from this point of view, although it must be remembered that the saving to the tramway undertaking will be little, but the lighting undertaking will have a great help. In these days of municipal enterprise there are many towns in which the tramways and electric lighting are both under the control of the municipality, and the question becomes one of importance.

There have been several combinations proposed to carry out this idea. One in which separate engines, dynamos and mains are used for each, the boilers being the same for both; another in which the engines and dynamos are the same for both, as well as the boilers. It is not seriously proposed to use the same mains in any case, as the variations in pressure allowable for tramway working would be quite impossible for lighting. In considering the advantages to be derived by such combinations it will be well to note under what heads a saving may be effected. In the first place there is a possibility of a reduction in capital outlay for buildings, even if the combined plant takes up the same floor space as the two separate ones; there is a saving in management expenses; the boilers run more economically and fewer stokers are required; the engine-drivers will not be increased in proportion to the size of the plant, and no doubt the engines will be worked at more economical loads. In the case where the same boilers only are used, all the savings in the above list may be effected, and there is no doubt that a portion of the boilers can be dispensed with, effecting a further saving in buildings and maintenance, cleaning, &c. When the same engines and dynamos are used for the two purposes, assuming that this is feasible, there is no doubt that the load in the evening will hardly be as large as the sum of the heaviest tramway and lighting loads; but even if it is, there will still be a means of keeping this load off the dynamos by the use of accumulators for the short-time, and the engines can be run with little expansion, which no doubt is hardly economical, but this will have no appreciable effect upon the costs, as the duration of the heaviest load is so short. With regard to this overlapping of the loads on a combined central station, the trams are as a rule far heavier loaded in the summer than in the winter. This is especially the case at seaside resorts, where the tramway is often closed altogether in the winter. This fact materially reduces the heaviest load on the station, and as a result the plant needed is less for the combined than for the two separate stations. A further point worthy of consideration is that of reserve plant. It is evident that with a combined station less reserve is required in all departments than the sum of the reserves required in separate stations, as the reserve must be at least equal to the largest unit of plant, either boiler, engine or dynamo.

The saving in administrative expenses will be considerable. The departments would be:—(1) Production; (2) distribution; (3) tramway; (4) private and public supply, instead of Nos. 1, 2, 4 for lighting, 1, 2, 3 for tramway, or four departments in the place of six.

A point of great interest is the price which should be charged for electricity for the tramways. This price should be the cost of producing the tramway units plus a percentage for profit; not, as is often suggested, a price which will enable the lighting current to be reduced to the same cost per unit as the traction units. This policy is, as Mr. WRIGHT (borough electrical engineer, Brighton) has lately very justly pointed out, robbing Peter to pay Paul. It is unfair that the passengers on the tramcars should help to pay the loss on the lighting units, and provide the people who do not ride on the cars with light at less than cost price. It is found that a load of the same nature as the tramway load can be supplied as a rule at an average of 1*d.* per unit, and the lighting load at about $4\frac{1}{2}$ *d.* per unit (average), with the same percentage of profit. This 1*d.* per unit is as cheap as or cheaper than it could be supplied from a separate plant.

By adopting a fair system of charging the economy of the combination will be felt in both departments in proportion as they deserve it.

A case which lends itself most particularly to economical working is where the accumulator traction system is combined with the lighting. Here the load can be spread far more evenly over the 24 hours, the starting loads and disturbance of pressure are taken away, and great economy is experienced. The plant which supplies the lighting will also supply the accumulators, and there need be no overlapping of the loads if a little care is exercised. Further, the same mains will apply for the tramway sub-stations as for the lighting. There is no need to further discuss this, as the advantage is obvious. The interest on capital of the tramway plant is saved, the engines can be kept fully

loaded for the whole 24 hours, or nearly so, no extra staff is required at the generating station and no extra management. The only expense to the tramway is the cost of attendance while the cells are charging, and the ordinary running costs.

There are some difficulties in the way of using the same plant for lighting and traction where one of the conductors is connected to earth in the latter. In a three-wire, or in fact any system of distribution to consumers, the difference of pressure between earth and any terminal must not exceed 250 volts. A tramway cannot be economically run at a lower pressure than 450 volts, and as one conductor is earthed, the pressure between the other conductor and earth is 450 volts. If the two sets of mains are connected to the same dynamo, the 250 volts pressure limit for lighting is exceeded. The interconnection must be made by means of motor transformers with the motor winding on the lighting pressure and the dynamo one on the tramway, or *vice versa*. The former is used when the lighting load will be greater than the tramway, and the latter in the reverse case. It is worth mentioning that in most towns the probable demand for light and motors for power will greatly exceed that for tramways in the near future.

The Dover tramways, which have just been opened, is the only example in actual operation in this country of a combined electric-lighting and tramway plant. The Corporation own the tramways, which are nearly $4\frac{1}{2}$ miles long, and the power is obtained from the local electric-lighting company, although from a separate plant. The price paid is 3d. per unit, subject to a sliding scale as the consumption of energy increases. This price is, no doubt, high, and could in many cases be reduced. The plant provided by the company for the tramway consists of two 200 horse-power Babcock & Wilcox boilers (water tube), two horizontal tandem compound-engines, coupled direct to four pole railway generators of 100 kilowatt capacity each. The pressure is 500 volts, continuous. Thus the only difference so far is that the plant is under one management and one staff instead of a separate one. However, there is a connection between the lighting circuit and the tramway circuit in the shape of a motor generator, one machine being an alternator at 2,500 volts and the other a continuous current machine at 500 volts. The alternator takes power from the lighting circuit for handling the cars in the sheds when the tramway plant is shut down, and gives power for the lighting circuit from the tramway generators in the daytime, or can do this when required.

It will be seen that there is no great step in combined plants in this case, especially as the Corporation uses and a company generates the electricity. However, there are far more important works in course of construction or decided upon at Plymouth, Portsmouth, Glasgow, Manchester and other towns, and in a year or so one may expect to see some real combination plants at work here.

There is a case of a combined plant in Europe which has been running for some time with great success, and to which sufficient attention has not been given by engineers in this country. It is the Rome light and power station. There is at Tivoli (18 miles from Rome) very large water-power; the quantity of water usually available is 800 gallons per second, and the fall is about 160 feet. The power obtained is about 2,000 horse-power, and the plant at present consists of six 250-kilowatt alternators, running at 170 revolutions per minute, direct coupled to turbines. There are also three direct coupled exciters of 27 kilowatts each for these alternators. Ordinary alternating currents at a pressure of from 6,000 to 7,000 volts, at a low periodicity of 43 cycles per second, are transmitted to Porta Pia, in Rome (18 miles off). The pressure in Rome is 4,100 volts. The loss of energy in the line is about 18 per cent. at full load, the extra loss of pressure at Rome being due to the impedance (resistance to alternating current in which no power is wasted) of the line, and does not necessarily mean waste power.

The power is transmitted by four bare copper wires on poles, each having a sectional area of 15 square inch, and supported by oil insulators of special design.

At the Porta Pia sub-station the current is divided into three circuits; one for lighting and motors, one for arc lighting, and the other for tramways. The current for the tramways is supplied at 400 volts alternating, by means of

transformers, continuous currents being provided by rotary transformers, which convert this alternating current at 400 volts to a continuous current at 566 volts pressure. The alternating current is supplied to a rotary armature, and is converted to a continuous current at a higher pressure. When more than 60 kilowatts are required, the power is supplied by motor generators, the motor being a synchronous alternating one (that is, one running in step, in this case with the generator at Tivoli), driving a 550 volt continuous current dynamo. These rotary transformers and motor generators are paralleled on their continuous current side to a large battery of Tudor accumulators, consisting of 304 cells with 1,864 ampere hours' capacity; 108 of these cells are used for regulation purposes. An automatic regulator is provided, which keeps the voltage on the tramway circuit constant. An arrangement is also used for keeping the load on the generators constant, notwithstanding the variations of the power demanded, the battery taking up the fluctuations.

The current for public lighting is provided at 500, 1,000, 1,500 and 2,000 volts for separate circuits, according to the number of arc lamps in series on each circuit. The current is kept constant at 14 amperes and is alternating, being supplied by transformers. The private lighting and power is also alternating, the high-tension distributors being at 2,000 volts, and there are several sub-stations supplying nearly 50 miles of low-tension mains at 100 volts.

It will thus be seen that this station is fulfilling the real duties of a combined plant, all the power required for lighting (public and private), power and tramways being supplied from one plant. I believe that another fall is being utilised and 2,000 horse-power more will be available next year.

I have endeavoured in these short articles to give a fair and unbiassed account of what is occurring, and a review of what has been done in electric traction in this country, and I also trust that the examples of the Paris, Hanover and Rome tramways will show what can be, and probably what might be, done in this country if our conservatism gives place to enterprise.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A MEETING of the Institute of Architects was held on Monday evening last, Professor Aitchison, A.R.A., president, in the chair.

The minutes of the last meeting were taken as read.

A paper was read by Mr. Arthur S. Flower, M.A., F.S.A., entitled

Notes on Renaissance Architecture in Malta

(with special reference to the Buildings of the Order of St. John).

In introducing his subject Mr. Flower alluded to the ignorance and erroneous impressions that generally prevailed about Malta among English people, and to the scant regard paid the island by architectural writers. Small as it was, Malta teemed with huge buildings, the product of centuries of activity and ambition. Churches, palaces, castles possessed a character, unusual, striking, commanding, which rendered it, to the lecturer's mind, one of the most interesting spots in Europe. The island was composed of one solid block of almost perfect building stone. A house might be built from the stone cut out from its own cellars, a fortress from its own moats, a cathedral from its crypts. Stone was the one material employed in buildings, and was extensively used for other and many novel purposes. It might be described as a mason's earthly paradise. The inhabitants seemed to be born masons.

No higher testimony could be given to the beauty and interest of the buildings than the enthusiasm they aroused in the cultivated and critical mind of the late Dean Church, who thought Valletta one of the most striking specimens of architecture he had ever seen. Some interesting passages from the Dean's published letters were quoted, describing his first view of the capital and of the general aspect of the interior of the island.

Besides the ethnological and geological conditions, the politico-religious influence exerted by the Knights Hospitallers had been an important factor in the architectural development of Malta. Its architectural splendours were chiefly due to them. Relics of former rulers—the so-called Phœnician remains, fragments of Greek and Roman structures, various beautiful evidences of Sicilian-Norman influence—the lecturer passed over as belonging more to archæology than to architecture. His purpose was to deal with buildings still in regular

occupation and use, belonging to a style most conveniently to be described as Renaissance. These were erected during the palmy days of the Knights of St. John, from the beginning of the sixteenth to the beginning of the eighteenth century. In explanation of how they came into existence, the lecturer briefly sketched the history of the Order, and the various vicissitudes it passed through from its foundation in Jerusalem early in the eleventh century till its establishment in Malta. This happened in 1530, when the Maltese islands, at that time little better than desolate barren rocks, were ceded to the Hospitallers in perpetual sovereignty. Fear of Turkish attacks compelled them to devote their first years to necessary fortifications, nearly all to be reconstructed after the great siege of 1565, when the Turks were finally repulsed. The creation of Valletta, a city which suddenly sprang up on a very unpromising site, the summit of a bare ridge never before occupied by buildings, was entirely the work of the Grand Master, La Vallette. The first stone was laid on March 28, 1566, at the corner of St. John's bastion, La Vallette taking up his abode in a wooden hut on the spot, and directing operations day by day until his death in 1568. So far nothing had been built except the fortifications. Del Monte, the new Grand Master, took equally great interest in the work, beginning his term by announcing that no one should enjoy his favour who did not promote the building of the city. At La Vallette's death nothing had been built except the outer fortifications. The first house, interesting as forming the nucleus of the present Governor's palace, was built by the Grand Master's nephew, Eustachio del Monte, in the centre of the high ground, on the place occupied by one of the Turkish batteries during the siege. In the next year, 1570, the designing of all the works, military, civil, and even ecclesiastical, was entrusted to Gerolamo Cassar, a very remarkable man, whom a document, dated May 18, 1581, refers to as the "ordinary architect and engineer of the Order . . . from 1565 to 1581." The most notable of his numerous works was the church of St. John. In 1571 the headquarters of the Order were transferred to the unfinished city.

The lecturer then gave a detailed description, illustrated by photographs and plans, of St. John's, Valletta, and other buildings and architectural features of note in the capital and other parts of Malta. The great hospital was one of the first buildings erected by the Knights, and always maintained on a lavish scale of expenditure. It is noteworthy as containing the largest ward ever built, 503 feet long by 35 feet wide, with a shorter ward of the same width leading out of it. Valletta alone has twenty-four churches, many of them splendid buildings, besides chapels and oratories. Outside Valletta, in the suburbs and country villages, there are a still greater number of churches, together with almost innumerable detached chapels. The latter are mostly octagonal on plan and domed, with very graceful outlines. The larger village churches have usually two western towers and a dome at the crossing. The dimensions of two typical churches, both dating from the seventeenth century, are:—Zeitun Church, 153 feet long and 111 feet broad, including side chapels, with a nave 31 feet wide; and Zebbug Church, 165 feet by 122 feet, and 32 feet across the nave. There were some forty of these village churches in Malta.

Città Vecchia, or Notabile, originally the chief city of the island, and the scene of St. Paul's sojourn there, is exceedingly picturesque both within and without. Its Romanesque cathedral was destroyed by an earthquake about 200 years ago, and the present building, of which Lorenzo Gafà, a Maltese, was architect, was consecrated in 1702. Noteworthy are the nave, upwards of 36 feet in span; the carved and inlaid choir-stalls, said to date from 1480, and the gorgeous altar ornaments and other treasures which escaped pillage by the French in 1798.

The lecturer concluded with a few remarks on the characteristics of the architecture of the Order. The term Palladian applied to it by Dean Church he considered inappropriate; it was more akin to early Florentine Renaissance than to any other type. With regard to a suggestion made by Mr. Ingress Bell that Spanish architects in great numbers were employed upon the city of Valletta, which he thought accounted for the similarity between the architecture of Malta and that of some of the Belgian towns, the lecturer, while granting the resemblance to Spanish work, particularly in ornament, could find no evidence of the actual presence of Spanish architects. Whencesoever derived, all the buildings of what might be called the heroic age of the Order were exclusively Doric.

The majority of the photographs represented mostly the later buildings.

Colonel Prendergast, who had been asked by the President to start the discussion, said he reluctantly did so, as he had come there to learn and not to teach, but he asked permission to propose a vote of thanks to Mr. Flower for his very interesting paper. Malta was a closed book, and few visitors could say anything of its architectural attractions. The stone of the island was a material which could be manipulated like chalk. It lent itself to decoration, for although of a soft kind, it hardened with

exposure. The points that were brought before them seemed of much interest, because it was unique to find such buildings erected, so to speak, for an employer. The Grand Masters of St. John were very great personages, and had large funds at their disposal which they seemed to have used freely. What appeared strange to him was the criticism regarding the church of St. John. The building abounded in faults. It was almost as flat a roofed building as they could have; it was out of proportion, and the height was altogether wrong, but the whole had been so nicely dealt with that one could not help liking it. These buildings were all built for a specific purpose. This church was merely a series of chapels; each country had its chapel. Among the drawings on the screens there would be found a picture of the church of St. Elmo, which was in the Early Renaissance style. The architect had made each of his chapels have more or less some resemblance to those in St. John's, although it was perhaps obscure. This was before the time when one wished to represent a Roman palace or something of that kind, and he had got rid of the heavier appearance.

The Rev. W. K. R. Bedford seconded the vote, and said he was able to appreciate the remarks in the paper. The roof of the church of St. John was original. A great deal of the church was modern. Most of the ornamentation dated from 1660 or thereabouts, but the roof was part of the original plan. The chapel of St. Elmo, which dated from about 1530, was Gothic rather than Renaissance in style, and was the first building of the Knights of St. John in the island. He called their attention to a very important fact subsequent to the first erection in Valletta. Though the Italian influence prevailed to a great extent, there were two great waves of reconstruction which passed over the fortunes of the Order. The Spanish Grand Master, and a great many of them that came in succession, brought in Spanish ways, and they found Spanish balconies fixed to Italian buildings. Another century had elapsed, and the last Grand Master erected buildings more in the French style, and so they had very nondescript styles, one with another, expressing in artistic degree the buildings in order. He was sorry to say that there was unhappily another way of construction in these days. As the leases of old buildings fell in, the jerry-builder turned them into flats.

Colonel Hogg, late commanding engineer, said the local authorities endeavoured to make new buildings for the Government harmonise with the older work, but as the drawings were prepared in London the task was not easy.

Mr. T. Blashill asked whether the late Eliot Warburton's statement about the deserted condition of Città Vecchia still remained true.

The Rev. Mr. Bedford, in reply, said the statement was exaggerated.

After a few words from the President, Mr. Flower briefly returned thanks.

PERTH ARCHITECTURAL ASSOCIATION.

THE inaugural meeting of the Perth Architectural Association was held in the lecture-room of the Perthshire Society of Natural Science on the 9th inst., when Mr. Hippolyte J. Blanc, R.S.A., Edinburgh, delivered an opening address. There was a good attendance, and Mr. G. P. K. Young, the president, occupied the chair. Among those present were practising architects of the city.

The Chairman, before introducing Mr. Blanc, explained the objects of the Society. It had been formed entirely by the young men in the district who were interested and actively engaged in the study of architecture and engineering, and with a view to carry out their desire to improve their knowledge they had combined to obtain better facilities for that purpose. The means they proposed to adopt were first of all through working classes at which certain subjects would be given out for study and discussion under the guidance of one or two of the practising architects of the city. The Society also proposed to give a few lectures during the season on special subjects of interest and a source of information to the members and to the general public. The first might be called the selfish part of the programme and the second was perhaps the unselfish part. The working classes had been already formed. There was a very good attendance, while the enthusiasm had been most gratifying. They hoped by the end of the session to have an exhibition.

Mr. Blanc, who was received with applause, said he had assented to the request to be present because he was glad of the opportunity given him to offer his congratulations on what he viewed as an important and valuable step on the part of local practitioners. Such a step as this was a recognition among them of the dignity of their profession, of its claims and of the responsibility attaching to those entering its ranks. He ventured to predict for them a share of the luck which, it was anticipated, must belong to all ventures conceived in this the-

great year of Jubilee. He wished them success for the sake of those launching the Association, as well as for those who might arise to attach themselves to it. Without presumption, he felt constrained to add that he was sure theirs would be cordially welcomed as an addition to the group of similar associations. There could be no doubt that the banding together of members of the same profession tended to the maintenance of professional etiquette. Yet he would remind them that, with all the advantages accruing to such associations, their influence for good was weakened unless there was a recognised freemasonry, a fraternal and confident co-operation among its members. He wished to lay before them, as a young Society, a few thoughts upon the interests of their profession, and indicate how best they could aid in promoting these. The past was that out of which the future grew, and any efforts towards progress which did not recognise the value of that part was unreliable. He desired to impress upon them that the enthusiasm of their beginning should be maintained as much as possible throughout their Association, and that, as life progresses, the Association should be proved a perennial by a constant springing up of new actors as the old actors subsided in the restfulness of autumnal repose. Such an Association as this should be raised upon the concrete of a fraternal communion with a superstructure of unaffected love for the profession. Love was their keynote. Another requisite was devoted study towards knowledge, but it must be patient, persistent and consistent. All knowledge acquired would never make an artist, but it would at least prevent the errors and anachronisms which betrayed the untutored hand. To Ruskin's mind there were two qualities which distinguished great artists—imagination and industry. Imagination was a high gift, though it could not be boasted that many artists possessed it. But industry had promised to it great rewards, and its exercise was within the power of all. What concerned them in this Association was the manner in which it could be made helpful primarily to young members of the architectural profession, and also to the public who interested themselves in art matters. There was no knowledge which would not be useful to the architect, but it was not intended that an architect should be expert in all. He should, however, have such experience of all branches that in the interests of the public, he, calling himself an architect, should prove himself competent to design a building which would at least be sound in construction and healthful, without extravagant waste of material. Architecture was a definite art, much more so than her sister arts of painting and sculpture. It was in the decoration of the forms of the building that the art was expressible. How were all the requirements to be most readily attained by the student? The only way was, first, by a course of well-directed study; and, second, by concurrent office practice during a specified number of years. He recommended five years at least. Mr. Blanc then reviewed the system of teaching on the Continent. Looking at home they found an absence of anything like State aid, and the burden was, in consequence, laid upon communities to establish, either by private enterprise or congregated effort, the necessary ateliers and larger schools where such instruction as was required by the architectural student might be obtained. The actual defect of their system was the too great ease with which one could enter the profession, take three or four years at very mechanical work in an architect's office, and without official study of any kind commence the commercial pursuits of an architect. With all the machinery in schools of art for training students there was still an important requisite wanting. There should be some form of test at the close of a youth's ordinary school education, from the result of which a direction might be given him as to that labour of life for which he indicated most fitness. An Association of this kind should exist primarily for instruction. It should be a nursery and training room for all entering the profession. Dealing with what should be their objects of study, he said the best subjects were to be found in the past. These designs, however, should be studied and not merely copied. Lectures, &c., should be systematically pursued, and every encouragement should be given to outside measuring and sketching. In this connection they should make the camera their friend. The student, also, must not overlook his opportunities in gaining office practice. The great difference between the British system and that pursued on the Continent was that instead of being too academic they had joined the practical with the academic. His care in the office should be to become a great draughtsman. In his early years of office work he should jealously guard himself against slovenliness. In architecture there should be a balance of light and shade as much as in the work of the sculptor or the painter. An architect's best help towards a satisfactory design was his first carefully finished drawing. He strongly advocated a careful study of perspective. Concluding, he gave advice as to examinations.

On the motion of Mr. David Smart, seconded by Rector Chambers, Mr. Blanc was accorded a cordial vote of thanks.

Mr. Blanc, in acknowledging the compliment, recommended the formation of an architectural library, and presented the Society with the first and second volumes of the "Edinburgh

Architectural Sketchbook," expressing the hope that it would be the nucleus of a very interesting collection.

The Chairman, on behalf of the Society, thanked Mr. Blanc for his valuable gift.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.

THE monthly meeting of this Society was held at the School of Art last week, when there was an unusually large attendance. The president (Mr. R. W. Fowler, F.S.I.) was in the chair, and among those present were Messrs. C. Hadfield, E. M. Gibbs, C. J. Innocent (hon. secretary), Joseph Smith (vice-president), T. Winder, J. T. Wheen, E. Winder, jun., W. J. Hale, C. B. Flockton, A. H. Holland, C. F. Longden, H. W. Lockwood, H. L. Paterson and C. Gibson. The following new members were elected as associates:—Arthur Appleby (student), Frank Barker (student), Henry W. Beale, John H. Chorlton, Sydney L. Chipling (student), Joseph W. E. Clayton (student), Herbert Ogden, George E. Turner (student).

Mr. J. A. Gotch, of Kettering, delivered an interesting lecture on "Eighteenth-Century Architecture," which was amply illustrated by numerous photographs of buildings, with plans and details, and limelight lantern slides. The lecturer said the view of architecture taken in the eighteenth century was very narrow, being little more than a consideration of the five orders. Neither Evelyn nor Addison had the slightest sympathy with Gothic work, and they may be taken to represent the cultured feeling of the age. The Renaissance had now developed to such an extent as to produce little more than copyism of Italian buildings without suitable adaptation to English wants. Architectural design was amateurish and artificial, and its professors were far behind the great masters, Inigo Jones and Wren, in ability. The large houses, of which many were built for great nobles, were devised for display rather than comfort. The State apartments were large and magnificent, and the exteriors were stately and striking, but the family apartments were tucked away as best they could be, without regard to the first principles of house planning. The smaller houses, however, were much more pleasing, and there are few towns which do not possess specimens of the Queen Anne or Georgian house, simple and appropriate in design and marked with enough character to render it interesting. The interiors of these smaller houses are generally well treated, and the woodwork of the period still furnishes abundant hints to designers of the present day. One inheritance we have from that time which alone would render it memorable, namely, the sash window. A cordial vote of thanks to the lecturer was moved by Mr. J. Smith, seconded by Mr. C. Hadfield, supported by Mr. C. J. Innocent and carried unanimously. The next meeting will be on December 14, when Mr. F. R. Farrow will lecture on "The Warming of Public Buildings."

THE ARCH IN ROMAN ARCHITECTURE.

IT cannot be denied that the arch, although a very beautiful feature, was employed by the Romans to such excess as rather to occasion monotony than to contribute to variety of design; for if the general character of Greek temples was invariably uniform, presenting in the exterior merely lines of columns, the amphitheatres and similar works of the Romans consisted only of continuous tiers of arches, which constituted their more strongly marked features, the columns placed against their tiers being merely ornamental accessories and comparatively of little effect, and even that not of the very best kind. In either case—the Roman or the Greek—a single compartment of an edifice, whether arcaded or colonnaded, serves as a pattern for the whole; and although uniformity and continuity conduce to grandeur, yet if precisely the same kind of uniformity recurs in every building of the same class, it becomes wearisome. In this respect Gothic architecture is far more favourably constituted than either Grecian or Roman, for it admits of infinite diversity of expression, where that of the general design is nearly similar to other buildings. There was one class of structures, however, which, though consisting uniformly of arches and piers alone, was eminently impressive and picturesque, namely, the Roman aqueducts, works of extraordinary grandeur, if estimated by their prodigious extent and the colossal massiveness of their construction, but not otherwise entitled to be termed magnificent, their architecture being in the plainest and severest style. In these there were sometimes two or even more tiers of arches, at others only a single one, as in that at Metz on the Moselle, which has exceedingly lofty arches, or, to speak more correctly, arches on exceedingly lofty piers, divided by offsets into three stages, the effect of which is no less advantageous than it is uncommon.

NOTES AND COMMENTS.

THE difficulty about the annual exhibitions of French art in 1898 and 1899 appears to be overcome. M. BOUCHER, the Minister for Commerce and Industry, has devised a scheme which is accepted as satisfactory. The immense Machinery Hall in the Champ de Mars will be assigned to the two societies of artists. The lighting of the hall is almost too perfect, for it will be difficult to conceal defects in pictures and statues, or to ascribe them to causes which the artists could not control. But the adaptation of the hall for the exhibition of paintings will be costly, and the Minister has arranged that a sum of 12,000*l.* chargeable to the International Exhibition of 1900 is to be applied to the works. The hall will be divided into two parts, one for the Salon des Artistes Français, the other for the Société Nationale. The central part will be occupied by the sculpture in both, and a number of small salons will be arranged for the pictures on both sides. There will be separate entrances to the two exhibitions, with pay places at each. After a couple of months' experience the members of the two societies may be persuaded that union is force, and it is time to abandon the rivalry between them.

THERE is a characteristic passage in Mr. RUSKIN'S "Bible of Amiens" relating to St. MARTIN, whose gift of half his short soldier's cloak to a beggar was at one time a stock subject for painters. The saint's charity was not confined to the sharing of garments, for, according to Mr. RUSKIN, "he is the patron of honest drinking, the stuffing of your Martinmas goose is fragrant in his nostrils, and sacred to him the last kindly rays of departing summer. His name is named over new shrines innumerable in all lands; high on the Roman hills, lowly in English fields. St. AUGUSTINE baptized his first English converts in St. Martin's Church at Canterbury, and the Charing Cross Station itself has not yet effaced wholly from London minds his memory or his name." But it is in Tours the power of the memories of the soldier-bishop's good deeds is still most active, and this week the Touranians appear to have been as zealous as their Mediaeval ancestors in commemorating him, for this year happens to be the fifteenth centenary of a man who, according to Mr. RUSKIN'S, notion, was "an extremely exemplary saint." The pilgrims were able to see the completion of one of the most important works of restoration undertaken in France, and for which M. LALON was architect. For the name of St. MARTIN has not saved the older of the cathedrals from repeated destruction. The original church was erected by PERPETUAS in the fifth century above the tomb of the bishop. It was rebuilt in the eleventh century, but apparently in the apse the old arrangement was preserved. Many alterations were afterwards made, and it is said that the English HENRY V. laid out much money upon the building. In 1796 there was a fire, which was caused by the Revolutionists, and of the immense building the two towers alone survived. During several years efforts were made to recreate the cathedral, and it now stands a stately Romanesque work, which is a memorial of the zeal of the clergy and people.

WE mentioned lately that a committee had been formed in London to co-operate with the Paris International Fire Prevention Congress. But owing to the interest taken in the subject in this country the programme of the British committee has had to be drawn up on broader lines than would have been requisite if the representation at Paris had been its only object. Whilst the business management for the Congress and Exhibition at Paris remains in the hands of the commissioner (Mr. HOARE), at his office in High Holborn, the entire work of the committee will henceforward be carried on at 1 Waterloo Place, where the necessary arrangements have been made under the supervision of the chairman of the executive, Mr. EDWIN O. SACHS. A committee and reading-room has been provided, a library is being formed, and for general meetings the lecture-room of the Royal Service Institution will be at the disposal of members. A number of valuable papers have already been promised, and the executive is undertaking various compilations, so that a start has already been made with the publications of the committee, and there is every prospect of their regular appearance.

England has lost a true Captain of Industry by the death of Sir HENRY DOULTON on Wednesday night. He had attained his seventy-eighth year, but those who knew him anticipated that so hale a man would see another decade. As the head of the firm of DOULTON & Co., he deserved to be considered as an embodiment of a kind of power that was most needed in our time. He was a representative of art as well as of science. The sanitary appliances of the firm are successful because in them principles of science have been rigorously applied, but they are graceful in form, and in many cases are adorned with surface decoration that satisfies the most fastidious. But in other branches of production art is supreme. In showing what can be made of simple materials by the hands of artists, Doulton ware was never surpassed. But it could not have been so successful without a special school of decorators, and there was no firm in England employing so many artists. Sir HENRY DOULTON was born in 1820, and belonged to a family who were long connected with pottery in Lambeth. He was trained to the craft in his youth. Sir HENRY DOULTON was a chevalier of the Legion of Honour, and besides the Albert medal of the Society of Arts, his firm gained 105 diplomas of honour and gold medals, besides 102 silver medals.

It was commonly believed when the late E. B. STEPHENS was elected an Associate of the Royal Academy that he succeeded because the Academicians supposed he was ALFRED STEVENS. Orthography was never an easy branch of learning to them, and they were pardoned as if they were children who were incurable. But it is curious to find a repetition of the mistake occurring within the last week. The *Sunday Magazine*, in an article on Exeter Cathedral, in describing the figures of the west front, says: "Mr. E. B. STEPHENS, to whose genius the Wellington monument in St. Paul's is due, tried a not unskilful hand upon the task of replacing a sorely decayed king or two." ALFRED STEVENS suffered much in his lifetime, but worse to him than any financial pressure from creditors would be the identifying of him with the Exeter sculptor or stone-cutter.

IN 1895 plans were prepared by Sir T. N. DEANE & Son for the completion of the buildings of the Church of Ireland Training College in Dublin. At that time no funds were available for the purpose. By the end of 1895, however, it was found possible to set aside the Free Home grant for building, and it was decided early in 1897 to allocate the money, which by 1898 would amount to 3,000, to the purpose of carrying out the first portion of the new work. In his last days at Kildare Place the late Archbishop of Dublin, Lord PLUNKET, who served, as on each previous occasion, on the building committee, devoted the most minute and painstaking attention to the adjustment and perfecting of the plans. He looked forward to the commencement of the work in the summer of the present year, and to its entire completion at no distant date. The archbishop's unexpected death in April put an end to all prospect of undertaking the building in 1897. This arose not alone from the paralysis which inevitably attended upon such a shock, but also from the prospects of undertaking a larger portion, if not the whole of the plans, which were held out by the fund which the Church proposed to raise to perpetuate the archbishop's memory. It is now expected that building operations will commence about Easter 1898, and there appears little doubt but that, in the first instance, the work will be carried round to the corner of Kildare Street and Kildare Place.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: SOUTH TRANSEPT, AND VIEW LOOKING NORTH-WEST.

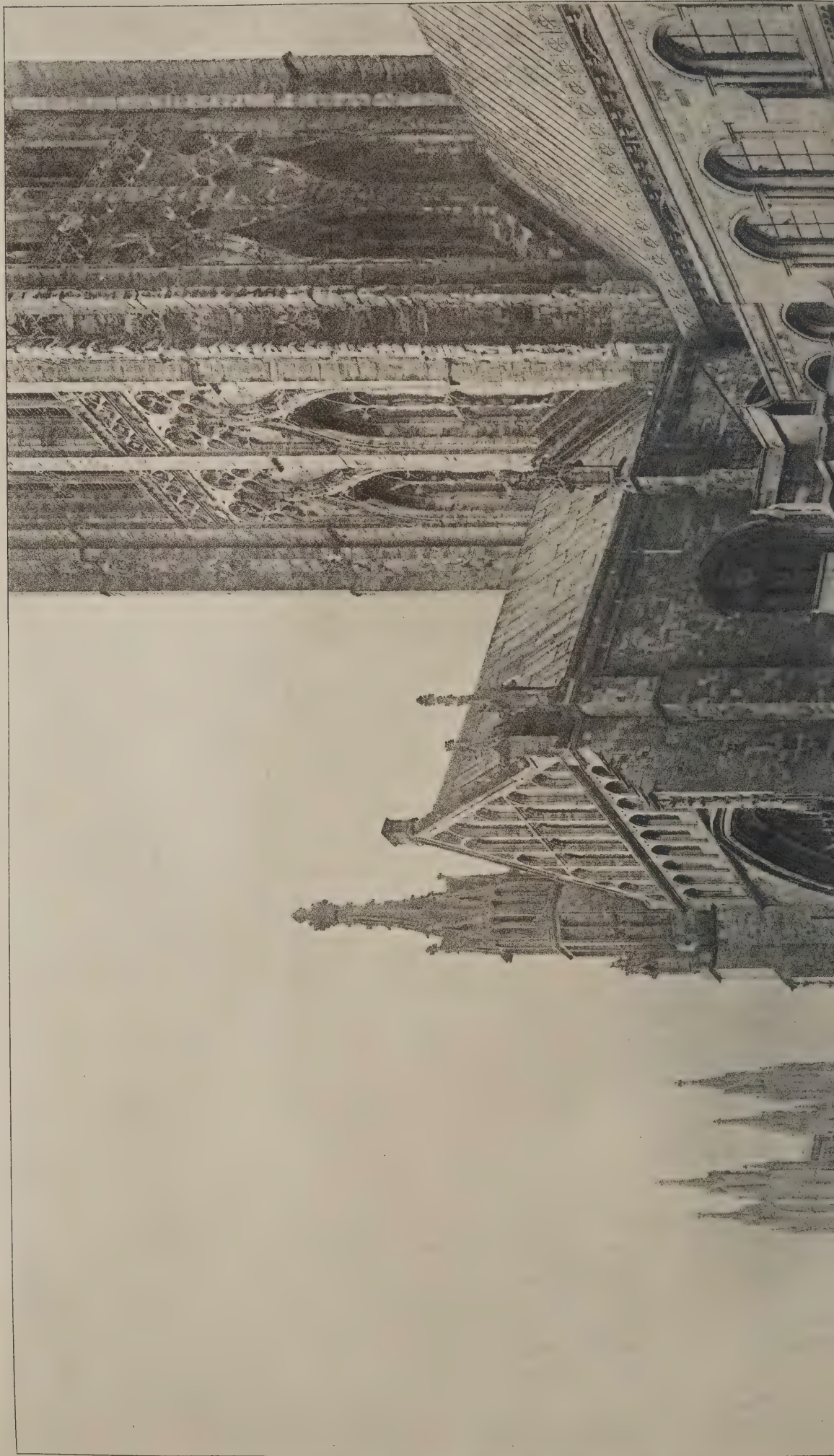
ST. GABRIEL'S CHURCH, WILLESDEN GREEN.

ST. JOHN'S COLLEGE, BATTERSEA, NEW LECTURE THEATRE AND LIBRARY.

NEW CHURCH SCHOOLS, SIDLOW BRIDGE, REIGATE.—SOUTH ELEVATION.—NORTH-EAST ELEVATION.

SWIMMING BATH, KENNINGTON ROAD.

The Architect, Nov. 19th 1897.



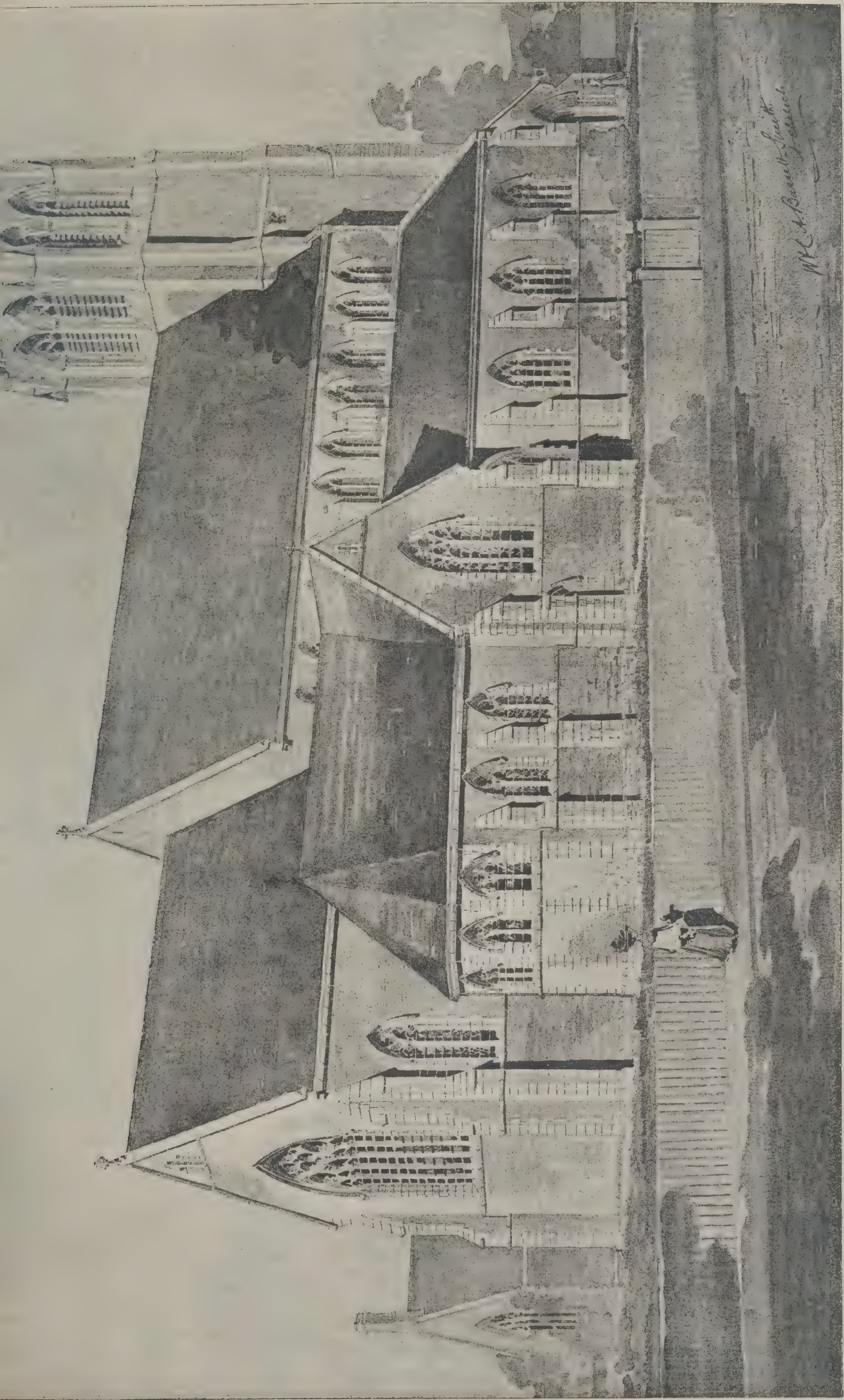


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CATHEDRAL SERIES, No. 89.—CANTERBURY: SOUTH TRANSEPT, AND VIEW LOOKING NORTH-WEST.





S. GABRIEL'S CHURCH, WILLESDEN GREEN.
Messrs. W. & C. A. BASSETT-SMITH and R. PHILIP DAY, Joint Architects.

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SOUTH ELEVATION.



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NORTH-EAST ELEVATION.

NEW CHURCH SCHOOLS, SIDLOW BRIDGE, REIGATE.

ARTHUR H. RYAN TENISON, A.R.I.B.A., } Architects.



PHOTOGRAPHED BY S. B. BOLAS & CO



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THE COMPLETION OF THE SOUTH KENSINGTON MUSEUM.

THE subjoined evidence concerning the plans and arrangements for the completion of the South Kensington Museum was given by Sir John Taylor, K.C.B., principal surveyor of the Office of Works, before the select committee on museums of the Science and Art Department.

Chairman (Sir John Gorst): Do you know the plans that have been prepared for a permanent building at South Kensington?—Oh, yes; I had a great deal to do with the conditions and the instructions to architects.

Are those plans in an advanced position, so that a commencement could easily be made?—The plans are partly prepared for the whole building; the order had once been given for them to be prepared, and the preparation of working drawings is considerably advanced.

If you had orders and funds you could begin the permanent building at South Kensington with great expedition?—There is nothing whatever that I know of in the way, except the final decision as to what the finishing of the buildings shall be in design and the funds.

Sir H. Howorth: How many plans are there in existence?—There were eight designs prepared in competition.

Do those plans include a design of which a part is already completed, the very fine terra-cotta building, Captain Fowkes's design?—Yes; they are all prepared with a view to that building remaining as it is.

Is Captain Fowkes's design one of those eight designs you refer to?—Oh, no; the eight designs were prepared about five years ago now.

Then Captain Fowkes's plans are entirely obsolete?—Entirely; they were not considered at all in connection with the designs.

In the proposed new plans one of these eight designs was, I believe, selected, Mr. Webb's design?—Yes.

Has that design been considered by the Office of Works?—It was not only considered by the Office of Works, but there was a committee to consider all the designs, to select from the eight designs sent in in competition.

That I know, but that is not quite what I meant. What I meant rather to ask was this: whether the Office of Works, on the plan being selected by the committee, has made suggestions and alterations, such as the removal of towers?—Yes, a considerable number of alterations have been made not only at the suggestion of the Office of Works, but also at the suggestion of the Science and Art Department, with a view to meet their requirements and make the buildings more to their satisfaction than the original design was.

Putting aside the elevation altogether, and dealing with the ground plan for a moment, was the director of the art museum, who would have to house his things in that building, consulted, as a matter of fact, about the arrangement of the rooms and the kind of galleries and the kind of lights, whether side or top-lights, and the sort of galleries which would be suitable for his collections?—I do not think any of the subordinate officers of the South Kensington Museum were consulted; I think the secretary would be consulted and he would take the opinion of all the officers of his staff; but I should have thought that the art librarian would have no voice whatever in the new building.

I refer not to the art librarian, but to the director of the art museum, who is directly responsible for housing, exhibiting and displaying his objects?—The director of the art museum has had the whole of Mr. Aston Webb's designs before him, and as I said, the original designs sent in in competition have been materially altered at the suggestion of the South Kensington Department, I take it at the suggestion, probably, of the director of the art museum.

You understand I am not asking any polemical questions at this moment. This is the point I really wish to put, that there are two theories about a museum. One is the architect's theory that the birds were meant for the cage, and the other is the museum director's view that the cage should be made suitable to the birds which it is to contain. Now, if the latter theory, which has been carried out in some museums but not in others, notably the Natural History Museum, is to prevail, it is clear that the director of the museum who has the display of the objects must be the first person to be consulted about the ground floors?—But I take it that the director was consulted in the preparation of these plans, I believe he was; of course, if you have a change of directors there may be a change of opinion.

Mr. Bartley: Were not particulars sent to the architects showing, roughly speaking, what was wanted to be provided in the new building?—Yes, to the best of my recollection.

Would not those particulars be prepared by the officers of the Department and those acquainted with the requirements of the new building?—Yes, I take it they would, in conjunction with the Office of Works.

Sir H. Howorth: With regard to the elevation of the buildings as prepared by Mr. Webb, you say they were pre-

pared with a view to make them more or less consistent with the very fine buildings designed by Captain Fowkes; are they to be virtually of the same style and of the same materials?—Oh, no; they would not be similar buildings to that at all.

Not in colour?—Well, that might be; the material has not yet been decided upon; the design would answer for either a red material or for stone.

I understand that there were some very large towers in the plans which were done away with by the Office of Works, is that so; one or two very large towers were dispensed with, possibly quite rightly?—There has been a desire to dispense with very large towers which were unnecessary, but the final plan has not yet been approved; the architect is merely proceeding with his working drawings on such portions as can be gone on with without a decision in regard to the towers. I do not think there has been a final decision yet with regard to those. There is every desire on the part of the Office of Works to avoid huge towers if they possibly can, and to make a suitable and sightly building without them.

Suppose the building was started next year; suppose we could get the Treasury to grant the money for a start, in how many years would you contemplate the buildings could be completed according to Mr. Webb's plan without putting a great strain on people?—I am assuming that when you say the buildings started you mean over the whole area of the proposed new buildings, not to begin at one corner and complete a piece and then begin again and complete another piece, but all over the site.

Quite?—I think the building ought to be completed in five years from the date of its commencement.

Had you in contemplation when you commenced, proceeding piecemeal with it, or completing the whole as a whole; did you contemplate completing some small galleries, and then adding a fresh piece again, or completing the whole as a whole; was that what you had in contemplation?—Personally, I am strongly in favour of beginning the buildings as a whole, because I think you get into difficulties where you have to join one portion of a heavy building to another portion, and the whole would be completed in a much shorter time; but there had been a suggestion to begin the south-eastern portion of the building, so as to provide additional office accommodation before the central portion. I think that would be a mistake; I should much prefer to see the whole building commenced at the same time, the whole of the foundations put in and the whole building carried up all over the site, rather than put it up piecemeal.

With regard to the plans as you have seen them, and as they are prepared, can you tell us the sort of galleries which they involve; are they galleries all of which have top lights, or have some side lights?—Some of the galleries have side lights to the best of my recollection; certainly some have side lights and top lights wherever they can be obtained.

Is it not within your knowledge that in all modern museums the existence of side lights is a thing which is very much disapproved of by everybody?—Well, for certain exhibitions I think side lights answer the purpose very well, and I should say myself that it is an extremely extravagant appropriation of a valuable site to have a large area covered with one-storeyed buildings only. It is not only an extravagant appropriation of the site, but it is an extravagant way of building; you have your roofing to put on and your foundations to go in, and you get your intermediate floor certainly at a cheaper rate, if it can be made suitable, than you would if you were to allow the building to spread over a large area only one storey high.

Does it in any way follow that you are to have only a one-storey building; surely the top lights at the museum in Jermyn Street are a most excellent way of lighting that building, and it consists of at least three storeys?—The Jermyn Street building is, in my opinion, an imperfectly lighted one.

Mr. Bartley: Is it possible to have two floors lighted one above the other with top light?—No, not to be lighted at all properly.

Sir Henry Howorth: Of course it is matter of opinion, but I spend a great many days and weeks in that museum, and I am bound to say that I know of no museum in which objects seem to me to be better exhibited than in the Jermyn Street museum.—Many of the objects are exhibited under the shadow of a wide projecting gallery.

There is a tremendous skylight, the light from which comes down on every one.—Yes, and there is a central opening through which the light passes; but all round the walls you will find, where the galleries of the floor above project, the cases are in shadow—seriously in shadow in many instances.

Have you not already in the Museum at South Kensington, in one or two very large exhibition-rooms, a gallery that runs round the building in which you virtually increase the wall space tremendously by the use of such a gallery?—Yes.

And in cases where there are no side lights at all?—Yes, it can be done; but I should certainly myself prefer to have good side lighting, to have lighting underneath the galleries of an upper storey.

When you come to economy of space, are you aware—I mention it simply as a fact that I was told by the people in charge—that in those galleries in the British Museum to which the plan of top lighting has been adapted and side lighting entirely dispensed with, it has led to an additional accommodation amounting to two additional galleries; that is, they consider they have now eight galleries instead of six?—I suppose that has reference probably to the newly-invented system of hanging book cases.

No, it is the additional wall space obtained by closing up the windows and making continuous wall cases all round the walls that has given them additional space of one-third more, a set of eight galleries instead of six?—But the rooms in that case are only one storey high; that is to say, they are top lighted from the ceiling to the floor, and they have cases constructed with iron galleries round them; but that would not answer the purpose in South Kensington Museum where you have to exhibit objects; at the British Museum they are mostly for books, I think.

No, pardon me; the galleries I refer to are the Egyptian Galleries and the Babylonian and Assyrian Galleries, which until recently were lighted only by side lights with great windows; those windows within five years have all been bricked up and closed up, and the top light is now the only method of lighting it, and they are adapting the same thing to every gallery in the museum where it is possible, and the walls are surrounded with fixed wall cases, and every mummy and every object in the Egyptian room which is not in a table case is now exhibited in these side cases?—I know these rooms perfectly, because I am doing all the alterations that are being made in them. The rooms are precisely the same as this room may be said to be, with a top light upon it. The windows were in the sides. We now have bricked-up the whole of the windows, and got the whole of that in wall space; but the room is only one storey high—that is to say, the skylight only lights the floor and the walls surrounding it. No doubt they have got additional wall space, but there is no light passing through the first floor upon which the light from the skylights strikes; it simply lights that room and that floor alone, and no more.

You get two storeys, one with top lights and one with side lights, in the British Museum by this method; the upper storey all through will presently have nothing but top lights.—That would be so.

Would that be an advantage in your buildings at South Kensington?—That is precisely what I think there would be; there would be a portion of the exhibition space lighted by side lights and as much as possible by top lights.

Are you responsible for making any of the cases at South Kensington?—No, not in the Science and Art Department.

Only the buildings?—I made the whole of the cases for the Natural History Museum, and I did the whole of the internal fittings of that building myself.

In your opinion would it be an advantage if the Office of Works made the cases for all the museums as it does for the British Museum; it does so for the British Museum?—The British Museum provide the funds, but I carry out their works of any importance for them. All their works in important exhibition cases I carry out for them.

Their furniture and cases?—Yes, all the exhibition cases and furniture of a special character.

Are there any public buildings whatever in which the Office of Works does not provide the furniture and make them except the Science and Art Department?—I do not remember any other building at present.

It is the only one?—Yes. I may be omitting something, but at the present moment I recollect none, except the Science and Art Department.

In making your cases are you dependent in regard to the most novel way of making them, the most safe way of making locks and excluding dust, entirely on suggestions from the staff at the different museums, or have you means of knowing what is going on in foreign museums?—I have a proper staff of my own constantly engaged in such work.

And you could undertake the South Kensington work without any difficulty if it was thought proper?—The South Kensington work is not nearly of such an extensive character as the British Museum and the Natural History Museum.

I do not quite follow you; is it more expensive to have these fittings made by the Office of Works than it is by a staff working it as they do at South Kensington?—I think not, because I have all the cases that are made for the British Museum and the Natural History Museum tendered for; I make complete sets of drawings and specifications and obtain tenders.

If this work was done by the Office of Works you think it would be done quite as economically as it is done now?—Well, I cannot for a moment suppose that having cases made on the spot could be an economical proceeding; I cannot imagine such a thing, certainly not if they were cases anything like what I have to make for the British Museum and the Natural

History Museum. Speaking of the constructing and dust-proofing of the cases, I am responsible entirely for the change in the mode of construction of all the cases in the Natural History Museum. They originally had them all made of gun-metal, and the estimate was so enormous for the fitting-up of the Natural History Museum in gun-metal cases that I set to work to produce a composite case in which the woodwork was reduced below what wood would stand in itself, but I combined metal with it.

Do you think that is as effective for excluding dust as a metal case?—Quite as effective, and at a very considerably reduced cost.

Are those cases you refer to all opened from the front, or are some opened from the back?—Some of them open from both sides, both front and back; some are double-sided cases, into which you can get from doors on either side.

You are aware that in some recent foreign museums, Vienna and elsewhere, the cases are never opened from the front at all now, but are opened at the back; there is a little narrow gallery runs along the back, and they are opened from the back?—I do not think with the construction which is adopted now it makes any difference which side you open the door from; they are absolutely dust-proof.

Do you approve of glass ceilings to the cases?—That is more a matter for the heads of the exhibiting Departments; sometimes they like the light down through the tops of the cases, and in other instances they like to have the light from the side; it depends on the object to be exhibited.

With regard to safety of another kind, do you think it is better to have cases with thick glass for exhibiting objects of great intrinsic value or to have iron bars; I have in view one department of the South Kensington Museum especially?—Well, the whole of the glass I use is plate, and plate glass is not readily cut with a view to theft.

What is the thickest glass you used in any exceptional case?—I endeavour to get it as thin as I can; it is the thinnest British plate I can get, running down to about quarter of an inch thick.

Is that safe if you are exhibiting gold objects of great intrinsic value in a very small space?—It is not safe if you take a hammer and break the glass, of course, but I have known of no instance where that has been attempted. The question is making a thing practically safe against theft with the attendants in the room.

You would prefer that to having cases with bars as they have for the regalia at the Tower, for instance?—That is an entirely different thing.

I am only speaking for very special parts of the exhibition; very valuable and very special parts?—That would be a question for the custodians rather than for me.

Lord Balcarras: I wish to ask you a question or two about these plans you have been talking to us about; I understand you, yourself, have made plans, have you not?—I made plans for the completion of South Kensington Museum in 1883, a complete set of plans.

Am I correctly informed that in these plans special care has been taken to design an economical building, that is to say there are no very large towers, or minarets, or pinnacles in your building, compared with those towers and so forth in some of the plans which have been made later on?—I had no great central towers; I had a central feature, suitably finished with terminal towers, but they were of no great height.

You had no great central tower?—No, I had no actual central tower.

Is it also the case that in this particular design you made the exhibition rooms were arranged in such a manner as would make it possible for them to be supervised and watched by a minimum number of constables, by having the rooms so far as possible opening one into another?—I think in the designs I made the galleries were more continuous than they are in the designs which have been made more recently; they were on a larger scale.

In your designs the ranges of galleries were more considerable?—Yes.

I suppose, in fact, it is a truism, is it not, that in that case an economy could be effected in watching?—It would certainly reduce the number of attendants.

Is it not a fact that one policeman can look after the Venetian Room in the National Gallery, and that one policeman could not look after six or eight small rooms, altogether in the aggregate smaller than the Venetian Room?—No doubt the watching is made more difficult with a large number of small rooms than if you have continuous galleries.

I wish to ask you one more question about the alterations you stated had been made or suggested in the new plans. What alterations were made or suggested?—A considerable number of structural alterations were suggested by the museum authorities, and their requirements were all met to their satisfaction by Mr. Webb.

What kind of things?—Provisions for certain people, not included in the original drawings, were suggested by the South

Kensington authorities and included in the plans; such alterations as that.

Do you mean new offices for clerks and that sort of thing?—They might be for attendants or for clerks.

But it was chiefly with respect to offices and so forth?—Well, not wholly; I think there were suggestions made with regard to the improvement of the exhibition space.

Were suggestions made, for instance, in some of those more decorative schemes that towers should be knocked off and so on?—I think that is very likely.

Do you consider it quite fair to the architect that he should send in a design for competition, that that design may possibly be accepted and receive a prize, and that then his design should be submitted to those persons who will perhaps have to find or account for the money, and that they should knock off the ornamental features on his plan in order to save money; do you think that is fair on the architect?—I do not think it is fair to the architect, unless the alterations meet with his entire concurrence.

Do you mean to tell the committee that Mr. Webb was satisfied when it was suggested that the towers in his design should come off?—I have not said so.

Can we assume that he was satisfied?—He was satisfied with regard to the arrangement of the plans, but I think I stated in my reply to the question that the external design of the building had not been finally approved; he was engaged on the plans and not on the features of the elevations. I do not think he has now got further than the plans and sections of the main buildings; I do not think the towers have been touched for the moment.

At one time it was commonly said, I only give it as a rumour, that objection was taken to the towers on account of the expense, and that we might, it is of course a few years ago, expect to see Mr. Webb's building made minus the towers?—It may have been said, but I for one should certainly not desire an architect who has gained the first position in a competition to mutilate his buildings beyond what he thought he could do with absolute propriety.

I am glad to gather from you that that is not the case. There is just one more question, and that is, was it your office that paid the architect's fees in this case?—Oh, yes.

Dr. Farquharson: I understand there are three sets of plans which have been prepared for the extension of the South Kensington buildings: first Captain Fowkes's, then your own, and finally this last set which are now under consideration?—Yes, in the case of the competition there were eight sets prepared, but it is as you say, there have been three sets of plans prepared.

By what is called limited competition, does that mean limited to a certain number of people who are invited to compete?—The architects in the competition were selected—four by the First Commissioner of Works and four by the Royal Institute of British Architects.

Sir H. Howorth: May I intervene one question. Could you tell us how it was that Captain Fowkes's plan was not carried out?—No, I cannot say anything about that.

Or why was it withdrawn?—I cannot tell.

And your own?—My own never was put before the Government.

Dr. Farquharson: Have the last set of architects ever had an opportunity of studying the plans prepared by their predecessors, so to speak?—Yes, they have had an opportunity of studying everything connected with the subject, and were informed as to the requirements, as far as they could be so informed in a case of this kind.

I understand there are two sets of plans—one for the Art and the other for the Science Department?—Yes.

Has the same architect carried out both of these?—No; the drawings for the Science Department have not yet been finally made. I have made myself a set of plans for the Science Department on the western side of Exhibition Road, but no steps have been taken for carrying those out, and in all probability before any buildings to such an extent as they would be were carried out on the south side of Imperial Institute Road, that would probably be the subject of another competition, I should say, amongst distinguished architects.

If you were asked to say which was the more urgent case to be carried out immediately, the Art extension or the Science extension, which would you say?—That is a question on which I am not prepared to give an opinion; it must rest with the authorities at South Kensington, who know the requirements much better than I do.

You know the way in which science teaching has necessarily got to be carried out now at South Kensington, and the cramped accommodation provided for it?—There is no doubt that the accommodation provided for the science branches is extremely poor at present; they are all in temporary buildings, with the exception of the building which was erected by General Scott, on the east side of Exhibition Road.

Have you got a plan which you think would be sufficient for the purpose of scientific teaching?—I should think about three

years ago we asked for information as to the requirements of the Science Department, with the view of ascertaining the size of the site required and approximately what would be the cost of meeting all the requirements, and that was the object I had in view when I prepared drawings for the western side of Exhibition Road.

Mr. Bartley: As regards the buildings that have been erected, is it not the fact that Captain Fowkes's was a general plan for covering the whole ground more or less?—I believe it was to a certain extent.

Was not a certain part of it really carried out by him and afterwards by General Scott?—Yes, a certain part.

And was not the idea then that his general plan would gradually be completed?—I am not at all sure that his plan was adhered to; on the contrary, I think it was not.

You mean after his death?—After his death.

General Scott altered it?—Yes, I think it has got away entirely from what was the original intention.

But a general plan was adopted by him and accepted by the Government, was it not?—Certainly, for all the central exhibition portions of the building.

Was it not laid before a committee of this house?—That is very likely; I do not remember.

You said the temporary buildings are not satisfactory; is it not probable that if there had never been any temporary buildings at South Kensington there would never have been a museum there at all?—That I cannot say.

Do you not think it is extremely likely that the Treasury would never have agreed to begin one large building?—I am not in a position to answer that question.

As regards the fireproof roofs, would there be any practical difficulty in really making all the roofs at South Kensington fireproof?—No practical difficulty.

Would it be a very costly thing to do?—Very.

What do you mean by very costly, would it run into a very large sum?—Yes, a very large sum.

Is not the idea of a fireproof roof comparatively modern?—Yes.

Is any great part of the British Museum fireproof in the roof?—Not what I should call a fireproof roof, no.

Is it not really a fact that the idea of these fireproof buildings has very much developed in the last few years?—Yes, very much indeed. In fact, one could hardly point to any roof over a public building which was absolutely fireproof until quite recently.

Then we are really condemning those who built South Kensington because they had not the knowledge of the present day?—In the case of some of the roofs, the fireproof floors having been placed in the building, the roofs ought not to have been of the construction they are; they are absolutely all wood, some of them.

Too cheap?—Too cheap.

The Raphael Gallery, is that your ideal of a fireproof roof?—Yes, I put that roof on, and I did the very most I could to avoid inflammable material.

Is there any improvement since that?—No, everything of course depends on the form which the roof must take. There is no difficulty in making a fireproof roof if you have not to get the light and ventilation through it, that is perfectly easy, but in a roof that requires so much glass in it as the roof of the Raphael Gallery has, the construction has to be of a special character to make it fireproof.

That would be the case nearly all over the museum, would it not, a great part of it at any rate?—Yes, it would.

Have you any idea of the cost of putting a fireproof roof all over the present buildings of the museum?—I have made no estimate, but if I had to give an opinion I should say that it would be from 50,000*l.* to 100,000*l.*

To do the roofing of the existing buildings?—Yes.

Do you know at all what the Raphael Gallery cost?—Yes, it was between 3,000*l.* and 3,500*l.* I think.

Sir Francis Powell: Are the plans for the completion of the museum now complete or nearly complete?—No, the progress with regard to the plans has been stopped, because we have no funds forthcoming.

What advance was made up to the time that stoppage took place?—Instructions had been given by the Office of Works to the architect to proceed at once with the working drawings for the completion of the building or a portion of it; I think the eastern portion of it was what was ordered with a view to the extension of the offices. These plans were proceeded with to a certain extent, and then further instructions were given that the matter must remain in abeyance for a time.

Referring to the present time there are no plans for the completion of the museum in an advanced state?—No working or contract plans, I should call them, are complete.

Before you make your contract or working plans for a building you generally feel bound to settle the general conception of it and the plans, so as to be understood by an ordinary person?—Yes, such plans are complete; the designs are complete.

And all that remain are the working drawings?—That is all.

Chairman: And some of those are ready?—They are not ready, but they had been proceeded with to a considerable extent before the order to cease was given.

Sir Francis Powell: All that remains to be done is to complete what I may call the technical part of the work?—That is really all.

The architectural sections, for example, in detail?—Yes, all the plans must be made; the plans, sections and elevations, in order that the quantities may be prepared and tenders obtained; that is the process.

You consider that the plans for their present stage are finally settled?—The plans were considered to be finally settled, and settled to the satisfaction of the Science and Art Department; the elevations have not been finally settled, that is to say, such portions of the elevations as the towers; but the general elevation is, I think, practically agreed upon.

Have they been settled by the highest authority, the Treasury?—The Treasury, in a case of that kind, would leave the settlement of the plans to the First Commissioner of Works, subject, of course, to their being prepared with a due regard to economy.

Do you think the matter has so far advanced that the terrible veto of the Treasury will not be exercised?—At present we are making no progress; nothing is being done just now.

You cannot say that the plans have been finally passed by the Treasury, using the word "plans" in the limited sense which I used just now?—No; the working drawings, when complete, would be put before the Treasury, with an estimate of the cost; that, as yet, has not been done.

The Treasury may even yet be alarmed by the magnitude of the figures?—Perhaps they may.

Do you consider the omission of the towers will gravely injure the design?—The complete omission of the towers would seriously mutilate the design; but it is just possible that some middle course may be found practicable to the satisfaction of the architect.

I believe Sir Gilbert Scott was never satisfied with the mutilation of his buildings of the Foreign Office?—No, he was not quite satisfied with it; but his original design for the Foreign and Home and Colonial Offices was a Gothic one.

But still, I never heard that Sir Gilbert Scott was ever satisfied with the elimination of his towers?—No; but I think the elimination of the towers in that case as originally designed was certainly a success.

Do you think that would not also apply to Mr. Webb's towers?—Mr. Webb's towers are very different from those which were shown on Sir Gilbert's drawings for the Whitehall front.

Were they less ambitious?—No, but much more suitably applied in regard to proportion.

Do the plans—which I may say have been provisionally approved—involve the omission of any administrative department?—No; to the best of my knowledge the Science and Art Department very fully considered the plans in every respect, and I have every reason to believe they were satisfied with them as they finally left them.

If ever any change was made in the administration, the plans would probably have to be altered?—Yes; there is no saying what the views of other chiefs of the Department might be if there were any change.

I understand you as expressing a decided opinion in favour of the completion of the museum at the earliest possible period?—Well, I think we have all been agreed that the completion of the museum buildings sooner or later is a necessity; and having made the progress which we have made in regard to obtaining designs by competition, and a selection having been made, it seems to me a pity not to proceed with the completion of the buildings as shown by the approved drawings.

Then I may take it, if I may put such a question, if there be fault at all in the matter, the fault does not lie with the Office of Works?—No, the Office of Works have been quite prepared to carry out any instructions they may receive.

Have they been anxious to receive such instructions?—We should have been very glad to have received such instructions.

You have excluded from the answers which you have given to me all questions about the western parts of the buildings.—I understand that subject is not before us in any way.

ROMAN ORDERS OF ARCHITECTURE.*

(Concluded from last week.)

NEXT in the regular order of their classification comes the Roman Ionic order. This too, like the Roman Doric, was borrowed from the Greeks and then altered to suit the tastes or whims of the Romans. The Romans were much more unfortunate in their modifications of the Ionic order than those which they introduced into the Doric. They never seemed to have liked or understood it, nor to have employed it except between the Doric and Corinthian. In its own native east this order had originally only been used in porticoes between piers or antæ, where of course only one face was shown and there were no angles to be turned. When the Greeks adopted it they used it in temples of Doric form, and in consequence were obliged to introduce a capital at each angle with two voluted faces in juxtaposition at right angles to each other. In some instances they used a capital with four faces.

The Romans, impatient of control, eagerly seized on this modification, but never quite got over the extreme difficulty of its employment; with them the angular volutes became mere horns, and even in their best examples the capital wants harmony and meaning. When used as a three-quarter column these alterations were not required, and then the order resembled more its original form; but even in this state it was never equal to the Greek examples, and gradually deteriorated to the corrupt application of it in the Temple of Concord in the Forum, which is the most degenerated example of the order now to be found in Roman remains. The only existing example of Ionic in Rome in which the columns are insulated is in the Temple of Fortuna Virilis, for the Temple of Concord is too barbarian to deserve consideration.

Its stylobate, like that of the Roman Corinthian, is lofty and not graduated, having a moulded base and cornice or surbase. In the column the base consists of plinth, two tori, a scotia and two fillets; the shaft has twenty fillets and twenty flutes and diminishes one-tenth of a diameter; the capital is two-fifths of a diameter in height; the volutes, however, dip a little lower, being themselves about that depth without the abacus; the corbelling for the volutes is formed by a bead and large ovolo, the latter being carved. A straight band connects the generating line of the volutes, whose ends are bolstered and enriched with foliage and a square abacus moulded on the edges covers the whole.

In the entablature the architrave is unequally divided into three fascias and a band consisting of a cyma-reversa and fillet; the lowest angle impends the upper face of the shaft of the column. The frieze is in the same vertical line and is covered with a fillet which receives the cornice; it is also enriched with a composition of figures and foliage. The cornice consists of a bed-mould two-fifths of its height and a corona with crown mouldings. The cymatium is enriched with acanthus leaves and lions' heads, and the mouldings of the bed-mould and architrave band are carved. The soffit of the corona is hollowed out in a wide groove, whose internal edges are rounded off in a cavetto, but without ornament of any kind, forming indeed a mere throating. Like the angular capitals of the Greek Ionic, the external volute of this is turned out and repeated on the flank; either that or the abuse of it in the Composite capital gave rise to the distortions of the order, in which all the volutes of the capital are angular, and consequently all its four faces are alike.

In other respects, it does not differ generally from the ordinary examples of the Roman Ionic. The Temple of Fortuna Virilis is pseudo-peripteral, and consequently has neither antæ or pilasters, nor do ancient examples exist of either.

The proportions of the Roman Ionic are about the same as those given for the Grecian Ionic. The architects of the present day generally prefer the Greek to the Roman form, hence very few examples of the Roman Ionic are now being executed.

The next order, according to the popular classification, which demands consideration is, as its name signifies, called Composite, and may be regarded as a genuine Roman order—in fact the only order of architecture that the Romans gave to the world. The ancient examples of this order do not differ so much from the ordinary examples of the Corinthian order as the latter do among themselves, except in the peculiar conformation of the capital to the column. In other respects, indeed, its arrangement and general proportions are exactly those of the Corinthian.

The Composite order was used in triumphal arches and in the best ages of Roman architecture in them alone. The difference in the capital consists in the enlargement of the volutes to nearly one-fourth of the height of the whole capital, and in the connecting of their stems horizontally under the abacus, giving the appearance of a distorted Ionic capital. The central tendrils of the Corinthian are omitted and the

A Decree was unanimously passed by Convocation at Oxford on Tuesday, authorising the Drapers' Company to erect a new building for the Radcliffe Library, on a site facing the South Park's Road, and constituting a wing of the museum corresponding to the Clarendon Laboratory, from designs from Mr. Jackson, R.A.

* A lecture by Mr. Cyrus K. Porter, published in *Stone*.

drum of the capital is girded under the stem of the volutes by an ovolo and bead as in the Ionic. Acanthus leaves in two rows fill up the whole height from the hypotrachelium to the volutes, and are consequently higher than in the Corinthian capital. This difference is given to the upper row.

The greatest defect of the Corinthian capital is the weakness of the small volutes supporting the angles of the abacus. A true artist would have remedied this by adding to their strength and carrying up the fulness of the capital to the top. The Romans removed the whole of the upper part and substituted an Ionic capital instead. Their only original idea of it was that of putting two entirely dissimilar things together to make one which should combine the beauties of both, though as a rule the one generally served to destroy the other.

In the Composite capital they never could hide the junction, and consequently, though rich, and in some respects an improvement on the orders out of which it grew, this capital never came into general use, and has seldom found favour except among the blindest admirers of all that the Romans did.

The only place where a modern architect could with propriety introduce the Composite order would be in a façade composed of several superimposed orders, in which case it might be placed above the Ionic or beneath the Corinthian order.

The proportions of the Composite are quite the same as those of the Corinthian order; if anything, perhaps, it is a little heavier, and its entablature more highly enriched with carving.

Besides the Composite order, as already described, the Romans made many other compositions or combinations. In some of these, animals of different species, the human figure, armour, a variety of foliage and other peculiarities are found. Shafts of columns are also sometimes corded or cabled instead of being fluted; those of the internal order of the Pantheon are cabled to one-third their height, and the flutes of the antæ of that ordinance are flat eccentric curves.

There are fragments of others in which the fillets between the flutes are beaded, some in which they are wider than usual and grooved, others again whose whole surface is wrought with foliage in various ways, and it would be no less absurd to arrange all these into different orders than to make a distorted and hybrid capital the groundwork of an order.

The last of the Roman orders to which your attention is invited is called the Corinthian. The prototype of this order is to be found in the Grecian order of that name, the most perfect example now remaining being that of the Choragic monument of Lysicrates at Athens, a description of which was given in our paper on the Grecian orders of architecture.

The fate of the Corinthian order at the hands of the Romans was quite different from that of the Doric and Ionic orders. These orders had reached their acme of perfection in the hands of the Grecian artists, and seem to have become incapable of further improvement. The Corinthian, on the contrary, was a recent conception, and although nothing can surpass the elegance and grace with which the Greeks adorned it, the new capital never acquired with them that fulness and strength so requisite to render it an appropriate architectural ornament. These were added to it by the Romans, or rather perhaps by Grecian artists under their direction, who thus produced an order which for richness combined with proportion and architectural fitness has hardly been surpassed. The base is elegant and appropriate, the shaft is of the most pleasing proportion, and the fluting gives it just the requisite degree of richness and no more; while the capital, though bordering on over-ornamentation, is so well arranged as to appear just suited to the work it has to do. The acanthus leaves, it is true, approach the very verge of that degree of direct imitation of nature which, though allowable in architectural ornaments, is seldom advisable; they are, however, disposed so formally and there still remains so much that is conventional in them that, though perhaps not justly open to criticism on this account, they are nevertheless a very extreme example.

The entablature is not so admirable as the column, the architrave being too richly carved. It is evident, however, that this arose from the artist having copied in carving what the Greeks had only painted, and thereby produced a complexity far from pleasing.

The frieze as we now find it is perfectly plain, but this undoubtedly was not the case when originally erected. It either must have been painted (in which case the whole order was also painted) or ornamented with scrolls or figures in bronze, which may probably have been gilt.

The cornice is perhaps open to the same criticism as the architrave, of being over-rich, though this evidently arose from the same cause, viz. reproducing in carving what was originally only painted, which to our eyes at least appears more appropriate for internal than for external decoration, though under the Italian sky, where it was introduced and used, the conditions may have warranted its use.

There are at least fifty varieties of Corinthian capitals to be found either in Rome or in various parts of the Roman Empire

all executed within three centuries, during which Rome continued to be the imperial city. Some of them are remarkable for their elegant simplicity, which so evidently betrays the hand of a Grecian artist, while others again show lavish exuberance of ornament which is but too characteristic of Roman art in general.

Like the Greek orders the Roman Corinthian may be said to consist of three parts—stylobate, column and entablature; but unlike them the stylobate is much loftier and is not graduated, except for the purpose of access before a portico. Its usual height is not exactly determinable in consequence of the ruined state of most of the best examples, but it may be taken at from two and a half to three diameters. In the triumphal arches the stylobate sometimes amounts to four and even to five diameters. It is variously arranged, however, having in the shallower examples simply a series of mouldings to form its base, with perhaps a narrow square member under it, a plain dado, and a covering cornice or coping on the top of which the columns rest. In the loftier examples a single and sometimes a double plinth comes under the base mouldings, and a blocking course rests upon the coping to receive the bases of the columns.

The column consists of base, shaft and capital, and varies in height from nine and a half to ten diameters. The base has usually, in addition to the series of mouldings, a square plinth whose sides are vertical; this with the whole height of the mouldings is about half a diameter. The spread of the base varies from a diameter and a third to a diameter and four-ninths; in the best Roman examples, as well as in the Greek, the shaft diminishes with entasis, the average diminution being one-eighth of a diameter. The shaft was always fluted when the material of which it was composed would permit.

The Romans often used granite and sometimes an onion-like marble for the shafts of their columns, the former of which could not be easily wrought and polished into flutes, and the latter would scale away if cut into narrow fillets. Like the Greek, the Roman Corinthian had twenty-four flutes and fillets; the flutes are generally semicircles, and they terminate at the bottom and top in the same form.

The hypotrachelium is a plain torus or bead resting on a fillet above a cavetto at the head of the shaft. The ordinary height of the capital is a diameter and an eighth. (There are some very fine examples in which the capital is only a diameter or even a little less.) It is composed of two rows of bands of acanthus leaves consisting of eight leaves ranged side by side, but not touching; of helios and tendrils trussed with foliage and an abacus whose faces are moulded and variously enriched. The abacus is one-seventh the height of the capital; in plan it is a square whose angles are cut off and whose sides are concaved in segments of a circle. The Corinthian capital is in too common use to require further description.

The entablature varies in different examples from one diameter and seven-eighths to two diameters and a half in height. The entablature of the Temple of Jupiter Stator, which is regarded as one of the finest examples of ancient Rome, is two diameters and a half in height, of which the cornice occupies a diameter and a sixth, leaving to the architrave and the frieze a little less than a diameter and a half. The entablature of the Pantheon is about $2\frac{1}{4}$ diameters in height. As the above are the best examples of ancient Roman Corinthian, it is perfectly safe for modern architects in using this order to keep within the lines fixed by these examples.

We cannot close this paper without some allusion to the wonderful works executed by this truly great people. Whatever of architecture they may have borrowed from the nations by which they were surrounded, or whatever they may have appropriated from the architecture of the nations they conquered, it must be admitted that they were the greatest builders the world has ever seen.

It is claimed by some writers that Numa, the first emperor of Rome, wishing to beautify his capital city, created a body of skilled workmen to whom he gave the title of "College of Constructors." This body of men or college were to a large extent governed by laws of their own making. They owed allegiance to the reigning sovereign and to them was entrusted the execution of all public work, erections of temples, arches of triumph, walls, aqueducts, bridges and roads; that in later times the services of this body of men were held in such high esteem that a company of them was attached to every legion of the Roman army. Their duties were to superintend the construction of camps, bridges and roads; thus, wherever the Roman army marched this body of skilled men carried the art of construction and instructed the inhabitants in the science of building. Whether this be true or not, it is true that wherever the Romans established themselves and assumed the reins of government, temples of the most exquisite workmanship were erected, theatres and amphitheatres were constructed, aqueducts and baths built, and cities walled and their streets paved.

Rome borrowed her chief architectural ideas from the Etruscans and the Greeks, but what she thus took she reconstructed in accordance with her own spirit, converting the whole

into realisations of grandeur and ostentation, in response to the wants which arose from her wealth and her conquests. Roman architecture may be described as an original transformation of Greek architecture. Applying it to much larger structures, Rome introduced the superposition of orders in storeys, substituting the vault and the arcade for the ceiling and the plat-band. She employed the smallest materials, and yet enlarged the intervals between the points of support. The triumphal arches, the baths, the amphitheatres and the aqueducts widely differ in their structure from the Greek model; these are all purely Roman works.

The spectator could not walk ten paces in the ancient Forum without perceiving that he was not in Athens. Situated at the foot of the capitol it formed one of the prominent objects of ancient Rome.

The arch of Septimius Severus, erected about the year 203 A.D., in honour of Severus and his two sons, rises in front of the capitol. The edifices which enclosed the Forum on the east having fallen gives an uninterrupted view on the right of the Palatine Hill, where Augustus and Nero had their palaces and gardens. To-day it is merely a huge collection of open vaults, buried galleries and halls paved with mosaics.

Titus built the Flavian amphitheatre and dedicated it about the year 80 A.D.; struck with its immense proportions the people called it the Coliseum. At the inauguration under Titus 5,000 wild beasts were put to death and 11,000 on the occasion which celebrated Trajan's victory over the Parthians.

The building covered a space of 65,000 square feet and its oval arena was 260 feet long and 150 feet wide.

The baths exhibit the life of the Romans even more intimately than the amphitheatres. Of these there were in Rome more than 800 which were frequented from mid-day to evening. Agrippa, Titus, Diocletian and Caracalla, each in their order of succession, strove to excel their predecessor in the luxury and magnificence of their baths. In the Bath of Caracalla the bathers had 1,600 marble seats, special and common halls and hot and cold baths of various degrees of temperature. One of these baths was 110 feet in diameter; another measured 126 feet by 78, exclusive of the niches around the sides and the halls at each extremity. The vaulted roofs were supported upon pillars 45 feet high, one of which has been carried to the Trinity Square, Florence, where it stands surmounted by a statue in red porphyry.

In the refinements of these baths may be read as in a book the intense luxurious and delicate life of the ancient Romans. It might be well to recall these baths, which were at once public baths, restaurants, gymnasiums, promenades, libraries, halls of declamation and congresses, before we boast of our own civilisation and prosperity.

Baths were not the only wonders of ancient Rome. Trajan's column was and is one of its most beautiful monuments. For the pedestal, the shaft, the capital and the statue of Trajan, Apollodorus of Damascus, the architect, employed thirty-four blocks of marble marvellously fitted together. Throughout its whole length the column is pierced by a staircase leading to the summit. Upon the pedestal garlands of oak, symbolical of peace, were suspended. Laurels gird the base of the pedestal. The shaft is enriched with a kind of endless scroll which winds round its circumference from base to summit. Here may be seen, ascending as it were from the bottom to the top, 2,500 figures of soldiers and prisoners, with an endless number of horses, elephants, weapons and war material.

Standing on the top, the conqueror, as it were, looks down upon this triumphal cavalcade marching upwards in winding file, and is recompensed for his victory.

In all these constructions, arches, temples, amphitheatres, baths, columns and tombs, whatever was not positively enormous in size was at least solid and strong. It was the custom of the Romans to combine beauty with strength, but beauty was with them none the less an object of their efforts because they considered it should be combined with utility. They may be said to have chosen by instinct outlines, curves and elevations that pleased the eye, a custom from which modern architects might learn a useful lesson.

While Rome drew to herself all the wealth and the active forces of the countries she conquered, making use first of Italy, then of Greece and the East, and eventually of Spain and France, she gave an equivalent wherever she carried her eagles and spread all around her genius and her arts.

Edifices of every kind were reared on the banks of the Tiber, the prevailing ideas of which were borrowed from other nations; while foreign countries on the other hand were embellished with the products of the Roman genius.

Italy was covered with aqueducts and the highways were lined and ornamented with tombs; towers and temples covered the land.

Following the example thus set by Rome, almost every city of the ancient world came in time to have its arena, its triumphal arch, its columns and its baths. Rome multiplied herself, yet remained ever unique. From the second century

everything became Roman in its characteristics, and ages have not sufficed to suppress the habit which became a second nature.

DRUIDICAL REMAINS IN BLAIR ATHOLL.

ACCORDING to the best authorities on Druidism in Scotland, says a correspondent of the *Dundee Advertiser*, an ancient religion had its seat and headquarters in Perthshire, somewhere near the Grampian range. Blair Atholl, although not the Druids' "Eternal City," yet in its day must have been one of the strongholds of their faith, if we may judge from the number of mounds, standing stones and circles which still remain in the district. That these relics should have come down to us from the dim past is probably due to the fact that Highlanders always viewed them with awe, the common belief being that "misfortune will closely follow the mortal who removes a Druid's stone."

The tourist or antiquary visiting Blair Atholl may in an hour's easy walk reach the mound on the eastern shoulder of Lude Hill. Owing to the mound's immense size and its commanding position, it forms a conspicuous object in the landscape, and may easily be viewed from the carriages of the Highland Railway as the train nears Blair Atholl. This colossal pile is circular in form, as the architectural efforts of primitive races invariably were. The base circumference measures 381 feet, while the sloped sides rise to 20 feet in the centre, thus forming a flattened cone. The foundation had originally been formed of great boulders arranged in a circle, and the inside built up with smaller stones in the form of a cairn, while the interstices were filled in with earth. On the summit of the mound the two side stones of a cromlech or Druids' altar project a little above the surface, and are 3 feet 10 inches apart. In the "Statistical Account" of the parish, published about the end of last century, the writer mentions that there was also a stone pillar, but unfortunately the pillar and a number of the foundation-stones have been removed. Chambers, in his learned work "Caledonia," says that "the Druids not only officiated in the affairs of religion, but also administered justice, their temples serving as law courts."

When the temple consisted of a mound, as in the present case, the priest, as judge, occupied the most elevated position, the pleaders, witnesses and criminals standing a little lower on the sides, while the general public stood at a respectable distance from the scene. The mound under consideration is mentioned in history as early 729 A.D., when Angus M'Fergus, the King of the Picts, after defeating the Maormor, or King of Atholl, met the vanquished king at Dunsith and signed the terms of peace; hence the name (pronounced) Dunsheë, or "Mound of Peace." In the locality the mound is known as the Shean, or the Fairies' Knoll. The good spirits were supposed to dwell in the doune or mound, and as silent witnesses watched the various transactions which took place within their domain.

That these mounds were used as law courts cannot be doubted, as the custom may still be traced in the place names in various parts of the country. Tynland Hill, in the Isle of Man, is still resorted to once a year, when with great rejoicing the laws are promulgated, no doubt a survival of what took place all through the country in the far past. Chambers, the authority already quoted, says the Druids were divided into three orders—the Druids, the Vates and the Bards. The Druids were the theologians, the Vates the professors of natural science, while the Bards sang in heroic verse the noble deeds of the brave and the true. These various orders performed their respective duties within the precincts of the sacred enclosure.

Interesting as the Druidical mounds are, they must yield the palm to the deeper interest centred in the cromlechs and circles. Cromlech is supposed by some authorities to mean "the bowing stones," or the stones obeisance was made to; but the majority regard it as signifying "the bent stone." The altar was formed of two standing stones, with one across the top, and from this top stone, which was always concave, the name "cromlech" is supposed to have been derived. There is not, unfortunately, a complete specimen of a cromlech in Blair Atholl, although the two side stones are to be found in various parts of the district. Besides the altar on the top of the "Shean," there is one on the shores of Loch Morag, and another near Loch Tummel. There was also a large altar at Bruar, quite close to the public road. There is only one of the stones now standing, the other having disappeared years ago. The remaining stone measures 5 feet 8 inches high, 4 feet broad and 20 inches thick. These side stones were commonly from 3 to 4 feet apart, and are known all over the Highlands as Clach-n'-iobairt, or the "Stones of Sacrifice." Baked cakes were offered at times on these altars, and it is of interest to note that in Wales, where some of the ceremonies of the Druids still survive, the archdruid stands within a circle of twelve stones, the stones being decked with the first offerings of the harvest.

But although the cake offering might on some occasions

satisfy the conscience of these sin-burdened men, yet, in common with other religions, Druidism demanded sacrifice by the shed blood of beasts. Some have even ventured to suggest that human sacrifices were at times offered. It is difficult now to ascertain whether that was the case or not, but certain it is that blood was shed, and possibly it may have been occasionally human. Nevertheless, the Druids were not the gross idolaters which they are sometimes represented. God was spoken of as the "Great Unseen," or Be'il—a name which some have imagined to be synonymous with Bel of the Babylonians. But this is a mistake, it being a contraction of Bea'il (the source of all existence).

The Druids' creed, consisting of four articles, attests its simplicity—(1) To worship God; (2) to abstain from evil; (3) to exert courage; (4) to believe in the immortality of the soul.

The cromlechs, being required to satisfy the spiritual wants of the early emigrants, would in all likelihood be erected first, and may have been placed in their present positions 3,000 or 4,000 years ago. The temples, being simple in form, would immediately follow. They commonly consisted of from four to twelve stones standing in an upright position, and arranged in a circle of from 20 feet to 30 feet in diameter. This circle was surrounded again by a larger circle. The Druids' temple was always roofless, "open to the face of the sun," the sun being the shadow of the Great Unseen and also the medium by which they worshipped God. Possibly the sun itself may have been worshipped, the transition from shadow to reality being quite natural and simple. The great temple of Grenich favours this view, as the name Grenich means "field of the sun," and it is quite within reasonable bounds to believe with Robertson, in his "Gaelic Topography of Scotland," that this was a place of worship dedicated to the sun. This temple is situated on the raised land overlooking the head of Loch Tummel. The outer circle measures 82 feet in diameter and can be distinctly traced, but the large stones of the inner circle have, like the Bruar cromlech, been "spirited away," although their position is still apparent from the holes left in the ground.

But of all the ancient Druidic remains in Blair Atholl, "Na Carrigeon" must be considered the most interesting, not only from its completeness, but also from its surroundings. This hoary temple occupies the summit of Edintean Hill, and overlooks the dark waters of "Lochan-na-Leathain," a loch to which several strange legends are attached. A little to the south-west are two caves running into the hill, while 30 feet or 40 feet below the "Na Carrigeon," a stream of water issues from a small round hole in the rock. The whole place seems charged with mystery, and no doubt for this very reason the Druids chose it as one of their "high places." This temple is composed of four upright stones, forming a circle of 21 feet in diameter, surrounded by another circle of 51 feet in diameter. These stones stand from 3 feet to 4 feet 6 inches high, and are placed to correspond as near as possible with the cardinal points of the compass, proving that the Druids possessed a fair knowledge of the motions of the heavenly bodies. The shadows cast by those stones played an important part in their religious ceremonies, as they both symbolised divine truth and denoted the time. As can easily be seen, the four stones cast only three shadows at three specific times, viz. at 6 A.M., 12 noon and 6 P.M., corresponding to the morning, noon and night of the easterns; while again at 8 A.M. and 3 P.M. the stones cast but two shadows—rather a striking coincidence, as these were the hours of the "morning and evening sacrifice" of the Mosaic economy. The space enclosing the stones is depressed to the depth of about a foot in the centre, in which a little water oozes up—a remarkable phenomenon on the top of a hill. Here, again, we have a suggestion of the stream which issued out of the temple on Mount Moriah, and which several of the writers of Scripture make allusion to. The name of "Na Carrigeon" seems rather difficult to translate. The word comes from carrig, a rock, carrigeon being the plural form; yet Gaelic scholars hesitate to say it means "rocks." Doubtless the word has some deeper meaning, referring to some of the ceremonies which were practised within the circle.

PROFESSIONAL PRACTICE IN AMERICA.

THE Chicago Architects' Business Association have adopted the following rules of practice:—

Drawings.—All drawings forming a basis for contracts shall be drawn to a scale of not less than one-eighth of an inch to the foot, in ink or by some other process that will not obliterate. General dimensions shall be accurately figured and the drawings made explicit and complete.

Scale Drawings.—All portions of the work that require a larger scale to illustrate the same shall be drawn full size or to a scale large enough to make them fully set forth what is required by the architect. No architect shall ask for bids on any work until all general drawings are complete and sufficient details made, which, in connection with the specifications, will settle all questions affecting the cost of work.

Supervision of Work.—The supervision of an architect shall be such as shall require the faithful execution of the work according to the true meaning and intent of the plans and specifications, but such supervision does not cover the duties of a clerk of the works. In case there is no clerk of the works provided by the owner, contractors must refer any questions about which there can be any doubt to the architect for decision before proceeding to execute the work.

Specifications.—Specifications must be prepared in ink or by some permanent process, and shall clearly explain the kind and quality of materials and methods of construction, and give such further information as may be needed to definitely supplement the drawings.

Everything that will be required in the work must be mentioned in the specifications as far as practicable, being classified and grouped under appropriate headings, and work called for by the plans and not referred to in the specifications, and *vice versa*, shall be included same as if mentioned by both plans and specifications, provided such work comes clearly within the branch or branches covered by the contract.

Rules for Letting Contracts.—Written invitations for proposals will be forwarded contractors for work to be let, stating when bids will be opened. This does not apply to public work requiring advertisement for proposals. Contractors desiring place upon the roster of an architect's office shall furnish reference as to mechanical ability and fidelity and be prepared to furnish a good and sufficient bond. Proposals shall be presented on the day set for opening same and will be opened in the presence of a representative of the bidders. Proposals shall be opened, read and posted at the time specified before such bidders as are present. Contracts shall be awarded by owners or architects within a reasonable time thereafter. Bidders shall not be held on proposals retained longer than ten days after date of opening. The lowest bidder will not be permitted to change the amount of his bid, but must sign contract or withdraw. The right is reserved to reject any or all proposals. If, after the opening of bids, changes are made in the plans and specifications amounting to not more than 10 per cent., the lowest invited bidder shall tender a detailed proposition for said changes, subject to the approval of the architect and owner, and if found fairly detailed the contract shall be awarded to him upon his bid so changed. Lack of ability to carry out the work in a proper manner, want of fidelity, or disposition to render less than is due, the owner, in strict conformity with the terms of contract, shall lay the contractor liable to be dropped from the roster of the architect temporarily or permanently, as in the judgment of the architect is just and right and in the interests of his clients. Final certificates of payment on a contract shall not be issued by the architect until the contractor has returned all plans and specifications to the office of the architect.

TESSERÆ.

Roman Monuments.

THE circular form was a favourite one with the Romans for their sepulchral structures of a more pretending class than ordinary. It will be sufficient here merely to mention those in honour of Augustus and Hadrian. The Tomb of Cæcilia Metella is a low cylinder, the height being only 62 feet while the diameter is 90, and it may be considered as nearly solid, the chamber or cella being no more than 19 feet in diameter. This cylindrical mass is raised upon a square substructure, which combination of the two forms is productive of agreeable contrast, and it was accordingly frequently resorted to. The Tomb of Plautius Sylvanus near Tivoli consists also of a short cylindrical substructure on a square basement, but is otherwise of peculiar design, one side of that stereobate being carried up so as to form a sort of low screen or frontispiece, decorated with six half-columns and five upright tablets with inscriptions between them. The Tomb of Munatius Plancus, at Gaeta, is a simple circular structure, of low proportions, the height not exceeding the diameter and therefore hardly to be called a tower, notwithstanding that it is now popularly called Roland's or Orlando's Tower. Of quite different character and design from any of the preceding ones is the ancient Roman sepulchral monument at St. Remi, which consists of three stages—the first a square stereobate raised on gradini and entirely covered on each side with sculptures in relief; the next is also square, with an attached fluted Corinthian angle and an open arch on each side, and the uppermost is a Corinthian rotunda, forming an open or monopteral temple (*i.e.* without any cella), the centre of which is occupied by two statues. As instances of other combinations we may briefly refer to what is called the Tomb of Virgil, near Naples, consisting of a square substructure surmounted by a conical one; to the Roman monument at Constantina, in Africa, conjectured to have been a cenotaph in honour of Constantine, the lower portion of which is a cylindrical structure surrounded by a peristyle of twenty-

four Doric columns and carried up as a lofty cone in receding courses or gradini, leaving at its summit a platform for an equestrian statue.

Slopes of Roofs.

The degree of slope given to the inclined faces of a roof varies according to the covering material employed, as well as to the climate. The ancient Grecian temples had very low or pediment roofs, varying from about 12 degs. to about 16 degs., the height being from one-ninth to one seventh of the span. In Roman buildings the inclination is somewhat greater, being usually 23 degs. or 24 degs., or from one-fifth to two-ninths of the span. The general introduction of the Pointed style of architecture led to the use of very high-pitched roofs, a very common proportion being that in which the length of the rafters is the same as the span, so that they formed an equilateral triangle. In comparatively modern Domestic architecture in this country it has been considered desirable for the length of the rafters to be three-fourths that of the span, and an angle of 45 degs. is still considered by some to be the best pitch when plain tiles are used. As builders can in the present day obtain excellent covering materials, the pitch may be made of any required degree, down to the low Grecian pediment, and it therefore depends on the style of architecture and the taste of the builder; the most common height being from one-fourth to one-third of the span. High roofs discharge rain the most rapidly and do not retain snow so much as those of low pitch, but where they have gutters they are liable to become choked by snow sliding into them and to overflow from water running into them faster than the pipes can convey it away. Steep roofs may be covered with small slates and are less likely to be stripped by violent winds. Low roofs, in consequence of their superior lightness, are less expensive, the timbers not only being shorter, but of proportionately smaller scantling, and they press less injuriously on the walls.

Breadth in Painting.

Breadth, or that quality of execution which makes a whole so predominate over the parts as to excite the idea of uninterrupted unity amid the greatest variety modern art owes to Michel Angelo. The breadth of Michel Angelo resembles the tide and ebb of a mighty sea; waves approach, arrive, retreat, but in their rise and fall, emerging or absorbing, impress us only with the image of the power that raises, that directs them, whilst the discrepance of obtruding parts in the works of the infant Florentine, Venetian and German schools distracts our eye like the numberless breakers of a shallow river, or as the brambles and creepers that entangle the paths of a wood, and instead of showing us our road perplex us only with themselves. By breadth the artist puts us into immediate possession of the whole, and from that gently leads us to the examination of the parts according to their relative importance; hence it follows that in a representation of organised surfaces breadth is the judicious display of fulness, not a substitute of vacuity. Breadth might be easily obtained if emptiness could give it. Yet even in that degraded state, if gratification of the eye be a first indispensable duty of an art that can impress us only by that organ, it is preferable to the laboured display of parts ambitiously thronging for admittance at the expense of the whole; to that perplexed diligence which wearies us with impediment before we can penetrate a meaning or arrive at the subject, whose clear idea must be first obtained before we can judge of the propriety or impropriety of parts. The principle which constitutes the breadth of Raphael was neither so absolute nor so comprehensive as that of Michel Angelo's. But his perspicacity soon discovered that great, uninterrupted masses of light and shade bespeak, satisfy, conduct and give repose to the eye; that opposition of light and shade gives perspicuity. Convinced of this, he let their mass fall as broad on his figures as their importance, attitude and relation to each other permitted, and as seldom as possible interrupted it. Masses of shade he opposed to light, and lucid ones to shade. The strict observation of this rule appears to be the cause why every figure of Raphael, however small, even at a considerable distance, describes itself and strikes the eye with distinctness, so that even the comparatively diminutive figures of his Loggie are easily discriminated from the Cortile below. To this maxim he remained faithful in all his works, a few instances excepted, when instead of light and shade he separated figures by reflexes of a different colour, exceptions more dictated by necessity than choice, and which serve rather to confirm than to impair the rule.

Portraiture with the Romans.

It was a custom among the ancients in very early times for warriors to have their portraits painted upon their shields, called by the Romans *imagines clipeorum* or *imagines clipeata*, and these shields were frequently dedicated in the temples in honour of their owners when deceased, or placed by victors as trophies (*clipei votivi*). The portraits were most probably painted in wax, but that they were well executed is very

doubtful. Among the Romans in the time of the republic the possession of the portraits of their ancestors (*imagines majorum*) was a proof of nobility; for by the *jus imaginum* none were permitted to make portraits of themselves except those who had themselves, or whose ancestors had, borne some curule magistracy; and Roman families were accustomed to boast of their *fumosa imagines* as a proof of their ancient nobility. These portraits or images, which were of wax, were preserved with great care by their posterity, and were only brought out upon great occasions or carried before them in funeral processions. They were probably painted busts, for the art of casting with wax in plaster moulds taken from the life was, according to Pliny, invented as early as the time of Alexander by Lysistratus, the brother of Lysippus. It seems that the Romans were also sometimes in the habit of prefixing the portraits of authors to their works. Martial mentions one of Virgil.

The Style of Titian.

The style of Titian's design has two periods: he began with copying what was before him without choice, and for some time continued in the meagre, anxious and accidental manner of Giovanni Bellini; but discovering in the works of Giorgione that breadth of form produced breadth of colour, he endeavoured and succeeded to see nature by comparison, and in a more ample light. That he possessed the theory of the human body needs not to be proved from the doubtful designs which he is said to have made for the anatomical work of Vesalio; that he had familiarised himself with the style of Michel Angelo, and burned with ambition to emulate it, is less evident from adopting some of his attitudes in the pictures of Pietro Martire and the Battle of Ghiaradadda, than from the elemental conceptions, the colossal style and daring foreshortenings which astonish in the Cain and Abel, the Abraham and Isaac, the Goliath and David on the ceiling of the fabric of Santo Spirito at Venice. Here, and here alone, is the result of that union of tone and style which, in Tintoretto's opinion, was required to make a perfect painter—for in general the male forms of Titian are those of sanguine health, often too fleshy for character, less elastic than muscular, or vigorous without grandeur. His females are the fair dimpled Venetian race, soft, without delicacy, too full for elegance, for action too plump; his infants are poised between both, and are preferable to either. In portrait he has united character and resemblance with dignity and still remains unrivalled.

GENERAL.

Mr. F. J. Warden-Stevens has prepared estimates of capital outlay &c., for an alternative area of supply for the electric-lighting scheme of the borough of Lewes, in accordance with further instructions received from the Corporation.

Dr. Fortnum has presented two cases of rings and engraved gems and medallions to the Ashmolean Museum, Oxford.

M. Tocilescu, while making researches in the Dobrugea at Adam Klissi, has discovered a basilica of the time of the Emperor Trajan, constructed of marble and consisting of thirty-two columns.

Mr. A. J. Spilsbury, of Queen's College, Oxford, has been awarded the studentship at the British School, Athens.

Mr. A. J. Balfour will open on December 3 the University Hall erected in Edinburgh at the cost of Mr. M'Ewan, and from the plans of Dr. Rowand Anderson.

The Borough Polytechnic is to be enlarged by the addition of five workshops and a gymnasium. The sum of 2,500*l.*, which was gained by letting seats for the Jubilee procession, will be applied towards expenses.

The London Water Commission will hold the first meeting for the reception of evidence in the "Moses" committee-room of the House of Lords on Monday next. The representatives of the London County Council will be the first witnesses.

The London County Council on Tuesday agreed to expend about 147,000*l.* on temporary buildings for pauper lunatics on the Horton Manor Estate, Epsom, which is to be the site of a permanent asylum.

Messrs. Frost & Reed are now exhibiting in Bristol twenty-two water-colour drawings by Mr. Tom Lloyd, R.W.G., which were specially painted by the firm.

The Representatives of the Corporation of London (Sir G. Faudel Phillips, Sir E. J. Poynter, P.R.A., and Mr. Temple) having visited the collection of about 200 old English, Italian and Dutch pictures which were offered to form a nucleus for an art gallery at the Guildhall, announce that, taking into consideration the varied quality of the works, though gratefully recognising the well-intentioned offer, they could not advise the Corporation to accept the whole or any portion of it.

The Architect.

THE WEEK.

THAT Admiralty engineers can occasionally be negligent was manifested by the action for injury to Rochester Bridge which was decided by the Lord Chief Justice on Monday last. The wardens of the bridge claimed 12,000/. There was no doubt that damage was done to the structure by a barge belonging to the defendants, but they pleaded that there was contributory negligence on the part of the plaintiffs, the bridge having been built after an improper design and of defective materials. They contended also that the bridge was erected in contravention of the Act of Parliament in not having sufficient headway, and that it was in fact an obstruction. The Act stated that the waterway was to be so constructed as to leave a clear headway of 18 feet, and the defendants' counsel were justified in insisting that what was intended was to have at least that height throughout the opening. It is a common phrase which is accepted as having only one signification. When the Britannia Bridge was proposed to cross the Menai Strait the Admiralty laid down the condition that there must be a headway of 103 feet. RENDEL, who was the engineering adviser to the Admiralty, after investigating the circumstances, proposed that the 103 feet should apply to the part over the navigable channel. His intention was to enable STEPHENSON to construct a very flat elliptic cast-iron arch. But the Admiralty would not depart from the condition, and in consequence it was necessary to devise the system of tubular girders which was an innovation in bridge building. When the plans for Rochester Bridge were submitted, the Admiralty departed from the official precedents and the common acceptance of words by sanctioning a bridge which was only 18 feet clear at one point. The Lord Chief Justice acknowledged that he was in doubt, but he came to the conclusion that the proper construction of the words of the Act was that the clear headway of 18 feet meant under the centre of the arch. His lordship's decision on any legal matter is entitled to the utmost respect. But in the case of bridges it will be found that in practice an altogether different interpretation of words is adopted. Just as waterway means the whole space available for the flow-water, headway means the space available for the passage of an object. The word headway is comparatively recent (it is not found in JOHNSON), and it was first applied to the progress of ships against adverse winds. In its application to construction the idea of opposition was retained. A headway of 18 feet means that an object of such a height can pass through without obstacle; but there is nothing to suggest that the object must resemble a mathematical line of length without breadth, and pass beneath the central point. The apparatus to be seen in the yards of goods stations, which tests, by means of bells attached to it, whether railway waggon when loaded correspond with bridge openings, gives a good notion of the signification of a headway. It is not a mere point which has to be determined, but as many points as are to be found in the width of a waggon. If, as Lord RUSSELL holds, the centre of the arch were alone considered, "rise" or "versed sine" would have been used instead of "headway." From the importance of the subject, we hope an appeal will be taken. It is unfortunate that the Admiralty officers were napping, but it will be well for us if they do not succumb to drowsiness in graver matters than the examination of the section of a bridge.

THE fourth general exhibition of fine arts and art industries at Barcelona will be opened on April 23 next. The municipality have funds for the purchase of exhibited works, and contributions will be added towards the same object by the Queen of SPAIN, the Infanta ISABELLA, the Government, the Corporations and prominent citizens of Barcelona. The Commission charged with the direction of the selection will consist of competent members. Committees will also be formed of representatives of foreign countries living in Barcelona. The Mayor of Barcelona

will invite artists on behalf of the municipality and through the respective committees to send some of their works to the exhibition, and all costs of transport, going and returning, will be borne by the city. The works acquired by the municipality will be utilised for the fine arts and art industries museums, which already contain examples of the principal Spanish and foreign artists, such as MM. DETAILLE, BARABINO, VAN BEERS, LENBACH, ROLL, SIGNORINI, MESDAG, ROUBAUD, ROCHEGROSSE, OCA-BIANCA, BARTELO, BIRKINGER, DELAHAYE, CORELLI, KARBOWSKY, ENGEL, MORBELLI, HUMMEL, TITO, BEAURY-SOUREL, ZANDOMENEGHI, RENOUART, HYNALIS, CASSIAZO, BOUCHER, APOLLONI, CHARLIER, BARRAU, SARTI, DUPONT, BUSCH, FREMIET, PANDIANI, HEIDEN, &c.

DURING several months there has been some excitement in the important district of which Finsbury Circus, Finsbury Pavement and London Wall are part, concerning the proposed project of the Bridge House Estates committee of the Corporation for an improvement. It appears that the leases of about eighty premises, with a rental of 3,486/., will expire at Midsummer 1899. The committee recommended that a road 30 feet wide should be carried through from Albion Place to West Street, that the premises in Finsbury Pavement and the buildings at the rear should be pulled down, and the site let on building lease for eighty years by public auction; that the remainder of the area should be divided into four blocks and dealt with in a similar manner at such times subsequent to the letting of the first block as might seem to the committee advisable and with a minimum of inconvenience to the present occupiers. It was calculated that by the arrangement the rental would be over 20,000/ per annum. The Corporation is an excellent landlord, and some of the leaseholders suggested that they should have a claim on the new sites. The committee, as a compromise, proposed that the remainder of the area, before or after dealing with the first block, should be offered in a greater number of blocks than four. There was a long discussion, but eventually an amendment was rejected by a majority of ninety-one votes, and the committee's recommendations were adopted. The Corporation has therefore undertaken its most important building scheme of the century, and on the success will no doubt depend some other building schemes. The district to be altered may be considered as wealthy, but in character it is hardly worthy of its position. Although the plans for the improvement have been prepared in the offices of the Guildhall, it is to be hoped that there will be some liberty allowed to those who are fortunate enough to obtain building sites.

It is the good fortune of the French to have a world-wide reputation for the production of a class of works of art for which no better name appears to be found than "objets d'art." They are mostly examples of the sculptor's art on a small scale. The demand for such works has been so extensive that a vast number of inferior imitations are to be found in the market. As there is a danger that foreigners and others may confound the two classes, a Society has been formed for upholding the true artist's work and setting aside what is of lower quality. The president of the new Society is M. GÉRÔME. The committee will consist of a dozen members. It is proposed to stamp with the mark of the Society all works submitted which are considered to be worthy to uphold the reputation of French artists. Exhibitions will be held from time to time in Paris and elsewhere to make the public acquainted with the works which have been approved. The proposal is not entirely original. The Chinese and Greeks have had a special stamp, and a guild mark was commonly found on the best examples of Mediæval craftsmanship. The practice was suppressed during the first French Revolution. The new Society will not only serve to separate the good from the bad, but it will also be a guarantee that the works bearing the stamp are genuine French examples and not foreign forgeries.

FRIDAY'S FIRE.

THE fire which destroyed a section of the City a week ago was on a scale that happily went beyond the experience of experts, and it was enough to astonish all London. But there is satisfaction in knowing that as yet nobody has come forward to charge architects and builders as the original cause of the disaster. The buildings which have succumbed were not perhaps examples of the most secure forms of construction. All the conditions prescribed by the Legislature and the municipality were, however, observed in them, and what more can be expected? There has been a great loss of property, and whether the expense of restoration falls on insurance companies or on individuals, the result is the same. It is only a purblind policy that can see any cause for gratification in such a vanishing of the products of labour, for so vast a loss cannot be balanced without the withdrawal of labour and capital from other undertakings. Equilibrium in business is not to be re-established without paying a costly price, and part of it has to be furnished by people who appear to be without any concern in the operations.

The most remote of our colonial subscribers will know long before reading these lines the circumstances of the fire, and the position of the district between Aldersgate Street and Wood Street so suddenly attacked. In Jewin Street and the neighbouring streets the flames were most destructive. In them were congregated a host of distributors and a few manufacturers. London businesses are following old precedents, for their representatives are congregating in special quarters. Wood Street, for instance, although far from being as imposing as it should be, is now as well known to traders throughout the world as Cheapside or Cornhill. In the houses which are now in ruins were to be found the satellites of the warehousemen and manufacturers of Wood Street and a few similar streets. A thousand things which men who bought and sold on a big scale would consider as not worth attention were to be obtained instantaneously from little depôts consisting of a room or two in Wells Street, Hamsell Street, Jewin Crescent, Bradford Avenue, &c. As it is difficult to obtain premises in the older thoroughfares, which are supposed to be paved with gold, some manufacturers and importers on a large scale were compelled to find a footing in those minor streets; but the majority of the occupants of the premises, and especially of the parts above the ground floors, were considered to be among the humbler classes of the mercantile community. Commission agents, dealers in fancy goods, trimmings, gloves, straw hats, feathers, umbrellas, shirt makers, artificial flower makers abounded in the region. Many were foreigners, who had at their disposal portable goods from all parts of the world which could be employed in clothing.

It is well to remember the character of the occupants in order to understand the extraordinary rapidity of the destruction of the buildings. They did not resemble buildings which are occupied as dwellings, chambers or ordinary offices. They formed a combination of warehouses and business premises on a small scale more tightly packed than elsewhere. It is doubtful whether any provision was made for such an occupancy. To have several metal safes on a floor may not be a source of danger, but the fall of a safe from a height is sure to bring ruin to a building that is on fire. The goods that were collected in the rooms were not of a class to impose weight on walls or floors, but as they were generally inflammable they were injurious in another way. Gas was in request during the foggy weather, and there can be no doubt it was one of the agencies in extending the conflagration. According to Colonel ROTTON, the chairman of the Fire Brigade committee of the County Council, the extraordinary rapidity of the fire was entirely due to the nature of the buildings, the stock they contained, the distribution of enclosed courts and well-holes, numerous communications in party walls, and the narrowness and relative positions of the thoroughfares.

With conditions so adverse the wonder is that the fire was not able to seize on a larger number of buildings. If the force of flames could be measured it would probably be found that never was so destructive an amount of power let loose in London. The strength and resolution of the Fire Brigade and the strategy of Commander WELLS

fortunately were able to conquer the foe, and we hope it will be long before they have to sustain a similar test of their combativeness. The excellent discipline of the City Police was also invaluable. As it was, the crowds of spectators impeded the advance of the fire-engines, and it is plain that henceforth in considering the risks of fire it will be necessary to include a London crowd as a serious obstacle against which unpleasant measures must be employed.

The fire has not demonstrated any serious defect in the organisation for coping with such dangers in the Metropolis. By the promptitude of the police not a moment was lost, the Fire Brigade was quickly at work, and there was no delay or breakdown of the water-supply. That in such a hive of industry not one life was sacrificed seems like a miracle. Taken as a whole, we cannot expect to have a more successful contest with a big fire in the narrow streets of London.

There is one consideration which should not be neglected. The buildings destroyed will probably be succeeded by others of a similar construction. The Jewin Street district had acquired characteristics which are not likely to be neglected by the property owners. Projects for the creation of grandiose Wood Streets cannot find much favour at present. The agents, ostrich feather merchants, the manufacturers and straw hat importers are likely to return to the streets which were familiar to them. But some preparation should be made for their reception. If many business premises on a small scale must be congregated under one roof, it is only prudent that the construction should not be of the simplest character allowed by the Building Act. If a man crowds his room with inflammable things such as straw goods, sticks and toys, surely there should be more precautions adopted for the protection of his neighbours than are necessary when the tenant is a solicitor or financial agent. The offices in the consumed houses did not correspond in purpose with those occupied by architects in Bloomsbury, by engineers in Westminster, and by lawyers in the Temple or Lincoln's Inn, but in a constructive sense there was not much difference. It is time the dangers should be recognised and adequate precautions adopted. The fire of Friday last was kept with difficulty within narrow limits. Under more unfavourable conditions of the atmosphere the loss would undoubtedly have been increased. In considering the fire problem, it is well not to be too sanguine, and if there are to be streets with stage upon stage of store-houses of fancy goods, we ought to take care the stages cannot easily be combined into a ruinous force which will be withstood with difficulty. That can only be done by a more costly construction of all the floors and by a different arrangement of the staircases.

GEOLOGY IN NEW SOUTH WALES.

AT the present time the British colonies are receiving much more attention in England than usual, and it is to be hoped mutual advantages will follow. Among other effects of the improved relations will be the increase of knowledge respecting colonial productions. From that an extension of trade may follow. The use of Australian timber of late years in the streets of London should be taken as evidence of English goodwill and the desire to support colonial enterprise as far as possible.

There is no doubt about the efforts of the officials in the colonies to inform the world concerning their departments, and especially the Australasian officials. One proof is seen in the details which are supplied of the work of the Geological Survey Department of New South Wales during the past year.

It is only natural that colonial statesmen should endeavour to employ, as soon as practicable, those industrial resources which do not need to go through elaborate processes. Hence we find that in New South Wales the sum of 500*l.* is offered to whoever first discovers a new reefing or alluvial gold or tin field, or a new deposit of silver, copper, diamonds or precious opal. Moreover, if in a year after the discovery 500 miners are employed on the spot, another sum of 500*l.* will be paid to the discoverer. No less than twenty-one applications were made for the reward in the past year, but unluckily not one of them was supposed to comply with the conditions. The Government

assist in other ways, for every possible encouragement is given to miners in cases where there is a likelihood of eventual success.

The Government geologist, Mr. E. F. PITTMANN, has not only to look after his staff, but he has to engage in a variety of operations. One time he has to investigate the heating of coal on board ships, then he is called to report on a proposal to establish a Government quartz crushing battery. Next we hear of him inspecting an "auriferous diamantiferous deposit." Money was granted towards the expense of sinking a shaft, but water rushed in and put a stop to operations. The Surveyor believes that the occurrence of diamonds in the quartz pebble drift points to the possibility of their being derived from the volcanic breccia, as in the diamond mines of Kimberley, South Africa. Evidently there is confidence that below the surface of New South Wales there are treasures to make the inhabitants wealthy without other aid. Water has a right to be included among the treasures, and colonists will read with satisfaction of certain mud-springs inspected by the Surveyor, which are accepted as "evidence of the extension of the lower cretaceous artesian water-bearing beds a considerable distance further south than they were previously known to occur." A proposal to construct a deep-water harbour at Port Kembla also engages his attention. The time of some of the geologists appears to be almost entirely occupied with reports on goldfields. In the Assay Office no less than 6,013 assays and analyses were made last year, a result of the increased activity in mining matters.

According to the official returns the aggregate value of the mineral products of New South Wales to the end of 1896 amounted to 118,367,234*l*. Last year was not remarkably productive, but the minerals obtained were valued at 4,478,368*l*. The scarcity of water, owing to drought in several of the goldfields, was the main cause of a decrease of 242,569*l*. in gold alone, as compared with the returns of 1895. The average earnings of the miners are calculated at 51*l*. 13*s*. 3*d*., or about 1*l*. weekly, but many of them follow other occupations. According to the report the figures "are sufficient to show that, with ordinary energy, a man settling on one of our goldfields can at least make a living, with the ever present prospects of striking something richer than usual." The value of the year's output of coal was 1,125,280*l*. The exports of silver and silver-lead amounted to 1,785,451*l*. The greater part came from the Broken Hill mines, of which the total mineral products were valued at 3,010,546*l*. The tin exported was valued at 102,117*l*. A gratifying revival has taken place in copper mining, the value of the exports being 200,311*l*. It is expected that the co-operation of English capitalists will lead to the setting up of works for the manufacture of the crude ores which are found in many districts of New South Wales, but the finished iron made last year only amounted to 4,721 tons, of a value of 33,283*l*.

In the search for gold and diamonds more common products are likely to be neglected. Marble deposits are known to exist in several districts of New South Wales, which have not received the attention their importance deserves. Fine samples of red brown to almost black can be obtained near Bathurst, and a beautiful grey tint near Mudgee. A nicely marked brown is obtainable in the neighbourhood of Molong, and a pure white from Caloola, near Newbridge, said to be equal to the second-class marble from the famous Carrara quarries. A deposit near Rylstone is of a black colour with white streaks and gold markings. Immense deposits of green serpentine also exist in the vicinity of Lucknow.

One important experiment is noticed. The Mining Department allowed the use of one of the diamond drills to the Royal Society on the occasion when an effort was made to gain authentic information in connection with the coral beds. The British Government allotted the *Penguin* to ship the whole diamond drill plant, the men engaged to work it, and members of the expedition from Sydney to Funafuti, one of the Ellice group of islands. The first bore was put down to the depth of 105 feet, of which 12 feet was coral. The remainder had to be driven through sand and loose pieces of coral, making it very difficult for tubing to be driven down. But the time allowed to do the work was too short. Before the arrival of a consignment of material and appliances to overcome the

drift-sand difficulty, the drill, plant and members of the expedition were on their return trip. Although not fully successful, the expedition gathered information which will certainly be a guide for further operations. The knowledge gained by a further expedition and more extended boring operations through the coral beds would be of great interest.

New South Wales will be able to rival Kentucky in its caves. They are under the control of the Government, and last year attracted 5,569 visitors. In some the electric light has been introduced, but magnesium ribbon appears to be mainly used during visits. Some of the caves take more than one day to examine. Judging by the number of visitors the Jenolan caves would appear to have most interest. The Wellington caves come next, and then follow Abercrombie caves, Yarrangobilly caves, Wombeyan caves, Bringoma caves and Bendithera caves. Mr. T. W. E. DAVID, one of the geological surveyors, has described some of the wonders of the Wombeyan caves. One is the Basin or New cave, of which he says:—

The entrance to this cave is situated on a steep slope above the bed of the Mare's Forest Creek. It is about 6 feet high by 12 feet wide; the cave slopes steeply downwards for about 20 feet into a chamber about 20 feet high, from the roof of which hang long ropy stalactites, nearly touching slender pillars of dripstone, rising to meet them from the floor. A second descent leads on to a small cupola in the marble, the roof ornamented as before by clusters of stalactites, and the floor with small rounded bosses of stalagmite. A further descent, past a mass of pendent calcite resembling a frozen waterfall, brings the visitor into a large chamber, the floor of which is traversed by ridges of stalagmite about 6 inches in height, ranged in wavy lines, like crumpled ribbons. From the remarkable evenness of their surfaces it is evident that they have once formed the margins of tiny ponds, now dry. Here the cave bifurcates. Following the left branch through a fissure 4 feet wide for about 40 yards, the visitor, after a slight descent, enters a dome-shaped chamber about 40 feet wide, and as many high. Following a gallery in the rock for about 100 yards past a stalactite known as the "Kangaroo's Tail," one of the most interesting objects in the caves is reached. This is a large pocket of stalagmite, which has grown by chemical action on the steeply sloping side of the passage, so as to form a perfectly water-tight tank, 5 feet deep by 3½ feet square. The wall of stalagmite, which constitutes three sides of this tank, is firmly cemented to the rock, has a perfectly level rim, and varies in thickness from a thin crust one-half inch in diameter at the rim to a strong wall of 6 inches or more through at its base. Passing on and still ascending, the principal feature of the cave comes into view—a staircase, in which the place of steps is taken by a number of stalagmitic pockets similar to the one just described, moulded out of the sloping rock. These vary in size from the smallest, about the size of a watch pocket, to the largest, measuring 10 feet long by 4 feet wide and 5 feet deep. Climbing to the top of the "basins," a second small series of stalagmite tanks is seen, plastered against the rock like swallows' nests. The height at which the water last stood in these cisterns is marked by a sparkling white film of calcite, studded with small tufts and rosettes of crystals of the same mineral.

The old cave, which measures about 90 yards in length by 40 yards in width, and with a roof from 50 to 60 feet high, is equally remarkable.

We also read of the "sounding-board," a transparent stalactite curtain 9 feet long, which resembles the woof of a coarsely woven material. When tapped it gives out musical notes. The "organ" is a huge stalactite, with fringes of stalactites that ring like a chime of bells. The "trophy" is a beautiful cluster of ropy and curtain stalactites about 15 feet high.

All the caves appear to have been formed by subterranean water-courses, and some are still being excavated. Although they were likely to be used as shelters, few fossil bones have been found in the Wombeyan caves, and there is consequently no clue to the age of the deposits. But if a foot stalagmite requires about forty years to form, it becomes evident that the ponderous "organ" and "trophy" are very ancient. Geologists will read the following suggestions about the uniformity between the past and present operations of nature which Mr. DAVID gives:—

The belt of limestone in which the caves occur is estimated by Mr. Young to be 2½ miles long by 1 mile wide. The rock is composed of a costly crystalline white marble veined with yellow. The coarsely crystalline varieties are less suitable for

lime-burning or building purposes than the more compact. Almost every kind, however, from the coarsely crystalline white marble to the blue limestone, can, I am informed, be obtained in the district. Mr. Young noticed fossils in one place only, namely, just below the New cave. These fossils show that the limestone bed is an old coral reef of palæozoic age. Buried beneath massive accumulations of clay, sand and quartz pebble conglomerates, and subjected for vast periods of time to intense heat and pressure, nearly all traces of the original organic structure of the corals and shells have been obliterated, and the old atoll has been converted into a bed of more or less crystalline limestone. The whole of these sedimentary strata with the underlying limestone bed have subsequently been slowly raised above the sea-level by those oscillations of the earth's crust which, as geology shows, have prevailed throughout all the past of which we have any record, and are even now in progress. Exposed to the denuding influences of air and water, the overlying rocks have been worn down until at last, at a point far inland, the fossil coral reef, now changed into limestone, is again laid bare. Then commences the process of cave-making already described. The lime dissolved out by the acidulated water in the course of the formation of caves is partly deposited in the beautiful and fantastic forms of stalactites and dripstones, but chiefly carried away in solution down the Wombeyan Creek into the Wollondilly River, on to the Nepean and Hawkesbury, and so out to sea at Broken Bay. Arrived in the waters of the Pacific, it is partly absorbed by fish, crustacea, shellfish and tiny organisms on our own coasts and partly carried southwards by the east Australian current, and later northwards into waters warm enough to support the life of the coral polyp, as at Lord Howe Island. Here it is taken up by the polyp and converted into beautiful coralline structures. Thus history repeats itself, and the coral polyps of to-day construct their stony skeletons out of the material which formed the bones of their Silurian ancestors. The Wombeyan caves are therefore interesting in many ways, as much from a scientific point of view as from the natural beauty of their scenery.

A colonial geologist has a busy time. He is expected to help miners by his advice, and it is well for him if he is not supposed to discover beds of gold. But when engaged on mining surveys he cannot forget the consideration of phenomena, and even amidst the arid districts of New South Wales there are opportunities to display the conservatism of nature, in adopting the same processes of destruction and creation which are to be witnessed in Europe.

ART IN THE COLONIES.

IN the address at the opening of the session of the Society of Arts, Major-Gen. Geo. Owen Tudor Burne, G.C.I.E., K.C.S.I., chairman of Council, referred to the progress of art in the colonies. He said:—I may remind you again, as I reminded you last year, that the term *Art* is defined by Lord Bacon as a proper disposal of the things of nature by human thought and experience, so as to answer the several purposes of mankind. Arts are therefore commonly divided into useful and mechanical, fine and liberal, the former being those wherein the hand and body are more concerned than the mind, and are known by the name of trades; and the latter being those which depend more on the labour of the mind, and are the produce of imagination. In the colonies we find a very creditable admixture of both these attributes, although it may be sufficient on the present occasion to refer more particularly to the fine and liberal arts, in which the colonies are making a progress which is eminently satisfactory.

Dealing with Canada first, it seems that there are several art schools in operation in connection with the many valuable educational establishments of that colony. Canada offers a fine field for the talent of nature's true artists, and although Canadian art has hitherto been imitative rather than creative, yet of late years, as the recent Chicago Exposition has proved, Canadian artists can produce pictures which show an individuality of expression which is most creditable to them, among whom more notable names are those of O'Brien, Reid, Bell-Smith, Harris, Forster, Brymner and Miss Bell. We are reminded also by a writer on this subject (Mr. Bourinot, C.M.G.) that the Marquis of Lorne and the Princess Louise, during their residence in Canada, did much to stimulate a wider taste for art by the establishment of a Canadian academy and the holding of annual exhibitions. We may feel sure, therefore, that in course of time Canada will give still greater attention to this branch of her progressive education than she does even now, and will soon follow the useful example of her Australian sisters in the establishment of national galleries and advanced schools of art.

In the seven great colonies of Australia we find much

progress made in the direction of art. Half a century ago no one troubled himself at the Antipodes about art, whereas now it is slowly gaining for itself a position which tends towards a distinctive Australian school. In New South Wales, for example—the mother colony of the Australias—an academy of arts was founded some twenty-five years ago at Sydney, in connection with other branches of public education, and an art gallery was subsequently opened and designated a "National Gallery," which is aided from Government funds, and is freely accessible to the public. The collection in this gallery represents a value amounting to about 90,000*l.*; while a colonial court, devoted to the work of Australian artists, is becoming a feature in the collection, and the purchase of a picture by the State is considered by these artists to be a high distinction. There are also in the country districts of New South Wales many schools of art allied with technical and other educational establishments. As to Victoria, we find that to her belongs the honour of being the first to initiate an art movement in the Antipodes, for after founding a public library at Melbourne in 1853, she added to it, a few years afterwards, a national gallery, in which the collection now amounts to about 450 oil-paintings, besides large numbers of water-colour drawings, engravings and statuary, and other works of art. Here, it may be added, a system of intercolonial exchange of pictures was inaugurated in 1894 for temporary exhibition purposes. There are also in Victoria eighteen provincial schools engaged in teaching science, art and trade subjects. In South Australia there is an art gallery, while drawing is made a compulsory subject in the State schools. In Queensland there are many institutions which comprise schools of art, and in connection with such a school established at Brisbane a technical college has been founded with much success.

In short, in our Australian colonies and in New Zealand there is a wide field for the genius of Antipodean artists who, although without such beautiful green fields and idyllic rural scenery as we possess in the United Kingdom, yet can appeal direct to nature of diverse character, "from the frigid heights of the Australian Alps to the waving palms and jungle-fringed rivers of tropical North Queensland." And we need only mention men like Lister, Streeton, Mahony, McCubbin, Fullwood, Spence, Roberts, Piquenett, Hanson and others, to come to the conclusion that there is a creditable amount of home talent in Australia which can appeal to limitless plains, silent forests, dark lily-covered lagoons, and the wild free life of the bush, for a thousand inspirations towards its development. There are many illustrations in England of the genius of these painters, and no doubt some of you have seen excellent specimens of Australian and New Zealand art in the Imperial Institute and in the Royal Colonial Institute and elsewhere—specimens which will bear good comparison with productions nearer home.

Passing on to the Cape, it may be mentioned that, although the fine arts do not occupy, at present, a large space in its rapidly improving educational establishments, yet that colony has recently passed an Act of Parliament for the purpose of establishing an art gallery at Cape Town, to contain, among other things, a collection of paintings and works of art hitherto held in trust by the South African Fine Arts Association. If I here confine these few remarks as to art to some of our larger self-governing colonies, it is merely, as I have before observed, for want of time. I have, perhaps, said enough to give you an impression that the subject is not neglected in our colonial empire, and I cannot better leave this portion of my address than by re-echoing the words of a true enthusiast (Frank Hutchinson), who tells us that the possibilities of art in Australia are, from a purely artistic point of view, limitless; for here are a thousand undiscovered charms and mysteries, sublime atmospheric effects, and infinite diversities of scenery and life as fresh as from the Creator's hand. With Australia, indeed, as with the minstrel of old, the way may be long and the wind may be cold, but she has at least within her the spirit of youth and daring, and ever ahead and beckoning her onward is—

Hope on the mountains
Beautiful as morn.

FIRE PROTECTION.

THERE could hardly be a more opportune time for the appearance of the first publication of the British fire-prevention committee than now arises. The pamphlet is entitled, "What is Fire Protection? A Study by Edwin O. Sachs, architect," and is obtained at the offices of the committee. The author goes over a wide field, and describes the organisations which at present exist for battling one of the enemies of building construction, and throughout he shows acquaintance with the subject. The following extract will sug-

gest the author's manner of treating the responsibilities of individuals who own property:—

It will have been noticed that all the expenses referred to are such as to my mind fall on the public purse, and that I have not taken into account the actual cost of the better construction or arrangements which the Building Act and fire-survey regulations would require. The property owners would have to cover this expense individually, but I shall not call it a special or extra outlay, as I consider that stability, with due attention to sanitation and fire protection, should be the essence of modern building construction. Surely inferior construction not only shortens the life of a building, but it is also in every way detrimental to the interests of a *bona-fide* investor. Safe construction enhances the value of a property, and the protective measures need not occasion much additional expense. Why not consider fire protection just as much a primary necessity for building as the block-signal system is for railway construction? Is there much difference in aiding a man's death by fire and his death in a railway accident? Why consider it more legitimate to spoil your neighbour's property by fire than to steal it? Bad construction means a risk to one's neighbour's life and property as well as to one's own. It may not only cause a direct loss, but also spoil the man's business for years, and throw those out of employment who are dependent upon him. Why permit injuries of this kind?

Now this is the first time I have in any way distinguished between the safety of life and the safety of property. The protection of property, to which I may have seemed to be specially referring, must in any case include measures for the protection of life, as no fire can originate without there being some personal danger. It is practically immaterial if this danger affects the inmates or the firemen. The protective measures will serve for both, and means for life-saving must be forthcoming as soon as possible after an outbreak has been signalled; as the helpers themselves may want them quite as much as those in or near the risks attacked. It should also be remembered that both a good staircase and a ladder are often quite as useful for the manœuvring of the firemen as for life-saving purposes, and that they are practically quite as essential for the saving of property as for saving life. I do not hold that any distinction need be made between the two risks when speaking of fire protection in general; but as the safety of a single human life must always be classed higher than that of the most valuable property, it may be well to give life-saving the first place when alluding to the two separately.

Up to the present it will have been noticed I have practically only referred to the prevention of fires originating from natural causes, negligence, or accident. Criminal fire-raising may seem not to have had sufficient attention. To my mind there is little or no criminal work where a perfect system of fire protection has been introduced. What with good construction and a fire survey, the quick arrival of the firemen and careful inquests, the risks of detection are far too great to encourage its growth.

Under "Fire Prevention" I first referred to the special requirements of the Building Act, the clauses of which can greatly influence the safety of life by requiring practical exits and sufficient staircase accommodation. I cannot here specially refer to the risks in theatres and assembly halls, which, to my mind, require separate legislation; I simply speak of factories, offices, business premises, hotels and tenement houses. In no case should any inmate of a building be more than 60 feet away from a staircase, and preferably there should be two staircases at his disposal in the event of one being blocked. Generally attention is only given to the construction of staircases, but it must be pointed out that their ventilation is equally important. Smoke is even a greater danger than fire, and may hamper the helpers terribly. The possibility of opening a window has saved many a life.

As far as the protection of property is concerned, the prevention of outbreaks can be influenced by the careful construction of flues, hearths, stoves, and in certain classes of buildings by the construction of floors and ceilings, the arrangement of skylights, shutters and lightning conductors. Then comes the prevention of the fire spreading, first, by the division of risks; secondly, by the materials used in construction.

When I speak of the division of risks the legislator's first ambition must be to prevent a fire in one house spreading to another, and a stranger's property, so to say, being endangered. This is quite possible, given good party walls carried well over the roof to a height regulated by the nature of the risk, the arrangement of shutters to windows where necessary, or the use of fire-resisting glass; again, a thoroughly good roof—or, still better, a fire-resisting attic floor—can do much. If the locality has a fire brigade, and the force is decently handled, "spreads" from one house to another should never occur. Narrow thoroughfares and courts are, however, a source of danger which may baffle all efforts to localise a fire. This should be remembered by those responsible for street improvements.

The division of a building or a large "risk" into a number of minor ones is only possible to a certain extent. I do not hold with spending enormous sums in order to make each of the minor "risks" impregnable. Our desire should be simply to try to retard the spread for a certain limited time after the flames have really taken hold of the contents. In those minutes most fires will have been discovered, and, where there is an efficient fire-extinguishing establishment, a sufficient number of firemen can be on the spot to localise the outbreak and prevent the conflagration being a big one.

Take a drawing-room in an ordinary well-built house. If the joists are strong and the boards grooved, if some light plugging be used and the plastering properly done, if the doors are made well-fitting and fairly strong, a very considerable amount of furniture and fittings can remain well alight for half an hour before there is a spread. In a warehouse or factory "risk" the same hold good. With well-built wooden floors, thickly plugged, and the ceilings perhaps run on wire netting instead of on laths, with ordinary double-ledged doors safely hung, at the most perhaps lined with sheet iron on asbestos cloth, a very stiff blaze can be imprisoned for an hour.

WALTHAMSTOW BATHS COMPETITION.

A MEETING of the Walthamstow District Council was held on Friday evening, says the *Essex Herald*, the purpose being to rescind the appointment of Mr. J. W. Dunford as architect of the proposed public baths, to appoint Messrs. Spalding & Cross as architects, and to ask them to present designs for baths to cost a sum not exceeding 8,500*l.*, and that 100*l.* be offered, without prejudice, to Mr. Dunford in consideration of the cancelling of his appointment. There was a large attendance of the public. Messrs. Spalding & Cross were the first firm of architects who came before the Council in connection with the construction of public baths, and there was an attempt in one quarter to get them appointed, but eventually it was decided to invite competitive plans from Messrs. Spalding & Cross, Mr. Plumble and Mr. Dunford for baths at an estimated cost of 7,000*l.* Designs were submitted by Messrs. Spalding & Cross and Mr. Dunford, and it was resolved that they should be referred to Mr. Plumble, who did not compete, for his award. His report went to show that while in some respects the design by Messrs. Spalding & Cross was superior, that by Mr. Dunford was far more within the limit of 7,000*l.*, and, consequently, Mr. Dunford's design was placed first. After a vast amount of opposition, it was decided to accept Mr. Dunford's design, subject to the approval of the Local Government Board, and he was appointed architect, and his appointment was sealed. When, as a result of the last election, the McSheedyite party gained the upper hand on the Council, an attempt was made to upset the appointment of Mr. Dunford and to secure the appointment of Messrs. Spalding & Cross. This was brought to a head on Friday evening, when the recommendations of the highways committee to substitute Messrs. Spalding & Cross for Mr. Dunford and to extend the cost to a sum not exceeding 8,500*l.* came up for consideration. The meeting lasted fully three hours and was fruitful in scenes, the use of personalities and such words as "lie," "turncoat," &c., being frequent. Eventually the recommendations of the committee were carried by 11 votes to 18.

Mr. Finch, in reply to a remark by Mr. McSheedy, said he thought Mr. Dunford would be foolish if he did not contest the action of the Council.

EDINBURGH ARCHITECTURAL ASSOCIATION.

THE opening meeting for the session of this Association was held on the 17th inst. in the Royal Institution, Princes Street. Mr. Thomas Ross, president, occupied the chair, and there was a fair attendance. After some formal business, the Chairman delivered the presidential address, in the course of which he said that, even after all that had been done to remedy the sanitary condition of the community, much still remained to be done. The surface of the streets and the general outward appearance of things seldom presented much that was positively offensive, but every one who had experience in visiting properties for the purpose of valuation and other purposes must be aware of the scandalous condition in which back areas, back greens, sunk floors and cellars were kept in Edinburgh, and that was not in the slums, but in the neighbourhood of the best streets. It was quite possible to step from gilded saloons, adorned with exquisite taste and richness, like some palace of the Arabian Nights, and find one's self in a back area or cellar surrounded by the most utter abominations. There were such places in good properties in Edinburgh, that had not been cleaned since they were built fifty or 100 years ago. That was not a rare condition of things. It was a very common one and it was

possible to find whole areas of back greens where a man of any refinement would shudder before he entered them. Yet it was from those places that the houses received their principal ventilation, and to such places children were sent to play. Proceeding, he said that within the last few months the Glasgow Architectural Association, evidently in the belief that there was a desire throughout Scotland to found a National Institute, took steps to test that by communicating with all the architects in the country. The outcome of a meeting in June last might be stated thus:—That as the formation of a National Institute of Architects would involve the suppression of the Glasgow Institute of Architects, there did not appear to be much prospect of the success of a National Institute. Then the suggestion was made that they should try and obtain their purpose by a federation of the architectural societies of Scotland, and some few details in connection with such a scheme were considered. It humbly appeared to him that that subject should not be allowed to drop, as the formation of a Scottish institute or a federation would be of the greatest benefit to all societies in Scotland and the cause of architecture. He understood that the Council of the Glasgow Institute had reported recently that, in view of the non-success of a former national institute, the proposal was of doubtful expediency. He thought, however, they might be favourable to some kind of extension or amalgamation with a national institute. It was quite obvious that an architectural institution of Scotland could not be formed with any hope of success without the aid of the Glasgow Institute, and if they decided against such a scheme, that, so far as he could see, put an end to it. It was quite different, however, with federation. That, if carefully gone about, could only result in a strengthening of all the societies, and prove a great saving of money to all. In regard to the Junior Architectural Society, he thought there was plenty of room in Edinburgh for both Associations. A vote of thanks was given to the President for his address, and this concluded the proceedings.

GLASGOW ARCHITECTURAL ASSOCIATION.

A MEETING was held in the rooms, 187 Pitt Street, on Tuesday, the 16th inst., the president, Mr. Wm. T. Conner, in the chair, when Mr. F. H. Newberry, head-master, Glasgow School of Art, delivered a lecture entitled "A School of Art." Mr. Newberry opened his subject by explaining that it was his intention to speak from his position as a teacher, and lay before his hearers what were his ideas as to requirements. The object of a school of art, he said, should be to teach craftsmen how to work in any material, and to engender community of thought and criticism between the different branches of study, but everyone should have an elementary knowledge of craftsmanship. As affecting architects, he considered construction and design should be relegated to the office, and the art part only studied in school. On the important subject of lighting, the lecturer said that an account of its steadiness the north light was preferable for beginners, but the south light also was often required as bringing out a variety of colour. Regarding windows he laid down the axiom, one room one window, and that one a plane, *i.e.* no combination of window and skylight, as thus avoiding cross or reflected lights. Mr. Newberry then took up the different rooms in detail, and specified their particular requirements. At the close, on the motion of Mr. P. S. Hill, A.R.I.B.A., a hearty vote of thanks was passed.

TESSERÆ.

Æsthetic Qualities.

ALL qualities of things which make them æsthetic are comprehended under four classes, which, according to their objective difference as well as according to their different subjective relation, produce for our passivity or activity a satisfaction different not only in strength but also in value, and are also unequally adapted for the purpose of the fine arts. These classes are the agreeable, the good, the sublime and the beautiful. Of these the sublime and beautiful alone are proper for art. The agreeable is not worthy of it, and the good is at least not its design; for the design of art is to please, and the good, whether theoretical or practical, can and need not be subservient to sensuousness. The agreeable satisfies only the senses, and is to be distinguished from the good, which pleases the pure reason. It pleases by its content, for the sense can only be affected by matter, and all that is form can only please the reason. It is true the beautiful pleases through the medium of the senses, in which it differs from the good, but it pleases the reason by its form, in which it differs from the agreeable. The good, we may say, pleases by a pure form that is according to reason; the beautiful by a form that is similar to reason; the agreeable by no form at all. The good is thought, the beautiful regarded, the agreeable only felt. The first pleases in idea, the second in contemplation, the third in material perception.

Nero and his Architect.

Nero sat in a wing of Caligula's palace on the Palatine, talking with Celer, his architect. Celer was an artist after the emperor's taste. We do not know if he had an eye for the grand and chaste in the art of Hellas; but a sense of the pleasing, the piquant and brilliant, was his, and to this he joined an attempt at the grand in a superficial sense, at that which wakens amazement by gigantic size and mighty proportions. When his art dreams were not cabinet pieces they were fever fancies, the realisation of which defied all human power. Palaces with roofs reaching the sky, supported by forests of pillars, bearing in their turn high up in the air rocks shaped into statues; vistas, losing themselves in an infinity of colonnades; fountains, casting whole floods as drops into space; marble basins, with isles and oared ships; a world of gold, ivory, mother-of-pearl, of jasper and marble, adorned with the choicest works of Polygnotus's, Parrhasius's and Apelles's pencils, and of the chisels of Phidias, Skopas and Praxiteles—such was the vision he conjured up before the emperor as they looked out over the Forum, Capitolium and Esquilinus. Nero listened with greater delight the looser rein the artist gave his wild imagination. "But knowest thou," continued Celer, "knowest thou, Cæsar, what I see there, high above house and sanctuary? I see the brow of a god, on the temples of which the sunset light yet lingers when it has gone out upon the hills of Rome. I see a giant figure, the like of which the world has never looked on yet, and by the side of which the Colossi of the Pharaohs are dwarfs. The statue is worthy my palace. The vision bears thy features. That brow, from which the sunshine will not depart, is Nero's. But," he added with a sigh, "all that is a dream—" "Which shall become reality," interrupted the emperor. "That promise I expected of thee," cried Celer. "I cannot dream more boldly than thou canst execute. But then, why art thou Emperor, if not to do great deeds? A thousand houses and temples must be destroyed to make room for this one palace—Cæsar Nero's golden house; but thy will is law, and thy might boundless." Some time after this conversation, July 19, in the year 64, a fire broke out in Rome which made more than sufficient room for the projected palace imperial of Nero. For eight whole days the capital of the world was like a huge pyre. Ten of its fourteen districts were consumed, and art treasures of priceless value were lost. The wind, which blew from the sea drove the monstrous clouds of smoke, formed into strange shapes, towards the Apennines, and the people that saw it said trembling the guardian spirits of Rome are flying hence.

The Sistine "Last Judgment."

There is an idle opinion which has been handed down from one writer to another, which is that the style of design of Michel Angelo is altogether confined to one character, of a robust and muscular kind, copied always from the same model, who, as Freart ridiculously says, was the porter of his academy. If this opinion is not altogether false and groundless, yet at least it is shamefully overcharged; and one would not have mentioned it but to put students on their guard that it may not prevent them from allowing themselves all those advantages in the study of drawing with which the works of this great restorer of art will best supply them. This exaggerated censure had been originally ushered into the world with much more moderation and justice and under the sanction of a most respectable name, for a writer of Michel Angelo's own time, on mentioning the *Last Judgment*, says that when he was at Milan a scholar of Da Vinci informed him that his master spoke of it to this effect:—"That the only thing which displeased him in this work was that in so many various aspects there were so few figures, from which cause the muscles were as apparent in the youthful as in the aged, and that the outlines were of the same character." The remark is in some measure just, as applied to the *Last Judgment*, but it is worth observing that it never could have been made by Da Vinci, as he left Rome to go to France in the Pontificate of Leo X., and the *Last Judgment* of Michel Angelo was not executed till near twenty years afterwards, under Paul III. No doubt a considerable monotony of character prevails in the *Last Judgment*, where also his want of general management in the distribution of his objects as a painter (which, by-the-by, he never professed himself to be) is sufficiently evident. But this does not appear in his less extensive compositions in the ceiling, which were painted some years before, when he was in the vigour of life.

English Art Prior to 1760.

Although foreign artists were liberally, nay, splendidly encouraged and rewarded here from the time of Henry VIII., yet we cannot boast of English limners whose works superseded those of Holbein or Vandyke, not to name many others of distinguished abilities who, practising here, afforded our native artists abundant examples of sterling art. Surely, then, the perceptions of our painters must have been more obtuse than those of our poets, many of whose works, fairly competing with

those of the writers of former ages, left all contemporaneous labours far behind; at that period, too, when neither painting, sculpture nor engraving contributed aught to the honour of our national intellect. The dulness of native genius affecting these elegant arts appears to have been, as nearly as may be, coequal to the general apathy, from the king down to the cobbler, touching such pursuits. Painting in particular may be instanced in proof of this, for the public apathy continued and general ignorance prevailed as to the merit of this art, long after certain English professors had proved to the world by their own meritorious labours that painting was no longer a dead letter in the living school of science. Prejudice, however, which governed the opinions of those who might have been expected to manifest better taste, had much to do with this. The leaders of fashion in matters of *virtù* either could not or would not appreciate justly the claims of their countrymen and contemporaries. Hence the public, taking the dicta of these leading connoisseurs for orthodox canons of criticism, concluded that painting on canvas like staining of glass was a lost art. Hogarth was, even by Walpole, his first panegyrist, pronounced to be no colourist, and Reynolds, even in the plenitude of his fame as a portrait painter, obtained no more than 300 guineas for his *Garrick between Comedy and Tragedy*, and for a subsequent work, *The Count Ugolino*, only 400; though the first was purchased by a noble earl and the latter by a noble duke, each reputed connoisseurs. The liberal encouragement which subsequently was bestowed on the arts by Alderman Boydell, a trader in the labours of his ingenious compatriots, induces us to marvel at these past events. Amongst the many operating causes of the change in favour of the living school, we may ascribe the first and principal one, perhaps, to the good sense and foresight of the patriotic band of artists who first projected the scheme of a public exhibition of their respective works. The circumstances which led to this originated, as in many other affairs of still greater national importance, almost fortuitously.

Pavian Romanesque.

Among the other more prominent characteristics of this style it should be noticed that whether forming actual porticoes and galleries or closed up and applied merely as decoration, the arcades were generally small in proportion to the building itself, and instead of occupying the centre width of the front or other elevation were mostly inserted into distinct compartments of it, slightly recessed within the general face of the wall, so that the plain spaces between them assumed the appearance of buttresses or, when narrow, of plain pilasters continued up to the cornice of the gable or roof, and cutting through whatever string-courses or other horizontal moulding (if there were any) divided the different storeys or stages of the edifice. Such buttress-like surfaces—for buttresses they cannot properly be termed—were occasionally more or less enriched, sometimes so much so as to produce vertical lines of ornament continued the entire height of the building, as in the front of San Michele at Pavia, which city may be considered as the cradle of Lombardic architecture. When, as was frequently done, these surfaces were made wider at the angles of the front than elsewhere, they gave an expression of repose and of great solidity to it, serving, as it were, as a frame to the architectural decoration. Among the other peculiarities of this style, that arising from small open galleries immediately beneath the cornice or roof is too remarkable to be overlooked, especially in gable fronts, where the arches of such galleries follow the slope of the roof itself, the columns being successively elevated one above another on steps (so that the base of those supporting the centre arch are above the lower arches), as at San Michele, just mentioned, or else by placing the columns on the same horizontal line and gradually increasing their height, as in the front of Pisa Cathedral. To this may be added the very prevalent custom of making an upper cornice or border of very small interlacing arches, or rather of mouldings producing that appearance. Pinnacles are of rare occurrence, and when introduced have the look of being set on the part they rise above, being separated from it by horizontal mouldings; besides which they are generally low and somewhat resemble pedestals. Pinnacles of this description may be found surmounting pilaster-breaks, and cutting through either an horizontal cornice or the sloping ones of a gable, as in the front of the cathedral at Monza.

English Records.

In the *volumina*, or *scapi*, of the ancients, the writing was carried in equal columns, as in the pages of a book, along the length of the skin, whilst the enrolment in both sorts of English rolls was written across the width of the membrane. Both these kinds of rolls are still used. The rolls of the common law, after the time of Henry VIII., contain so many skins that they cease to be rolls, but become simply oblong books, and, unlike the early rolls of the same series, are exceedingly ill adapted for preservation and inconvenient for use. There are many of these misnamed rolls of the reign of Charles II., which in shape,

size and weight resemble the largest of Cheshire cheeses, often requiring two men to lift them from the rack. Membranes may be fastened together after the chancery fashion in any numbers, and yet remain a legitimate roll, though imposing much bodily labour in the consultation. The Land Tax Commissioners' Act of 1 Geo. IV. extends, it is said, 900 feet when unrolled, and employs a man three hours to unroll the volume. Other records have the shape of books. Domesday Book, called both "Rotulus" and "Liber," the oldest and most precious of our records, counting eight centuries as its age, and still in the finest order, is a book; and as occasions presented themselves for adopting this shape without infringing on ancient precedent, the far more accessible shape which we now call a "book" seems to have been employed. A considerable part of the records of the courts of surveyor-general and augmentations, in the reign of Henry VIII., of wards and liveries and requests, are made up as books. Other documents, those relating to fines, the "Pedes Finium or Finales Concordiæ," the writs of "Dedimus Potestatem," and acknowledgments and certificates, writs of the several courts and returns, writs of summons and returns to Parliament, inquisitions post mortem, &c., by tens and hundreds of thousands are filed, that is, each document is pierced through with a string or gut, and thus fastened together in a bundle. The material on which the record is written is generally parchment, which, until the reign of Elizabeth, is extremely clear and well prepared. From that period until the present, the parchment gradually deteriorates, and the worst specimens are furnished in the reigns of George IV. and William IV. The earliest record written on paper, known to the writer, is of the time of Edward II. It is one of a series entitled "Papyrus magistri Johannis Guicardi contra-rotulatoris Magnæ Costumæ in Castro Burdegaliæ anno domini M^o. ccc^o. viii^o."

Invention in Painting.

As for any rules that may be prescribed to assist invention, they can be but vague at best, particularly for the man who has occasion for them. Those most generally laid down are, that unity of idea be pursued through all parts, principal and accessory, and that all necessary conformity with the circumstances of times, places, usages, characters and manners be continually kept in view. But the successful application of these, and all such necessary observances, must entirely depend on the stock of liberal general education which is previously treasured up in the mind of the artist. Without this adequate education the hands of the painter or sculptor are inevitably tied up from all great undertakings, whatever his natural genius may be; for nothing can be more true than the old adage, "that the painter paints himself, or that the work is always a representation of the author." This is not to be understood, as some have imagined, that either the representation of the artist's face, or the peculiar conformation of his bodily structure is traceable in his works. No; it is the mind of the artist which is visible in what he does; the one must necessarily be an offshoot of the other; they are equally wise or foolish, contracted or expanded, made up of commonplace and gross ordinary materials, or the contrary. From a rude, trifling or ill-formed mind nothing good, instructing, great, sublime, amiable or interesting can be expected. Such an artist may, indeed, attempt to employ his memory, and imitate the celebrated works of others, coldly and at a distance; but he cannot be original without showing himself.

Seal Engraving.

The Greeks carried this branch of the fine arts to the same perfection which their genius and feeling for the beautiful enabled them to reach in all others to which they devoted their attention; but we do not trace its existence among them to a very remote date. It has been supposed that as Homer does not allude to seals they were not used in his time. It is to be lamented that we have no information respecting the process by which the ancient intagliatori (scalptores and cælatores—though the latter term seems to apply more properly to metal-chasers—as they are called by Pliny and others) executed works which are now justly referred to as the best examples of the art. It has been a question with antiquaries whether the lathe was known; but though it is not described by any ancient writer, the works themselves seem to afford evidence of its employment, and Pliny refers to the invention of an instrument which he calls "tornum," which may fairly be supposed to mean a turning machine or tool. It is certain they were acquainted with the use of diamond powder. The modern practice of cutting stones in intaglio is by an apparatus similar in principle to the turning lathe, which gives the cutting tool, placed horizontally, a quick rotatory motion, and the stone on which the design is to be engraved being brought into contact with it, the surface is ground away or indented till the effect required is produced. Instruments of various sizes are used which can easily be removed and replaced, and it is usual, during the process of engraving, to supply the points of the tools with diamond-dust mixed with a little sweet oil.

NOTES AND COMMENTS.

It will be an advantage if that part of the Public Health Act which relates to complaints by a ratepayer against local authorities to the Local Government Board is amended. It may be considered as more economical than a lawsuit, but the Whitehall authorities are difficult to move, and when actions are taken the right to complain is sure to be urged, and impedes judge and jurymen. There is the doctrine of misfeasance, which is entirely out of place in connection with the responsibility for sanitary works. The difficulties attending an action for damages by defective drains were exhibited in a case which was argued a few days ago before Mr. Justice WRIGHT. The plaintiff claimed damages against the Bishop Auckland Urban District Council for injury to his houses caused by sewage. Mr. Justice WRIGHT, when he tried the case at the last Durham Summer Assizes, left the following questions to the jury:—(1) Were the foundations of the plaintiff's houses insufficient? Answer—No. (2) Was the defendants' sewer badly constructed originally, that is, before their time, and, if so, in what respect? Answer—It was badly constructed in consequence of defective joints. (3) Was the defendants' sewer improperly and negligently maintained or repaired by them, and, if so, in what respect? Answer—The sewer was improperly and negligently maintained, because the defendants did not examine the drain the whole length of the street on the second occasion upon which they opened it out. (4) Was the damage caused entirely by the bad situation or bad foundation or bad construction of the houses? Answer—No; it was caused by the water from the sewer. In the Queen's Bench Division, when the case came up for further consideration, the defendants' counsel moved for judgment on the grounds that the flooding was a non-feasance for which no action would lie, and that the plaintiff's remedy was to complain to the Local Government Board. It was not shown that the defendants did anything wrongly, or neglected anything which was necessary. Mr. Justice WRIGHT said he considered the findings were contrary to the evidence, but he had to accept them as right. He believed that all was done in the way of repairs that ought to have been done, but with the findings before him he was compelled to enter judgment for the plaintiff. Stay of execution was granted. Apparently the repairs were executed in small divisions at a time, but as it was known that the drains were not of the latest or most perfect form, having joints without flanges, it is hard to see how the jury, with the evidence before them, could have arrived at any other conclusions than those given in reply to the Judge's questions.

THE late Mr. CHARLES JOHN SHOPPEE, who died on the 18th inst. in his seventy-third year, would have been a very prominent architect if he had lived in a provincial town. But he did not attempt the risks which are required to gain a foremost place in London. His was a safe and, we believe, a remunerative practice. He was an excellent President of the Surveyors' Institute, and was closely connected with some of the City companies. Although a most peaceable gentleman, on three occasions he was chosen to be Master of the Armourers' Company. Mr. SHOPPEE was also Master of the Barber Surgeons' Company. He restored their hall, which was threatened with destruction a week ago, and was a useful representative of the company in helping to manage the Irish estates. He was elected to the Council of the City and Guilds of London Institute. Mr. SHOPPEE also restored Gray's Inn Chapel. But the majority of his buildings were designed for business. The name SHOPPEE sounds English, but it is a corruption of "CHAPUIS," for the late architect was of Huguenot descent, and kept up connection with his fatherland by his office of deputy governor of the French Hospital.

It is the fashion of late years to imitate English manufactures in France, and especially in Paris. We cannot, of course, object to so sincere a form of flattery by a people who are adepts, but why should the atmosphere be also inspired by the fashion? From the deterioration of Paris buildings it would seem as if the air in the city exceeds our London air in the quantity of injurious elements. The

latest victim is the Madeleine. The Corinthian capitals of the exterior colonnade are in so dangerous a condition that several of the acanthus leaves have had to be removed in order to avoid accidents. The subject has come under the notice of the Municipality, and however stingy the councillors may be in voting money for ecclesiastical buildings, they dare not neglect so prominent a building. It is anticipated that the works will be commenced early in the coming year. The church has had a strange history. It was commenced in 1764. On the death of the architect his successor completely transformed the arrangements. NAPOLEON insisted on another transformation, with the object of using the building as a sort of temple of fame for his army. He decreed that on the anniversaries of the battles of Austerlitz and Jena the building was to be illuminated, that there was to be a concert and a discourse on military virtues. The downfall of the Empire suspended operations. In 1816 it was ordered that the building was to become a church, but VIGNON, the architect, adhered to his plan of a temple of victory. The completion of the works was carried out by M. HERVÉ. The Madeleine is unlike any of the churches in Paris, but it is well adapted for grand ceremonies.

THE Orleans Railway Company that obtained the privilege to erect a terminus on the site of the Cour des Comptes in Paris have yet to accomplish a difficult task, for it will be necessary to satisfy a more severe body of judges than was hitherto constituted about the suitability of the design for such a position as the Quai d'Orsay. Among the members are the painters M. PUVIS DE CHAVANNES, M. BONNAT, M. LAFENESTRE and M. DETAILLE; the architects M. PASCAL (the inspector-general of civil buildings), and M. VAUDREMER (Government architect); that is to say, six members of the Institut de France. The following architects are also members of the commission:—MM. HAENTCHEL, BERTRAND, NENOT and LISCH (inspector-general of historic monuments). We find also the names of M. ROUJON (director of fine arts) and three inspectors-general of the Department of Ponts et Chaussées, senators, deputies, &c. In all there are twenty-five members, and it would be strange if they allowed a design to pass which would not be an ornament to Paris.

THE visitors' committee of the Cheshire County Council report that the extensions of the Upton Lunatic Asylum would have been completed next month if the plasterers employed had not given up working. It was found necessary to send to America for substitutes, and plasterers have been likewise engaged in Italy and France. Some of the new-comers were persuaded by the strikers to break their agreement, but the committee are taking precautions to prevent a repetition of the weakness.

OWING to the perversity of a tenant the Commissioners of Public Works in Ireland cannot obtain Kilmallock Castle, which stands in need of Sir THOMAS N. DEANE'S conservative attention. The tenant is a smith, and the stronghold of the DESMONDS is used by him as a forge. Tenant right is now more valuable than landlord right where the latter has survived, and he demands 500*l.* for giving up possession. Eviction is a slow and troublesome process, but it is the only resource in this case. The Irish chiefs cared little for the picturesque, and Kilmallock Castle is so commonplace it does not gain interest by its decay. But it is supposed to have guarded the "Irish Baalbec" in the days of its glory. Not long since it was doomed to destruction, but the Grand Jury of Limerick saved the castle. We hope it was not a useless interference, for unless it comes quickly under the charge of the Board of Works, it may be destroyed by the local vandals.

ILLUSTRATIONS.

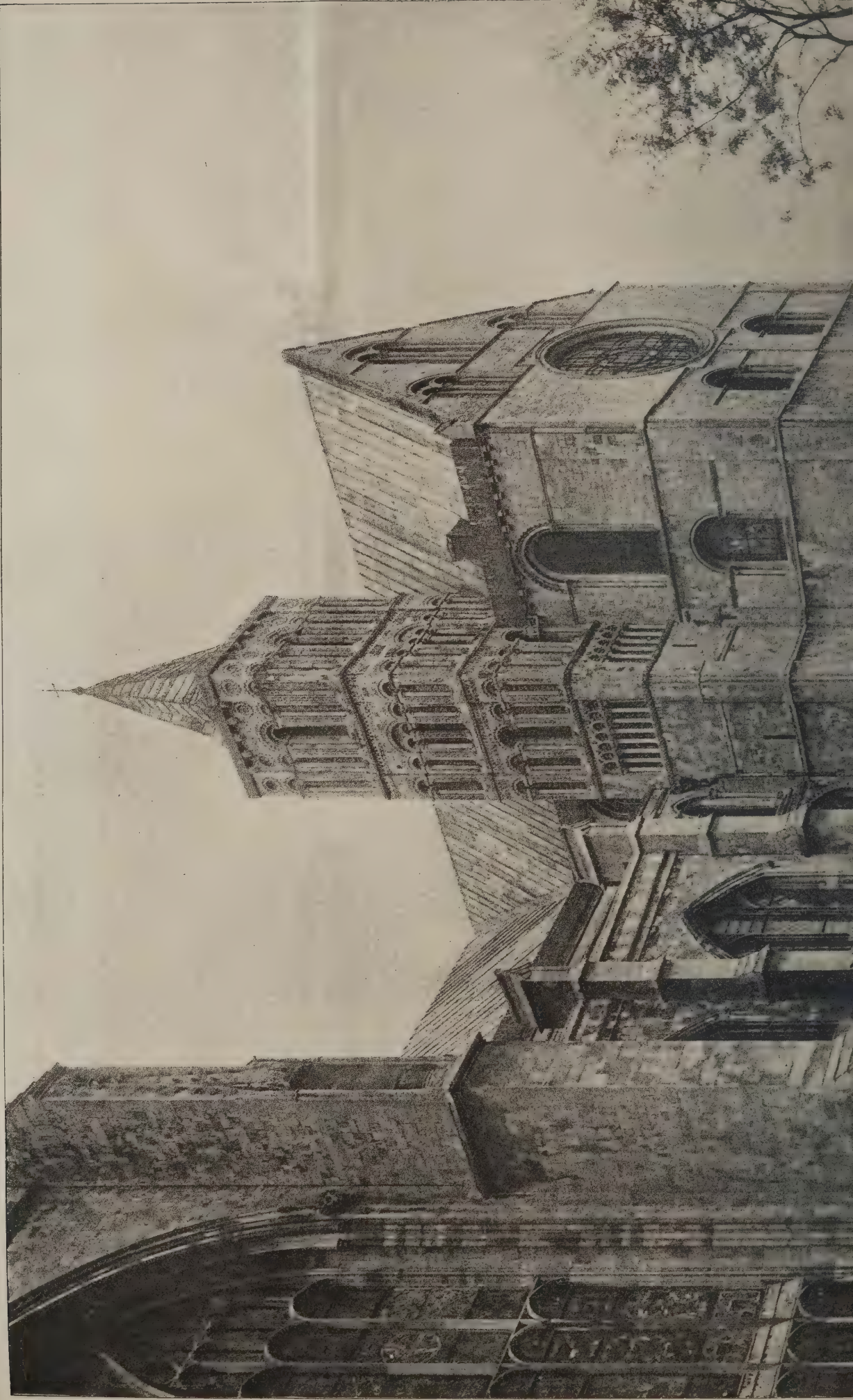
CATHEDRAL SERIES.—CANTERBURY: SOUTH CHOIR TRANSEPT AND NORMAN TURRET.

ALLIANCE INSURANCE OFFICES, MANCHESTER.

NEW UNITED PRESBYTERIAN CHURCH, FOUNTAINHALL ROAD, EDINBURGH.

DRAWING-ROOM, ALTHORP PARK, NORTHAMPTON.

The Architect, Nov. 26th 1897.

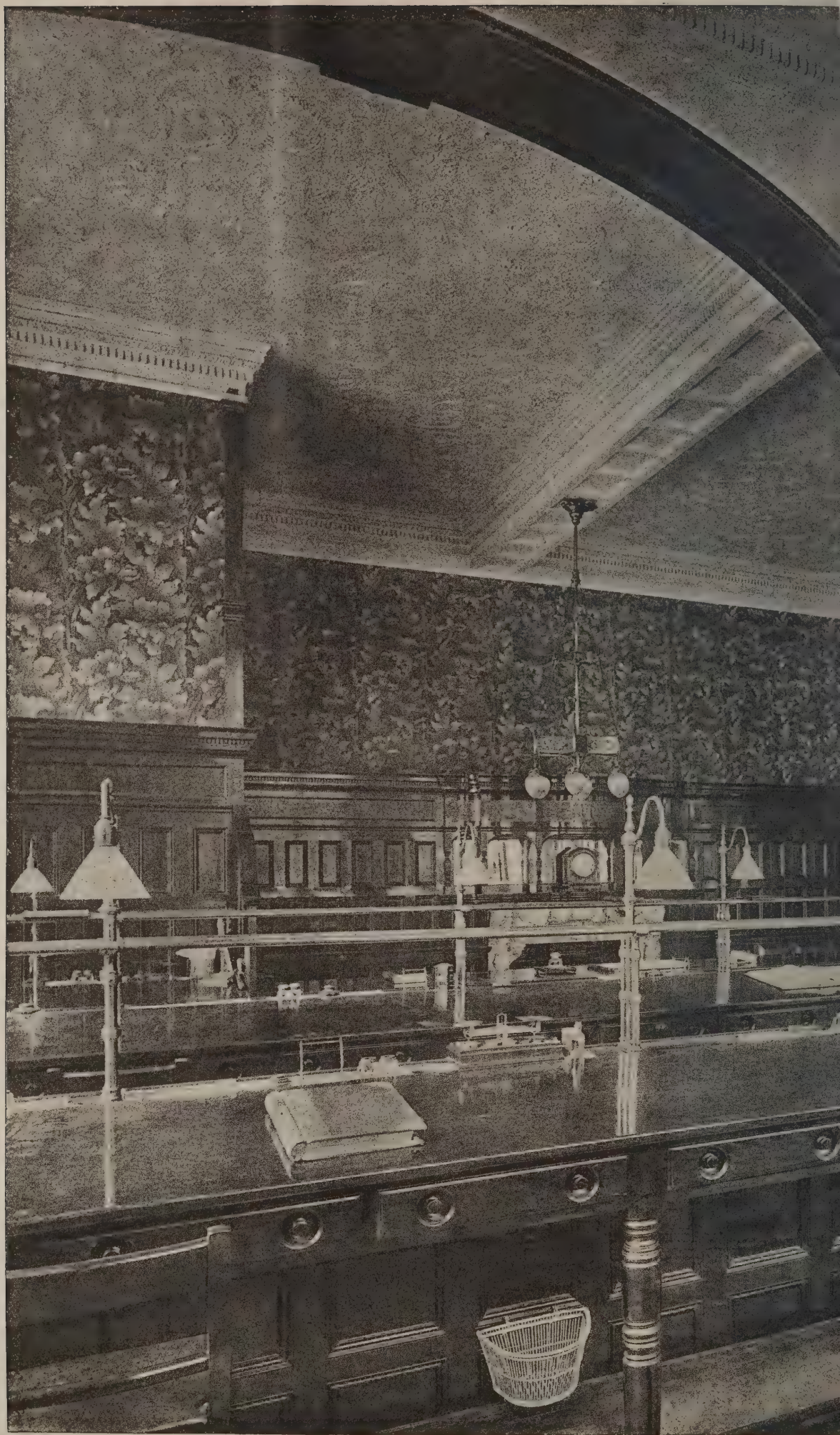




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CATHEDRAL SERIES, No. 90.—CANTERBURY: SOUTH CHOIR TRANSEPT, AND NORMAN TURRET.



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ICES, MANCHESTER.

E, Architect.







INK- PHOTO. SPRAGUE & CO. 4 & 5 EAST HARDING STREET FETTER LANE, E.C.

FOUNTAINHALL ROAD, EDINBURGH
R.I.B.A., Architect.



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26th 1897.



INK PHOTO SPRAGUE & CO. 43 EAST HARDING STREET FETTER LANE E.

PARK, NORTHAMPTON.

ENCER, K.G.

ECCLESIOLOGIA GERMANICA.

By T. FRANCIS BUMPUS.

(Continued from page 300.)

ALTHOUGH the comprehensive title which has been selected for these papers precludes a lengthy description being given of any particular building or buildings, the comparatively little known character of the Dom at Halberstadt has constrained me to break through my self-imposed rule in this instance. So, before resuming the notes on the steeples and steeple groups of this part of Germany which its description interrupted, I propose making a few remarks upon the interior of what is, to my thinking, the most harmoniously-proportioned cruciform building in this part of Europe.

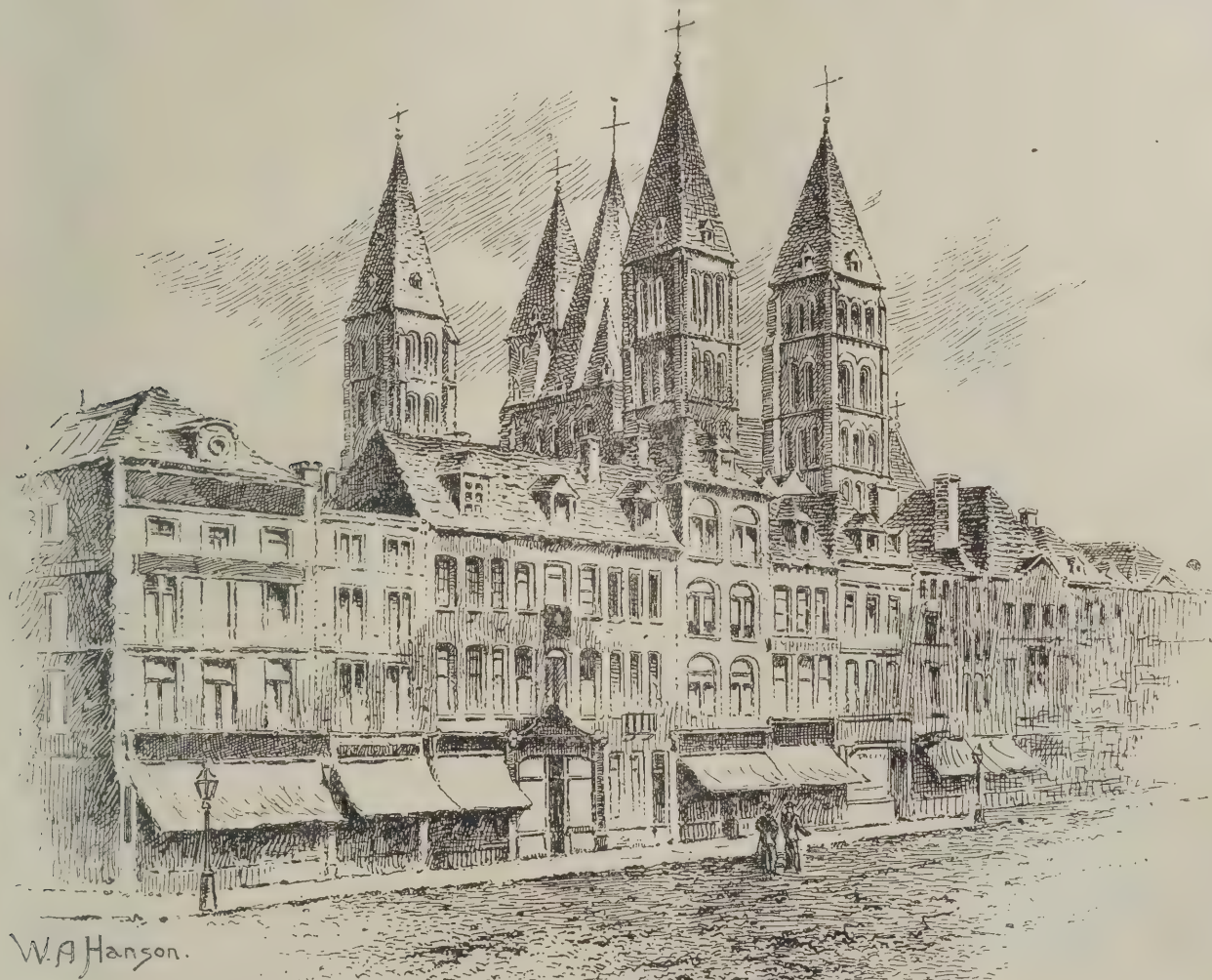
Next to its narrowness, the leading characteristic of the Dom at Halberstadt internally is its French aspect, the disposition of its nave piers,* and the graceful three-sided apse

the same end from an æsthetic point of view, viz. that prolongation of the clerestory windows to the string-course above the pier arches which adds such dignity and richness to the internal elevation of Ratisbon.

The unrelieved space left between the apex of the pier arches and the string-course of the clerestory, is not so disagreeably apparent at Halberstadt as in the examples to which I have just alluded; but while a small unpierced portion of the clerestory windows does in a measure answer to the Ratisbon Cathedral arrangement, yet relief to the bare interval of wall above the arches would certainly have improved the *ensemble*.

The prevailing hue of this elegant church internally is a greyish white, one that would be materially softened by painted glass, in which the aisles and clerestory of the nave are entirely deficient.

An immense organ by Heinrich Herbst of Magdeburg (1718), but almost entirely rebuilt in 1838 by Schulze, forms, with its nobly carved case, a magnificent termination to the view westward, towering as it does to the roof and completely



CATHEDRAL OF TOURNAI, FROM THE GRANDE PLACE.

terminating the vista, so agreeably broken by the exquisite Late Pointed rood-screen, being strikingly reminiscent of the cathedral of Tours.†

Such great German churches as Freiburg-im-Breisgau, Magdeburg, Metz, St. Sebald Nuremberg, and Ulm are unfortunate in desiderating a triforium range,‡ or what answers

* See *The Architect*, October 8, 1897.

† In the French example the rood is wanting. That beautiful and, it may be added, indispensable feature to a Pointed church being, as almost everywhere in France, wanting at Tours. A tall, nondescript iron gate ill supplies this deficiency.

‡ It seems not a little strange that the triforium should be absent from the Middle Pointed buildings of a people who showed what a noble feature it could become in such churches of the Romanesque and Early Pointed epochs as Neuss, Andernach and Limburg, where it goes under the name of Männerchor. Strasburg and Cologne Cathedrals are the only two great thirteenth-century Gothic ones possessing *bona-fide* triforia.

occupying the west end, above the gallery in which it is placed. This gallery has an elegant parapet pierced with quatre-foiled circles, and from its centre a species of small corbelled pulpitum projects. A wide Pointed arch springing from capless piers, and having a large quatrefoil circle in each spandrel, supports the whole.

The nave is fitted up for the Lutheran service with good and substantial, but heavy-looking, pews, having huge poppy-heads, on the "motif" of the old woodwork in the choir, to their ends. A few feet in advance of the central arch of the rood-screen,* which stands beneath the eastern arch of the crossing, is placed a stone altar having a painted front in lieu of antependium, and furnished with a crucifix and pair of candles. Some timid advances towards a more ornate ritualism seem to have been made lately in the Lutheran churches of Germany—such as the employment of coloured altar frontals for the

* As it is proposed to devote a special section of these Notes to the roods of Northern Germany, its description is at present deferred.

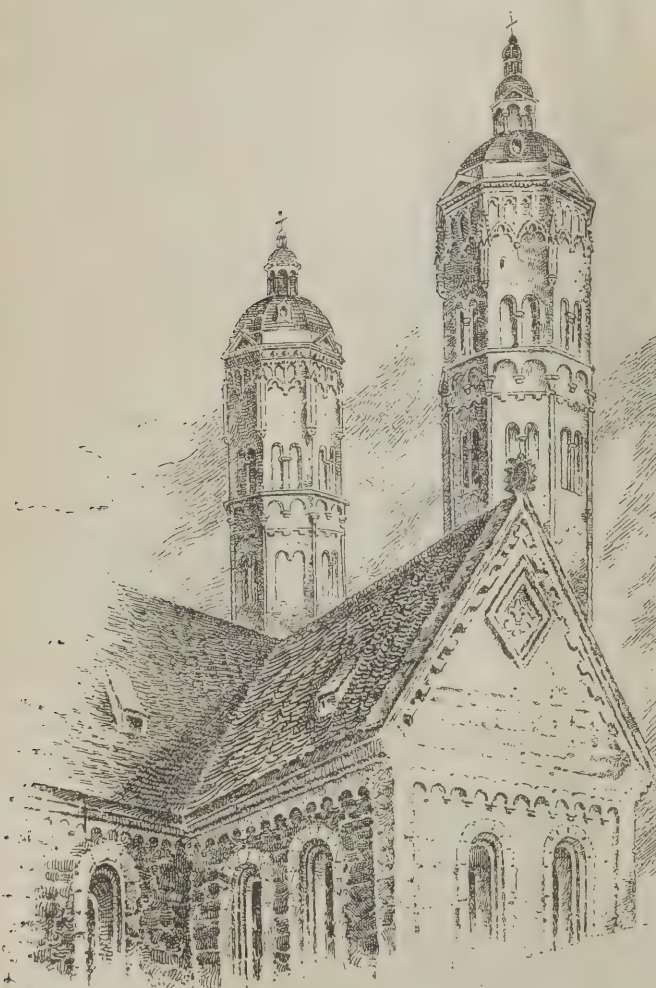
various seasons of the Church, which I notice have been adopted at Herford and Naumburg. In some of the Erfurt churches of the Lutheran persuasion I found vases of flowers in addition to the customary crucifix and lights on the table.

Passing within the screen, the old choral arrangements of the five-bayed eastern limb seem comparatively undisturbed. The stalls and Bishop's throne, which latter, as at the Protestantised cathedrals of Meissen and Naumburg, stands at the west end of the choir facing the altar, are fine specimens of wood-carving; three standards for lights of three branches apiece are disposed at intervals up the centre of the choir; and some rich tapestry, the canopied figures bracketed against the piers, and the Late painted glass, of which the windows of both aisle and clerestory boast a goodly supply, unite in composing a most picturesque architectural *ensemble*, one that would be materially enhanced by an amelioration of the mean arrangements of the altar, and its equipment with the crucifix and lights. There is no reredos, and a beautiful vista, terminating in the painted windows of the apsidal lady chapel, is thus obtained.

Passing into the choir aisles, a deterioration in workman-

of an autumnal leaf—look remarkably well, rising from the slender towers with their gables and graceful belfry windows. The mention of these steeples warns me that it is time to quit this fascinating building, and to resume the thread of my notes on that section of the subject which arrival in Halberstadt caused me temporarily to drop.

Although the architecture of this part of Germany, be it Romanesque, Pointed or Flamboyant, is superior not only to that of Westphalia and of the provinces bordering on the Baltic, but in some respects to that of the Rhine, there are no steeple groups in Saxony which impose the visitor at a *coup d'œil* like those of Gelnhausen, Limburg, Speyer, Andernach or Cologne. Neither can it show anything to compare with that extraordinary group at Tournai, one which for our purpose may be considered as thoroughly Teutonic, and of which I am able to furnish an illustration from the facile pen of Mr. W. A. Hanson; but Naumburg, Erfurt, Halle, Freiburg-on-Unstrutt, Muhlhausen, Arnstadt and the Liebfrau-Kirche at Halberstadt will not prove altogether disappointing in this respect, if they do not combine into such fascinating groups as those named in



W. A. Hanson

The Eastern Steeples
Naumburg

ship is very evident, the groining ribs springing from their slender shafts without the intervention of capitals. There is, however, some really beautiful detail, especially a narrow doorway in the south aisle having a sculptured Nativity in its tympanum. The Germans excelled in small bits of detail like this. One chapel—that of the Blessed Virgin—alone opens out of the circumambient procession path, upon the awkwardness of whose planning I had occasion to animadvert in a former paper.

Excepting, perhaps, a certain feeling of confinement, the prolongation—at the point called by the French the "Pourtour"—of the wall connecting the extremity of the aisles with the lady chapel obliquely, in lieu of continuing it due eastward to meet an apse, is not quite so disagreeably forced upon the spectator as when viewing the church externally.

From the upper storey of the cloisters, of which I shall say something when reviewing these entourages generally, the whole south side of the Dom is visible at a glance. Hence, the tall, modern Lübeck-like western spires—the colouring of whose metal-work assumes under certain conditions of light the tint

of the first list. As a rule the Saxon steeples, when four in number, are placed in pairs flanking either extremity of the church. As we are supposed to be still in Halberstadt, we will take the last-named example of spire groups first—that of the Liebfrau-Kirche. This is a most interestingly untouched eleventh-century conventual church, of exceedingly simple Romanesque architecture, and retaining its original flat wooden roof. It is equipped with four steeples. The eastern pair—tall octagons capped with spirelets—occupy the angle formed by the nave and either transept. Usually the eastern angle is chosen for their *locale*. The western pair are square towers, gabled on each side, and crowned with quadrilateral stone spires of the Rhenish type. I may add that additional dignity is imparted to the western elevation of this church by raising the façade between the steeples considerably above the roof line, after the fashion of the screen façades of Goslar, Brunswick and Gernrode, but the arrangement in this instance has a far greater appearance of solidity and grandeur, being coextensive with the depth of the steeples and transversely roofed with a gable in a *bona-fide* manner.

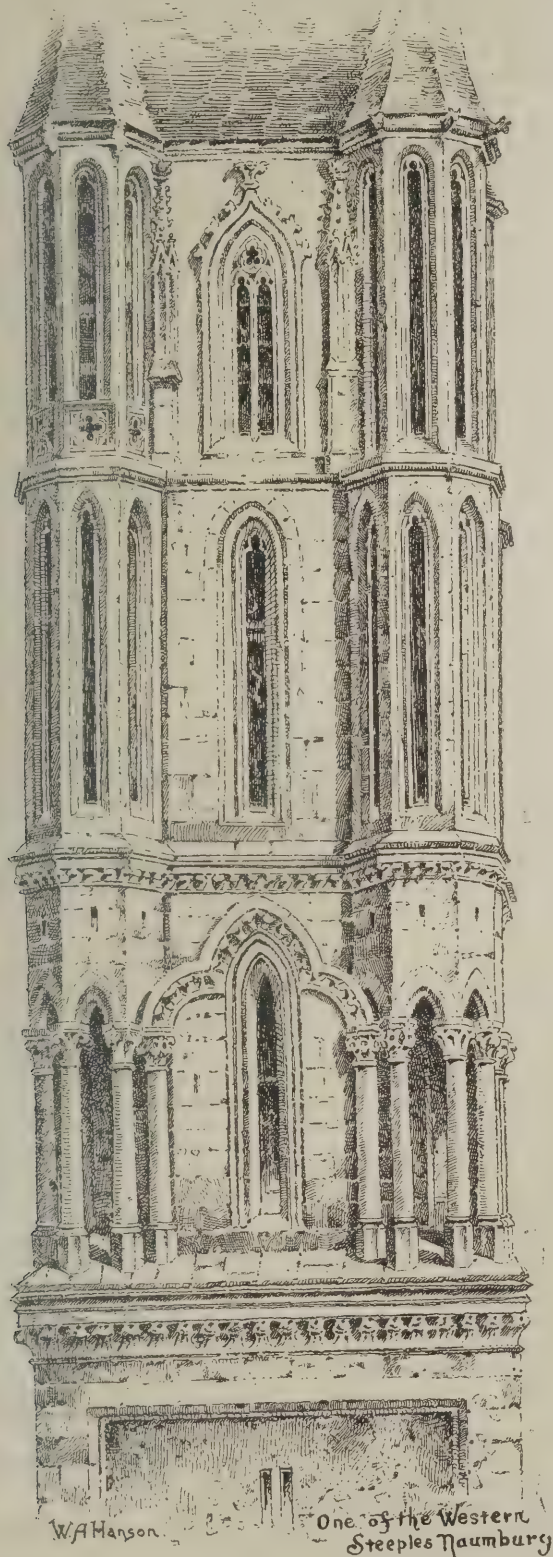
The cathedral of Naumburg was originally planned with four steeples, but it has only attained the fulness of this dignity within the last quarter of a century, during which great and salutary restorations and ameliorations have been carried out in the fabric of this most interesting German church.*

The Dom at Naumburg, of which it will be remembered a slight description was given in the first number of this series of papers, consists of a nave with aisles and transept in Transition between Romanesque and Pointed—or, to speak more strictly, in a style which titubates, like Münster, Osnabruck and Trèves, between the latter and the former protean one—and to which a "choir" of Early and Middle Pointed Gothic has been added at the west and east ends respectively.

Occupying the angles formed by the eastern choir with the transepts is a pair of steeples in Romanesque. These are carried up square to the same height as the walls of the choir and transept, the corbel-table being continued right round, and seeming to bind the three limbs together in a very satisfactorily

* Naumburg is described in the second volume of *The Sacristy*, a short-lived publication which, it was hoped, would have taken up the work that *The Ecclesiologist* had dropped shortly before the appearance of its first volume in 1871. Naumburg Cathedral was then in a deplorable state, its internal arrangements deserving to the full the censures passed upon them by the writer of the article. Among some of the most interesting contributions to this ephemeral publication were "Embroidery," by J. Aldham Heaton; "Gregorian Music," by Rev. H. Fleetwood Sheppard; "Some Thoughts on Modern Parish Churches," by J. T. Micklethwaite, who also contributed a paper on the completion of St. Paul's, where the present arrangement of the choir fittings was at that time (1870) under consideration; "The Anabaptists of Münster," by Rev. S. Baring-Gould, &c. The tone of all these articles was much more advanced than that of *The Ecclesiologist*, in the volume of which for 1855 there was an excellent account of Naumburg from the pen of the late G. E. Street.

solid manner. They then take an octagonal shape, and are capped with bulbous slate cupolas. These last, as well as the uppermost stage, betray the hand of the Late Pointed architect, and, while not a little picturesque, will scandalise the purist.



One of the Western Steeples Naumburg

The square portion of these towers opens, on the ground floor, into a small apsidal chapel. The next stage contains other chapels approached from the aisleless eastern choir, which, it will be remembered, is raised some 16 feet above the level of the nave and transepts, being elevated upon the crypt, whose floor is only 4 feet lower than the pavement of those portions.

The western pair of steeples seem to have been rebuilt when the elegant choir at that end of the church was projected, early in the second half of the thirteenth century. Until within the last twenty years the southern steeple had not risen above its square substructure, while the northern one had been completed with the exception of its pinnacles and spire—a fantastic dome forming its capping, as shown in Puttrich's book on the architecture of Saxony. Now, both have been finished, and with their elegant angle tourelles recall the steeples of Laon to

those familiar with the architecture of the country lying around that city, Soissons and Rheims; and few districts of Europe can show such a galaxy of churches as this. Pinnacles and slate spires of not very felicitous outline now crown these western steeples of Naumburg. Bamberg Cathedral has a similarly outlined pair of western steeples. I am indebted to my friend Mr. Hanson for the extremely spirited drawing which he has furnished of one of these towers, thus precluding a detailed description. This I have chosen in preference to a more distant and generalising view, as it enables the student to form a closer acquaintance with the beautiful Early Pointed detail in which it abounds. The carving of the cornice to the lowest stage is unusually good, and is carried right round the eaves of the western choir. The manner in which the natural foliage springs upwards and fills a large hollow with its ramifications is among the best I have seen in Germany; indeed, one is inclined to doubt not only the parentage of this detail, but of the upper storeys of the steeples generally.

(To be continued.)

PROTECTION AGAINST FIRE IN MUSEUMS.

ONE of the subjects to which the Select Committee on Museums of the Science and Art Department gave most attention was the provision against fire. It was notorious that the buildings of the

South Kensington Museum

could not be called fireproof in the lowest sense of that much-abused word. Mr. Edward Street, who had been instructed to examine them in 1893, gave a general opinion of the case in the following words:—

"Upon studying the buildings and their contents, one is first struck with the great beauty of effect as one walks through the various galleries, and a systematic series of visits, such as I have lately been making, greatly strengthens this impression upon the mind. One is still more deeply impressed as to the value of the collection brought together, and with the knowledge that, as regards many of the exhibits, if lost they could never be replaced; and this must not be lost sight of in considering the buildings in which such a priceless collection of beautiful objects is housed. One is astonished most of all at the apathy or condition of things that has permitted a series of old buildings, built of wood and lath and plaster, and in many instances covered with tarred felt, to go on existing from year to year in close proximity to such a collection of art treasures as I have referred to; and, further, that this danger should have been aggravated by the erection of a further series of large temporary buildings constructed of fir framing, and covered, it is true, on the outside with iron, but lined internally with varnished matchboarding. Nor is fire the only element that would be disastrous to the collections. One's experience as a fire-office surveyor leads one to the conclusion that almost as much damage is done by smoke as by the water and in extinguishing fire or embers as by the actual fire itself; and it is scarcely necessary for me to point out to you that water falling from a hose on to the Raphael Cartoons would have results that all lovers of the art of past ages must shudder to contemplate."

Some of the buildings are so dangerous Mr. Street considered they would not be insured on any premium that could be offered, and he added, "their preservation to the present time speaks in loud praise of the care and watchfulness of those who have had the care and charge of the premises and their contents."

The need of safety was so urgent that the committee were compelled to adopt the unusual course of preparing an interim report which contained a strong representation that the permanent buildings which are required should be proceeded with without delay, and according to the committee, it would be a grave discredit to the country if the settlement of the matter by Government were longer delayed. The evidence given by Major-General Festing, R.E., before the committee reveals the constant care which has to be taken in order to avoid a catastrophe.

The Chairman: Have you charge of the arrangements in the case of fire?—Yes.

Let me ask you generally, what is your opinion as to the safety of the buildings?—I think that the safety of the buildings depends absolutely upon the watching; that is the one thing. Many of the buildings are extremely inflammable. When I say that, that is perhaps rather strong, but they are more inflammable than public buildings ought to be, certainly, and I think it is only by extremely careful watching that we can feel any measure of security at all.

Is the watching of the buildings organised by you?—Yes, of course as a police matter.

Day and night?—Yes.

What provision have you in the case of fire; have you any immediate provision?—We have fire extinguishing apparatus all over the building; we have water mains right through the

buildings, with hydrants here and there; we have a certain number of small hand engines, and hand pumps and extinguishers, and we have a detachment of Royal Engineers who live on the premises.

Have you ever had a fire in your time?—We have had one or two, but they have been very trifling. Some years ago we had a fire in a sunlight flue in the museum; some woodwork which had been put to trim the opening of the flue somehow or another had not been properly protected originally, and that caught fire from the heat of the sunlight; that was put out in a very short time with one of these hand pumps.

Lord Balcarras: What was the date of that?—I cannot remember.

Is it twenty years ago?—I should think probably as much as twenty years ago. We had a small fire in one of the wooden buildings which is used by the professor of astronomy; that was seven or eight years ago, I think. In connection with the photographic work there was a drying closet which got overheated. That was put out by the men before the arrival of the fire brigade, and very little mischief was done. We had a fire of larger dimensions, not in our own buildings but in the buildings which were alongside the exhibition, the Inventions Exhibition, I think it was. They were buildings which had been erected originally as temporary buildings, and either from the overheating of a flue or from sparks from the flue, the roof of that building caught fire. It was a roof constructed in such a way that it was extremely difficult to get at, and the whole of the roof of the building was burned.

Can you tell us precisely when that occurred?—That was at the time of the Inventions Exhibition, which was in 1884 or 1885.

Mr. Acland: Do you give an alarm from time to time the same as the alarm is given on board ship for fire drill?—Yes. Sometimes the alarm goes off itself. We have the electric system of alarms all over the buildings, and sometimes they give an alarm when nobody gives it, so that the men get a certain amount of practice in turning out—quite automatically, as one may say.

What appliances have you? Have you a manual engine?—We have two manual engines, but we really never use them; at least, when I say we never use them, I hope we shall never have to use them. Our detachment of men now is not large enough to work a manual engine. We have water-mains all over the building, and hydrants at different places and hose kept in readiness. Of course, two men or three men with a hose at a hydrant can do as much work as eight men at a fire-engine.

Are your hydrants and pipes all through the building and accessible to every place where fire is likely to occur?—Yes; I suppose there is no place in the building which you cannot reach from a hydrant with perhaps two lengths of hose.

And are your high-pressure mains all over the building, in every part?—Yes; by high pressure I mean only the high pressure of the water company. In addition to that we have a high-pressure apparatus.

A hydraulic injector?—No, an air apparatus, by which we can discharge 2,000 gallons of water at the highest pressure.

Is that available over all parts of the buildings?—Yes, because it can be put into connection with the whole system of mains. We have that because some of our highest roofs are not very well commanded by water company's pressure.

What is the method of the patrol of your firemen at any time?—They do not patrol.

How many of them are there on duty at night-time?—They are divided into two pickets, half one day and half the next, and that half are on duty the whole twenty-four hours; they cannot leave the premises at all; and of the others not more than two can be out the whole night.

Are there fixed call points that the men turn a key at in the different galleries?—Yes; there are alarms distributed about over the galleries which cause a bell to ring just outside the barrack-room; inside the barrack-room is a dial arrangement, by turning the handle of which dial, when the bell stops ringing, the pointer shows the number of the bell that has been pulled, therefore they know where to go to.

Therefore the sergeant or officer in charge at the barrack-room knows when the fireman has gone up to or gone by a given point. What is the connection between the fireman who turns his point, so to speak, and the officer on duty?—The alarm is sounded by the policeman who is patrolling the gallery; supposing he sees fire, he has to pull the alarm at the nearest pull, and then the men know where to go to.

But apart from the actual call for fire which is communicated by a policeman, say, to another policeman or to your firemen, do your firemen periodically, irrespective of fire, let someone know either next day, or the officer on duty at night, that they have been by a certain portion of the building?—The firemen do not patrol the building, the policemen do; the policemen who patrol the building set the tell-tale clocks.

What do the firemen do?—Nothing until they are called or; every evening they test these fire alarms to see if they are

in proper order. When they leave off work at six o'clock or so, after they have had their tea, they test the alarms to see that each of them will ring and is in proper order.

I gather from you that the patrolling of the galleries, both as to theft or fire, is done entirely by the policemen, and in the event of a call being given, your firemen in the barrack respond?—Yes.

How often is your fire gear and your hose inspected?—Every day; the sappers look round it every day.

How often do you put your hose on to the hydrants?—Every week the men have a drill; they cannot do the whole of it in one week, but they arrange to do from one day to another, and one part to another, to see that it is all right.

When was it last tested?—They had a drill last Saturday.

Was everything satisfactory?—Yes; at least, nothing was reported unsatisfactory.

How often do you subject the firemen and the police to what I may term a test call or a test drill?—We have never subjected the police to a test call; as to the firemen, not at regular periods, but if I happen to be about some time in the night I may pull the call and summon them.

For both the police and the firemen?—For the firemen. The police do not want to be called together; they want to remain on their beats. The firemen I want to call together to work.

Have you ever asked the chief of the fire brigade with you to concentrate his engines from the adjoining station on the Museum by way of a test?—No, because when the fire brigade comes in, I think it much better that my men should be withdrawn and leave the fire work entirely to the fire brigade; my men would then come in much more useful in looking after moving any cases and property of that sort in the Museum.

What I want to know is, have you and the chief of the fire brigade ever met, and subjected both the Metropolitan Fire Brigade men and your own men to a supposed conflagration at South Kensington Museum, to see with what rapidity they could get there?—No.

You have never had the brigade there for any fire?—The brigade came, as I said, for that small fire at the Astronomical Observatory, and they also came to that fire in the temporary building by the Inventions Exhibition, and I believe they came (long before my time) when Mr. Braidwood was chief of the fire brigade.

There would be no disadvantage to either the Museum staff or to the brigade if occasionally that were done; do you think there would?—No, I should think not.

Bethnal Green Museum.

Major-General Festing was also questioned about the condition of the Bethnal Green Museum.

Mr. Bhownaggee: Is the nature of the Bethnal Green Museum building such as to expose it to great risk of fire?—No, I think no great risk; of course it has a wooden floor, and as long as you have a wooden floor you have stuff that will burn, and stuff in which fire will no doubt spread, but, on the other hand, it is a detached building and there are no fireplaces in it; when you are once inside the building you practically almost command the whole of the inside, you can see the whole of it, and therefore I should say it was not a building that was exposed to great risks.

The wooden flooring is the real part of the building that exposes it to a good deal of risk?—Yes; one can quite conceive that if there were a large fire in the neighbourhood, flakes of fire might come through the skylight and, pitching on to the wooden floor, there would be something for them to get hold of; on the other hand, I say the interior of the building is so clear that one man with a hose inside of the building would be able to attack a thing of that sort very quickly, and therefore I should say that the risk from fire is not very high there.

If the flooring caught fire it would be the most dangerous part of the building to catch fire?—Yes, it is a part of the building that is possible to catch fire.

Would it be easy to replace by some less inflammable material?—It is a matter of expense.

Would it be very costly?—It would cost a good deal. It is rather a difficult question, and in order to make a strong fireproof floor, you would have to do a great deal to the actual supports of the building, as they are at present. I do not know whether you would have to alter the iron columns which support the floor at present, but of course it could be done; and it is a matter of expense.

And you do not think that expense would be well incurred in making the building entirely fireproof if that wooden floor is the only combustible matter. Are there any arrangements for putting a fire down there?—We have hydrants and we have small hand-engines, and we keep three men always in the foreman's quarters close at hand there.

Edinburgh Museum.

General Sir R. Murdoch Smith was examined about the safety of the Edinburgh Museum.

Sir H. Howarth: How long have the present buildings been built?—They have been built in three portions; the east wing and a portion of the centre hall were begun in 1861, and then a number of years afterwards the second portion of the central hall was added, with the halls at the back; and the west wing was finished in 1888.

Have you had the responsibility of recommending any one of these buildings?—No, they are all built on the original plan, with slight modifications.

Have they all top lights or sunlights?—All top lights, with the exception that in the wings the halls to the front have floors, so that they form three halls, one above the other, and, of course, the two lower ones have no top lights; all the rest of the building is arranged in halls with galleries round the halls, and top lights throughout.

What access is there to the galleries?—By stairs; there are two stairs at each end of the great hall, from the ground floor up to the first floor, and then from that floor up to the next.

Are you satisfied that the buildings as exhibition-rooms are excellent?—I think they are excellent; I think it is the best lighted Museum I have ever seen.

I think so too. With regard to danger from fire or otherwise, are you satisfied with regard to their safety in that respect?—I think so; every possible precaution is taken, and we have a very complete set of fire apparatus in every part of the building, and that apparatus is inspected every month by one of the assistants, who has special charge of that, and with him there is always one of the other officers, two of the attendants, two of the police and one of the artificers who go in turn; so that in the course of a few months every officer and every man in the Museum has taken part in the inspection of the fire apparatus, which is also tested once a quarter with water; it is not tested every month with water because of the great mess it makes in the building.

Mr. Gray: You told us that in your opinion the buildings are admirably suited for their purpose?—I think so.

What is their construction, stone?—Stone, and glass roofs.

Practically fireproof?—Well, I should be sorry to say that they are exactly fireproof, but the basement is all vaulted and the whole of the ground floor is cement covered with tiles; the galleries cannot be said to be fireproof with wooden floors, but taking it altogether I think it is very safe from fire.

Are there means for separating the central building by fireproof doors, or anything of that kind? None; there are large archways.

What is the lighting, gas?—It is gas.

Are the jets exposed?—They are exposed; they are on long rods.

Have you no electrical installation?—None whatever.

Why?—Because the Treasury did not sanction the cost; it has twice been brought before the Treasury, and it is to be hoped it will pass some day.

That, I understand, is your strong wish?—Very much so.

Both in the general interests of the safety of the collection?—Both for safety, and especially for cleanliness; the amount of soot and dirt caused by the great amount of gas-lighting in such an immense building is so great that I believe the cost of simply repainting the building inside would very nearly pay for the installation of electric light.

That is, you have a collection there valued at something like 120,000?—One hundred and twenty thousand pounds odd.

All exposed to the damage from dust?—They are protected by cases; but the building itself is made dingy and dirty by the gas, and all exposed objects, like architectural casts and so on, are also exposed to the dirt caused by the gas.

Do you know when the last application was made to the Treasury?—Well, it was sent this last year for this current year's estimates.

And still refused?—It was refused by the Treasury. The Office of Works, I know, sent in an estimate.

What was the amount of the estimate?—I have no idea; that belongs to the Office of Works.

Have you ever gone into the question yourself as to what the additional cost would be as between gas and electricity?—I do not believe it would cost more than gas, when once the installation was paid for.

The initial cost of the installation?—Yes, because I believe the cost of the current in Edinburgh is very cheap, only 4d. a unit.

That is, you propose to take it from existing supplies, and not from any special supply of your own?—Precisely; from the supply provided by the Corporation, which is now supplied all over Edinburgh.

And as to the heating?—That is by hot-water pipes at low pressure from furnaces placed in the basement.

There is no danger likely to occur to the building from that?—I think none whatever, because the basement, as I have already mentioned, is vaulted in stone throughout.

Dublin Museum.

Lieut.-Colonel Plunkett gave evidence about the watching in the Dublin Museum.

Sir Henry Howarth: What is the protection at night; are there any of the under officials who live on the premises, who sleep there?—There is only a gatekeeper belonging to the museum sleeping there at night, one of the porters, but the metropolitan police of Dublin take charge of it, and they have members day and night in the museum, and there is also a fireman there of the Dublin Fire Brigade all night.

Do they divide the responsibility of custody with the civilians who are not police at all?—During the night they have the entire custody of the buildings—the police; there is nobody else there. The gatekeeper is sleeping in his house, which is close to the gates, but it is detached; although it is only about 30 or 40 yards to the museum, it is not in the building. The police and the fireman are the only people in the building at night.

Have you any boilers or other things necessitating fires in the building?—The heating apparatus is in a vaulted underground building shown upon that plan which I have handed to you, just adjacent to the museum.

And you think it fairly safe?—It is a fireproof vault, and I think there is no danger whatever of fire from our heating apparatus; the electric-lighting apparatus is also there.

Mr. Bartley: Do you make your own electric light?—Yes, we have our own installation.

Sir Francis Powell: As to the safety of the buildings as regards fire during the night, are you satisfied with the present arrangement?—Yes, I think the present arrangement is a very good one against fire. The fireman and the Dublin Metropolitan Police have regular practice at which officers of the museum attend in turn, and the attendants and labourers and the men in the workshops all attend; there are hydrants all over the building, and the fireman is there on bunk duty at night—that is, he sleeps there in his clothes ready to get up at a moment's notice.

Does he patrol the building?—He sleeps; the police patrol the building.

Is there a night patrol?—A constable patrols it all night.

So that the building is never left?—Never left.

Mr. Daly: Is the collection in the different branches of the Dublin Museum a very valuable one?—Yes.

Is the collection insured?—No; the Government never insure any collections, I believe.

Do you think they should be insured?—No, I think that fireproof buildings should be provided, and of course every possible precaution taken against fire. I think if that is done insurance is unnecessary.

But then, are the buildings fireproof in the Dublin Museum?—The buildings proper, the permanent buildings, I think you may consider fireproof; they have very little wood or anything inflammable in them at all. The temporary buildings in which are at present the fossil fauna and some of the geological collections and a few other objects are temporary buildings and they are not so, I was going to say not so fireproof, but I am not sure I am quite right there; they are not safe from fire on account of various stores and temporary buildings in and about them.

Are there portions of the Dublin Museum buildings fireproof?—What I should call the museum proper I should call fireproof, but some of these temporary buildings, which we hope will be removed within a short time to make room for permanent buildings, although fireproof themselves, being built entirely of brick with iron roofs, are so crowded up with objects and fittings that I do not consider them safe from fire.

So that if fire occurred on account of the congested state of the objects in the place great damage would be done, I suppose?—Great damage would be done, but I do not think there would be any fear of the main museum buildings, in which the most valuable part of the objects are, being involved in the fire.

And I presume you have no fire brigade?—We trust to the Dublin Metropolitan Fire Brigade. They arrange for fire practice with our men once a month, at which the officers attend in turn and the attendants attend regularly, and also they provide a fireman who is there all night.

In case the assistants lived on the premises of the Dublin Museum would you say that they should be trained to have some knowledge of extinguishing fires?—They are so trained at present; they have to attend the fire drills and learn under the superintendence of the Dublin Fire Brigade.

They live at a distance from the buildings?—They do.

They might be the last to attend in case of fire?—That is extremely likely.

That is a curious method of having a brigade?—Of course we have electric communication with the fire brigade, and the fireman and police on the premises would summon them.

British Museum.

The system adopted in the British Museum was described by the principal librarian, Sir Edward Mavnde Thompson.

Mr. John Burns: What is the total number of police you have on at night?—Four and a sergeant.

Beyond those there are the firemen?—Yes.

How many on at night?—Two firemen always on at night.

Do the police in charge at the British Museum, beyond doing police duty, do firemen's duty?—They are all practised in fire-drill, and are all available.

And the police know the fire-drill?—Yes.

And they work harmoniously and automatically with the firemen?—Yes.

Do both the firemen and police wind up a clock at certain hours?—Yes; with regard to the four police on duty, I should explain that three are outside at night; there is one at the gate and one on each flank; there is one locked up inside to guard the gold and medal rooms, and he has to keep on pegging two tell-tale clocks. A fireman also patrols the basement at night and pegs a tell-tale clock.

There are no commissioners on duty at night time?—No.

What is the general system of your fire arrangements?—Do you mean the water arrangements?

Yes; is it high-pressure?—Yes.

What pressure; can you tell me?—Yes, I think I can tell you that; it is from 40 to 60 lbs. In the night time it runs up to 60, but in the day time it slackens, being drained off in other directions, but it does not fall under 40.

Who has the mechanical administration of your pressure and your hydrants and hose, an engineer?—No, they would be under the chief fireman.

Is your chief fireman an engineer, or is your chief engineer a fireman?—No, we have not an engineer; the man who would be really responsible would be the clerk of the works.

And under him the fireman?—Yes.

How often are these tested?—They are tested officially once a quarter, but we have monthly inspections, and, of course, the men are constantly testing the hydrants all round the place; when polishing up and cleaning they test the things.

But officially you have your quarterly test by the chief of the fire brigade, and tests by the clerk of the works and the chief fireman whenever they may think necessary?—Yes.

Do you see these tests?—I personally? No. The chief officer of the Metropolitan Fire Brigade sees that. I know all about it personally. I know the arrangement perfectly well.

Do you know if the pattern of your hydrants and your gear is the same?—Just the same as the Metropolitan; everything is interchangeable.

And you consider that an advantage?—Decidedly.

You having the four firemen you have mentioned, you are on the telephone with the chief officer and the local fire staff?—Yes, we are on the telephone with Theobald's Road fire station, which is the nearest, and with Scotland Yard and the Tottenham Court Road police-station.

Who furnishes the four firemen in the museum?—They are men who have come on; they are our own men. I do not like the system, and we shall try if we can by degrees borrow them or hire them from the brigade, as we do the police from the Commissioners. We have tried to do that, but at present the County Council have asked such a large sum for the firemen that the Treasury will not let us hire them.

We are just discussing the terms for you, I may say. These are men who have been in the brigade, and have been taken on by you?—Yes.

And now inspected by the chief of the brigade?—Yes.

Have you ever had with the chief of the brigade a test call to the museum?—Yes, urgency calls. We have had two in my recollection. Captain Shaw brought up seventeen engines, I think; and about six years ago we had a test—we got, if I remember aright, six engines up in ten minutes.

You are in favour of the present system of fire administration?—Except that I should prefer to have our firemen hired from the brigade.

The fact that the chief of the fire brigade occasionally inspects in no sense interferes with your administration of your staff?—Not at all.

Can you conceive a better method of fire prevention than that which prevails?—No, I think ours is very good; we have high pressure all over the place—about 100 hydrants. We have a reserve in the way of tanks on the roof carrying about 23,000 gallons, and we have gear all over the place put about in boxes in different stations; every point can be commanded, and we have 8,000 feet of hose. The other day the local inspector came round, and told me that he had never seen a place so well equipped.

The fact that occasionally the officer of the fire brigade, the chief of the fire brigade, comes in and sees that you are all right, in no way interferes with either the discipline or administration of the museum staff?—Not at all.

Do you keep the gangways and passages in the museum of sufficient width for the hand engines?—Yes, we are always careful of that—to run the hose rather. We keep the gangways clear to run the hose.

Do you keep the gangways between your cases and your nooks and between the art objects, whatever they may be, of sufficient width?—Yes, we always keep sufficient room to run our hose.

Do you make that a cardinal rule of your fire regulations?—We make it a rule in arranging our objects not to interfere with the gangways.

Mr. Bartley: Can you tell us, with reference to the precautions for fire, are all your floors fireproof?—Practically, I think they are. If you take the basement, I think we might run a fire right through without touching the upper part.

What about the floors above?—Some are wood.

They are not fireproof?—But they are very hard wood, and closely laid, and they would be very difficult to burn.

What about the roof?—It is coppered.

Is it not made of timber?—Well, I cannot tell you that; there must be very little timber in it; it is mostly girders.

When was it built?—About forty-five to fifty years ago; I think the museum was finished about 1846 or 1847.

Is it not almost certain at that period that it would be made largely of wood?—I think it is a great deal girder work.

The gutters?—Iron girders; I know that in cutting ceilings we have to go through girders.

It is not a modern type of fireproof roof, I suppose?—I do not suppose it is.

Do you think it would be desirable that it should be so in future building?—In future building, of course, we should take the newest patterns of things.

Do you mean to say that in the whole of the British Museum there is only one man walking about inside at night?—Down in the basement there is a fireman always patrolling, and the sergeant of police goes his rounds as well.

Then it is not strictly correct that there is only one man inside?—We put him into that department because of the special value.

It is a very large place, of course?—Yes; but, of course, there are constant patrols, you understand. I suppose your question is put with a view to the safety. You will, perhaps, allow me to explain that we have patrols at certain times. We always have a patrol when the public are turned out, to begin with, consisting of the messengers, police and firemen, and so on. Then an hour afterwards the museum is always patrolled again, so that, for example, we turn the people out at 10 o'clock at night, and there is a patrol goes round at 11 through all the part that has been open to the public.

There are patrols outside always?—Always.

NORTHERN ARCHITECTURAL ASSOCIATION.

THE opening meeting of the Northern Architectural Association's winter session took place in the Art Gallery, Grainger Street, Newcastle, on the 17th inst. The following letter was read from Mr. William Glover:—

16 Market Street, Newcastle-on-Tyne:

November 17, 1897.

"To the members, Associates and students of the Northern Architectural Association.

"Gentlemen,—I have often thought that as our Association is one of the most important of the allied societies its president should wear an insignia or badge to correspond with those of the presidents of other kindred societies, and that it would give me much pleasure to present one. I have always taken a great interest in the welfare of the Association, and as you have done me the honour to elect me on your council for over three-fourths of the period of my membership, and the further honour of electing me vice-president for three years, I have felt that I would like to show my appreciation of your kindness to me and my regard for the present president, my old friend, Mr. F. W. Rich, who has done so much for the Society, by presenting to the Society a badge to be worn by the president and his successors during their year of office. In this spirit I have to ask you to accept from me the accompanying insignia or badge. I am indebted to our esteemed friend, Mr. W. S. Hicks, for the design, which I am sure you will agree with me is very beautiful, and combines artistic thought and skill in every line; and I may add the work has been carried out by the Goldsmiths and Silversmiths' Company, London, in a most artistic manner to the complete satisfaction of the designer and myself. Trusting the badge will be acceptable to the members, and with my best wishes for the future success of the Association.—I am, gentlemen, yours very sincerely, WM. GLOVER.

"A. B. Plummer, Esq., hon. secretary,
Northern Architectural Association."

The badge, of 18 carat gold, is oval in form, with beaded mouldings, between which is the name of the Association in dark blue enamel. In the centre, carried out in proper enamel colours (red, white and blue), and in high relief are two shields bearing the arms of Northumberland and Durham, having the square and compass below. An entwined ribbon on one side with the motto "Super Justitia Ædificata" (upon Justice built), and on the reverse side an ornamental lambrequin; above the shields composed of platinum is an antique helmet and the castle crest.

The President proposed a vote of thanks to the generous donor. Their friend, he said, did not believe in half measures; everything about the present was of the best. The occasion must be their rallying point. The badge must be held in the same manner as the mace at the House of Commons. It must always be on the table when business was afoot.

Mr. Oswald seconded. In doing so he referred to the many years Mr. Glover had interested himself in the welfare of that Association, and how assiduous he had been. He had bought prizes for the students, and had made additions to the library, and had presented two albums to the Association—one to contain pictures of the places they had visited and the other for portraits of prominent members. The interest of the two latter books would increase as the years rolled on. He spoke of the beauty of the design, and said Mr. Glover's kindness was warmly appreciated by them.

Alderman Dunn, of Gateshead, supported the motion, which was most heartily carried.

Mr. Glover, who was warmly received, thanked those present for their kind words and their applause. He referred to the members who had passed away during his time, and he concluded by giving some inspiring advice to the younger members of the Association.

The President (Mr. Frank W. Rich) then delivered his address, during which he said:—It may be interesting to glance hurriedly with an architectural eye over the past famous sixty years, and see how Newcastle-upon-Tyne comes through the ordeal. In the year of Her Majesty's accession, Newcastle would wear an entirely different aspect to Newcastle of the present day. The boundaries of the town at that time might roughly be taken to extend on the west to the west end of Thornton Street; on the north to Leazes Terrace; on the east to Ellison Place, and on the south to the Tyne. The growth of the city is not due to architecture, but to the great commercial spirit that is now upon us. There are two broad circumstances which may account for this prosperity. (1) The district is celebrated for its great mineral wealth; (2) the birth of the railway system. This latter circumstance is most intimately associated with this district, and here we have the starting-point of my remarks. Newcastle, a little previous to the time we start (1837), was but a moderate sort of place, sleepy in a way, something like the keels that used to glide down the Tyne at high tide with their heaped-up cargoes of coals as compared with the present craft. There was the castle, the older churches, All Saints and St. Thomas; the assembly rooms. And a quaint old place it must have been, and crammed full of history. But at this anterior period to the great epoch under review there was born a man who was destined to work a transformation of the old place, one of those men of indomitable will, one of those great captains of industry for which Newcastle is so justly celebrated—I allude to Richard Grainger, sometimes called "the architect of modern Newcastle," a position to which I don't think he ever aspired, but who had the good sense to call to his aid the architects of his native town, and to imbue them with the enthusiasm of which he possessed so large a store. He must have been a bold man and a shrewd one. His plans were most ambitious and gigantic, and his architects responded to the call, as, indeed, all men of art have done at all times when not beset with hampering circumstances. Grainger was well on with some of his schemes at the time of Her Majesty's accession, and the making of the great railways may be said to be synchronised with this. After these preliminary remarks we may now look at some of the architecture of modern Newcastle, of that coming within the famous sixty years, and see what account our friends living or dead can give of themselves. As a means of better realising what I am about to say, we may imagine ourselves arriving by train at our Central Station. Here, we are at once confronted by a famous building, the work of our first president, a building designed in the very beginning of the railway system, when no one could foretell its gigantic growth, yet to-day this building is as useful as the day it was built, when other stations in Britain have become obsolete and swept away to give place to modern structures. Coming out into Neville Street we obtain a fine view of the station, a building, from the clock tower to the west end, full of dignity. It is a matter of regret to us all that the original majestic design for the portico (which now hangs in the vestibule of the Museum of Natural History) was not carried out instead of the existing portico, and an equal matter of regret that the eastern extension of the station should not have been carried out on the lines of the original design, instead of the sort of coal dépôt roof lately erected. For these matters the directors must be blamed, and ought to be heartily ashamed of themselves. I make these remarks because I believe it echoes the view of all architects, and also in defence of the able man who designed the original building. The view from this spot as a "townscape" is somewhat unique. In looking to the east we bring in the view Collingwood Street and Mosley Street up to the Arcade, and in which the famous tower and spire of the cathedral group well. Looking in a

more northerly direction a similar view is obtained of Grainger Street, with the domes of the Exchange, and equally admirable monument to Earl Grey, closing the vista. We may now walk down Neville Street, and in doing so one cannot forget the change that has been effected in so short a time. One can remember Neville Street so well before Grainger Street was cut through when all the buildings round about were old-time buildings, and now nearly every one of them are new. The street, as we all know, is a very spacious one, broadening out very considerably at the Monument to George Stephenson, and with the modern buildings, now erected here, forms as fine an entrance to a city as will be difficult to beat. The entrance into London from King's Cross is shabby compared to it, as is the case in many of our principal cities. The buildings from the Douglas Hotel to the offices of the Standard Insurance Company are all modern business premises, save one, and on the other side of the street is the very large hotel lately erected by the North-Eastern Railway Company. The Union Club faces us as we proceed, forming a fine group with the offices of the *Newcastle Chronicle*, Messrs. Emleys and the offices of the Union Insurance Company. The mention of the offices of the *Chronicle* reminds me of my younger office days, about thirty years ago, when this building was designed by my old master—Mr. Parnell, a member of our Association. Before that time it was the town house of Dixon Dixon, of Unthank. To the south, where once stood the picturesque old Westmorland House, we have the offices of the Coal Trade, a very fine design by our ex-president. We now enter Collingwood Street, which, when I knew it first, was entirely residential. It is now something like the City of London, bereft of residents. The building that arrests our attention is the very fine bank, lately erected by Messrs. Hodgkin & Co. It is a stately and thoroughly gentlemanly building, and reflects the greatest credit on a lamented colleague (Mr. Robert Johnson), and the liberal-minded directors who allowed him "rope." A very fine block opposite—the offices of the Northern Assurance Company—is by the same artist. I must not forget a small building to the east of the bank, which was designed by Mr. Parnell, and was the first break into the residential quality of this street, and for many years stood high above the rest of the buildings. We now come to St. Nicholas Square. On the one hand we have the Town Hall Buildings, stretching from the square up into the Bigg Market, occupying the site of some very quaint old houses, which I remember very well, and on the other the street called the High Level Approach, a very extensive range, the High Level buildings (the work of Mr. Parnell), and opposite a picturesque block of offices by a past president (Mr. John Johnstone). Coming into Mosley Street, and proceeding half-way, we come to a famous corner, one that would be difficult to equal in any provincial city. At this particular spot, the meeting of Mosley Street, Dean Street and Grey Street, there is food for contemplation, as each corner presents something worth seeing. At one the National and Provincial Bank, by the late John Gibson; another the new building of the Prudential Assurance Company, by Mr. Waterhouse; and at the corners of Grey Street we have the start of what we call the Grainger buildings. At the head of Mosley Street stands the Arcade, one of Grainger's ambitious projects, and a stately termination to the street. Passing down Dean Street, and under the very fine arch which carries the North-Eastern Railway—a credit to engineers—one wonders why they did not carry the railway on one of the terrible utilitarian structures they delight in, floating like a spider's web, and proportionately ephemeral, but this is a good honest arch. Passing under this, one sees on all sides new buildings by colleagues yet amongst us, and many by others gone to their long home. At the angle of the Sandhill stand the very fine offices of the Royal Insurance Company, designed by Parnell, and further on the huge commercial buildings of Lombard Street, Queen Street, King Street, the Sandhill, &c. While we are at the riverside we might from the Quay look for a moment at the High Level Bridge, one of the most architectural engineering bridges in the country. Its design may be obsolete, but it far and away excels the terrible wrought-iron bridge a few hundred yards further west, which may be said to be entirely devoid of the faintest æsthetic design, and is an insult to our time. Coming back to the foot of Grey Street, we now undertake by far the greater portion of our task, for we now start with the noble buildings of Grainger and his architects. We must content ourselves with a very cursory glance. Taken altogether, they form one of the most extraordinary instances of town building ever conceived and carried out by one man. Within a year or two, they all practically fall within our period. The buildings in Grey Street, Shakespeare Street, Market Street, Hood Street, Grainger Street, Nelson Street, Nun Street and Clayton Street yield a quantity and quality that should satisfy the most exacting. As I said before, Grainger had the good sense to be guided by experienced architects, hence we have the buildings well designed, which means that detail and grouping are useful. There are, especially in Grey Street, buildings of the finest Renaissance design, where students

will find a wealth of material, and it must not be forgotten all these buildings are of a genuine stone, not stuccoed and painted, and when newly built, clean as they came from the hands of the mason and seen in a brilliant sunshine, they would indeed resemble a veritable palace of architecture—a rebuilding of Rome. To describe them all is out of the question, but we may just glance again at Grey Street, and the best view is to be obtained at the junction with Mosley Street. Here the full and graceful proportions of the whole are taken in, but not quite at one view, a circumstance which adds to the charm, for Grey Street not only ascends with a gentle gradient, but bends proudly away to the right with a noble sweep, passing on the way the Bank of England, the Theatre Royal, the group of the Exchange with its finely designed domes, Lambtons' Bank and terminating with the monumental column in memory of Earl Grey. They are familiar to us, but possibly like the prophet in his own country not sufficiently appreciated. So subtle is the design of this street that, while rising and curving, no harsh or abrupt treatment can be observed, each building though separately designed falls into one harmonious group. We may now leave this mass of modern buildings, and may safely say they stand a lasting monument to the genius of Richard Grainger and his architects, Dobson, Green, Wardle and Walker. Grainger Street West has not yet been mentioned. It is a comparatively new street, built since Grainger's days, and entirely by individual owners, the buildings being designed in every case by local architects, the result being a great diversity of design from the tail end of the Gothic revival down to date. I might also mention the new offices of the Water Company and of the Gas Company. My list, I am afraid, is but half complete, but I think I have enumerated enough to show the enormous mass of commercial buildings that have been erected here in this period, from the designs of our colleagues. I will now run over a few of the buildings that cannot be said to be commercial—the College of Medicine by our friends Messrs. Dunn & Hanson, the College of Science by the late R. J. Johnson, with whom I had the pleasure of being associated; the Museum of Natural History, St. Stephen's Church, St. Aidan's, St. Michael's, St. Matthew's, St. Peter's, St. Mary's, Rye Hill, St. Dominic's, St. James's, the Roman Catholic Cathedral by Pugin, with the tower and spire so ably added by our ex-president. This short list, taken at random, could be multiplied many times. I have not even said a word about the works and factories that abound with us, and in which architecture is often called to aid, and possibly this address would be incomplete were I not to mention that enormous hive of industry, the Elswick Works, where I have had the honour and privilege of carrying out some of the finest shops in the world. I have been in many of the chief cities of England and Scotland, from time to time, and looked about me, and often with a view of finding anything better in this respect than we have in Newcastle, but have been unable to find any. Newcastle will hold its own either in its architecture or in its administration of cleanliness. In speaking of the continued commercial prosperity, one often notices how in a busy practice commercial men often mould the ways of architecture. The imperative demands of trade are often antagonistic to the precedents in architecture. For instance, take a familiar case. The shop windows of our city, or any city, show the busy man will insist on having his window in one square of glass, or because he cannot get any glass large enough, he will divide them by gossamer bars. I am quite sure his goods would be as well seen if shrouded in architectural encasements. It would seem also in walking through our streets that the architecture will presently be "behind the scenes"—in other words it will be covered by huge letters of the alphabet. What is the cause of this trumpeting from the house fronts? Have we all become short-sighted that we cannot see to read a man's name in modern letters? I once lost a good client for declining (politely, I hope) to carry out some letters of this nature, over 9 feet high. It has often been said that an architect without the men of the building trades would be like a commander-in-chief without soldiers. The men of the building trade are our soldiers, and the excellence of their workmanship is of vital importance to us, and we cannot help but notice the nearly total extinction of some trades—that is to say, as independent trades, which are the only means in which to bring up apprentices. I am one of those men who believe that the best technical school is the workshop, where a lad would be in actual touch with the minutiae of the trade by which he will hereafter earn his living. There is at present too much of the former and too little of the latter. The apprenticeship system is self-acting and costs nothing, and I am sure the results to architects would be a comfort.

Mr. A. M. Dunn proposed a vote of thanks to the President. He said Grainger never received half the credit he deserved for making Newcastle what it was, adding that the results must have been disappointing to him financially. As the result of a Chancery case he learnt that the Grainger property was proved to be of a value of one to two millions of money. When Grainger left Newcastle, he left it one of the finest cities in the

world. Regent Street, London, could not compare with Grey Street, Newcastle. There should be a monument put up to Grainger's memory in one of the principal thoroughfares of the town.



The Great City Fire.

SIR,—The lesson of the great fire in London on the 10th inst. is this—that the proprietors of large buildings, such as warehouses and factories, especially those situated in crowded thoroughfares, should provide their own fire appliances. This fire broke out in the middle of the day, when the members of the staff were as a rule in attendance at the various warehouses, and doubtless had the necessary fire-extinguishing appliances been available at the establishment in which the outbreak occurred it would have been extinguished at once, and nothing whatever would have been heard of it except an incidental reference in the Fire Brigade report. This, however, could not be done, and the enormous traffic in the narrow streets made a rapid attendance of the public Fire Brigade a matter of absolute impossibility.

A fire in the middle of the night is apparently less dangerous than one in the middle of the day at this part of London. The public Fire Brigade has a right to expect that the owners and occupiers of large business premises will assist it to the extent of providing such simple apparatus as will be sufficient to cope with a fire discovered in its early stages.—Yours faithfully,

MERRYWEATHER & SONS, LIM.
Greenwich, S.E.: Nov. 24, 1897.

GENERAL.

A Meeting of the Institute of Painters in Oil-Colours, Piccadilly, was held on Wednesday, when the following artists were elected:—Honorary members—Messrs. L. Alma-Tadema, R.A., and John S. Sargent, R.A. Members—Messrs. E. Matthew Hale, Dudley Hardy, Gabriel Nicolet, G. C. Hindley, A. D. Reid, A.R.S.A., and R. G. Somerset.

The Late William Morris's "Kelmscott Press," which was established in order to revive printing of the old style, is about to be closed. The type will remain in the hands of the trustees for future use, but all the special ornaments will be discontinued, and the wood blocks deposited in the British Museum.

Mr. John Aldam Heaton, who was largely employed as a designer and decorator in London, died at Hampstead on Saturday. He was the author of "Furniture and Decoration in England during the Eighteenth Century."

M. Boldini, the French painter, has departed for New York, where he proposes to remain three months in painting portraits.

A New Station for the Great Northern Railway at Peterborough is contemplated, the cost of which would be about 50,000*l.* A large sum is also to be expended in improving the Great Eastern station.

The Recent Competition for public baths and wash-houses for the parish of St. Matthew, Bethnal Green, has been decided, the author of the design "Savon" (Mr. R. S. Ayling, A.R.I.B.A., of Parliament Mansions, Victoria Street) being awarded first premium, and "Red Cross" (Mr. E. Harnor, A.R.I.B.A., of 5 John Street, Adelphi) second.

The West Ham Corporation have instructed Mr. A. Saxon Snell, F.R.I.B.A., to prepare plans for the erection of public swimming and private baths at Plaistow, E.

The Next Meeting of the Northern Architectural Association will be held on Wednesday next, December 1, at 7.30 P.M., at the Art Gallery, Newcastle-on-Tyne. Mr. John Lane, of York, will deliver a lecture on "The English Cathedrals," with limelight illustrations.

St. Bride Church, Rosevale Street, Partick, the first building erected by Rev. Dr. John Macleod and the kirk-session of Govan parish in connection with the recently inaugurated scheme for church extension throughout the parish of Govan, was dedicated on Saturday afternoon. The church, which has been designed by Mr. Macgregor Chalmers, the architect for the extension scheme, is one of the most beautiful in its interior arrangements of those which have been erected in Scotland in recent years.

The Insurance Companies affected by the recent fire, who are associated in the loss on the bulk of the buildings destroyed, have entrusted the adjustment of the claims against them to Mr. Robert Willey, F.R.I.B.A., surveyor to the Hand-in-Hand Insurance Company, of 33 New Bridge Street, Blackfriars, E.C., and Mr. J. R. Cooper, F.S.I., the senior partner of the firm of Ventom, Bull & Cooper, surveyors, 35 Old Jewry, E.C.

The Architect.

THE WEEK.

THE difference between a drain and a sewer has at last been determined by the House of Lords. The case originated in an application by the London School Board for a mandamus to compel the Vestry of St. Matthew's, Bethnal Green, to repair a pipe which drained several houses. Apparently no order relating to the construction of the drain was to be discovered. The School Board maintained it was a sewer and should be repaired by the Vestry, while the contention on the other side was that the pipe was a drain, for which the School Board as owners of the houses were responsible. The Divisional Court held that although no order for its construction was forthcoming the pipe was a sewer and the vestry of St. Matthew's were bound to repair it. The Court of Appeal affirmed the decision. The Vestry accordingly appealed. The Lord Chancellor said it was clear, apart from statutory definitions, that this was what everybody would understand to be a sewer. He had not the smallest doubt that the officers of the Vestry perfectly well knew what was being done. It was not a small operation—the highway must have been taken up, and the local authorities must have been fully aware of the purpose and effect of the work. If, then this was a sewer, it was impossible to avoid the application of the language of the Act of Parliament or the conclusion that the sewer was vested in the Vestry and must be repaired by them. A combined system of drains might be constructed under an order of the Vestry by a private person. In such a case the combination would still be a drain and not a sewer, but there was no evidence of such a state of things. It was clear that those who alleged that this was a drain and not a sewer must prove that such an order of the Vestry was made, but no such order was produced, and he did not believe that any order of the kind was made. He came to the conclusion that the judgment of the Court of Appeal was right and must be affirmed. As the other noble and learned lords concurred the appeal was dismissed, with costs. The effect of the judgment must be an increase of the liabilities of the vestries in the Metropolis and of the sanitary authorities in other places.

THE project for the Glasgow International Exhibition of 1901 has emerged from the nebulous condition of its first stage. The guarantee fund amounts to 290,696*l*. Several applications for the offices of secretary and general manager have been received. An executive council has been formed and has held a meeting. HER MAJESTY has promised, if all is well, to be patron, and although the Prince of WALES is unable to accept the office of honorary president, His Royal Highness has offered to become vice-patron. The preliminary arrangements are therefore sufficiently satisfactory to warrant a belief in the success of the exhibition.

ON November 4, 1804, half a dozen artists met at the house of SAMUEL SHELLEY, the miniature painter in George Street, Hanover Square, in order to ascertain if a society of painters in water-colours could be founded. In addition to SHELLEY were present HILLS, WELLS, VARLEY, GLOVER and PYNE. It was decided to try the experiment of holding an annual exhibition of water-colour drawings which were to be produced by the members. The first exhibition was opened on April 22, 1805, at the "Great Room" in Lower Brook Street, Grosvenor Square, to which sixteen members contributed. There were 275 drawings, and the exhibition was visited by 12,000 people. W. S. GILPIN was the first president; he resigned in 1806. Next year he was succeeded by GLOVER, and then by REINAGLE. In 1812 there was a split, and it was resolved "That this Society, having found it impracticable to form another exhibition of water-colour paintings only, do consider itself dissolved this night." An effort was made to reconstitute it as a Society of Painters in Oil and Water Colours, but in 1821 paintings in oil were excluded. The first President of the reconstituted Society was CRISTALL. On his death in 1832 he was succeeded by COPLEY FIELDING, and then

came J. F. LEWIS, F. TAYLER and Sir JOHN GILBERT. On Tuesday night the election of Mr. E. A. WATERLOW, A.R.A., as president took place. The competition lay between him and Mr. HERKOMER, R.A., and the victory was won by a single vote. Mr. WATERLOW, like his predecessor, is also a painter in oils. But the majority of his works might be said to be inspired by the spirit which prevails in Pall Mall East.

THE annual meeting of the Society of Antiquaries of Scotland was held in Edinburgh on Tuesday. The following office-bearers for the ensuing year were elected:—President, the Marquis of LOTHIAN; vice-presidents, J. BALFOUR PAUL, Lyon King-of-Arms; Major-General Sir R. MURDOCH SMITH and the Hon. JOHN ABERCROMBY; secretaries, DAVID CHRISTISON, M.D., and ROBERT MUNRO, M.D.; foreign secretaries, Sir ARTHUR MITCHELL, K.C.B., M.D., LL.D., and THOMAS GRAVES LAW; treasurer, J. H. CUNNINGHAM; curators, ROBERT CARFRAE and Professor DUNS, D.D.; curator of coins, ADAM B. RICHARDSON; librarian, JAMES CURLE; councillors, Sir GEORGE REID, P.R.S.A., and JOHN RITCHIE FINDLAY, representing the Board of Trustees; CHARLES J. GUTHRIE, THOMAS ROSS, GILBERT GOUDIE, REGINALD MACLEOD, C.B.; Sir HERBERT MAXWELL, Bart., M.P.; JOHN HOME STEVENSON, and ALEXANDER J. S. BROOK. According to the annual report the museum had been visited by 22,310 persons during the year, and the number of objects of antiquity added to the collection had been 135 by donation and 370 by purchase; while seventy-seven volumes of books have been added to the library by donation and 102 by purchase, and the binding of 150 volumes has been proceeded with. Among the more important donations to the museum is the series of articles discovered during the excavation of the Roman camp at Ardoch, undertaken by the Society last summer, which have been presented by Colonel HOME DRUMMOND, of Blair Drummond, the proprietor.

THE School Board of London on November 8, 1894, accepted the tender of Messrs. KIRK & RANDALL, amounting to 31,324*l*., for erecting new stores for books, apparatus and furniture in Clerkenwell Close. In connection with the adjustment of the accounts for this work, the committee received a letter from these contractors stating that the very numerous alterations made as the work progressed, necessitated by the requirements of the district surveyor and parish authorities, and the delay which followed, entailed considerable extra expense, and will result in a loss to them. They forwarded a detailed statement of claim for additional payment, amounting in all to 2,750*l*. 19*s*. 5*d*., and offered to refer the matter to some disinterested and qualified professional man. Messrs. KIRK & RANDALL have since notified the Board that they are willing to accept half the amount of their claim, viz. 1,375*l*., rather than refer the matter to arbitration under the conditions of the contract. Having regard to the special circumstances of the case, and to the fact that if the matter were referred to arbitration the Board might, with the sum awarded and the costs of the arbitration, be held liable for a still further payment, the works committee are of opinion that the proposed settlement should be agreed to.

THE work of the city engineer of Liverpool is of a most onerous nature, and it has been efficiently carried out by Mr. BOULNOIS. But it does not follow that his successor will be equal to the duties. Accordingly it was arranged that the examination of plans and other routine work in connection should be undertaken by a building surveyor. Apparently on the assumption that the office of engineer would henceforth be a light burden for the holder, the health committee of the City Council fixed the salary at 1,000*l*. a year. That sum is inadequate for the services of a competent engineer, and accordingly on Wednesday Sir A. FORWOOD moved that the sum should be 1,500*l*. But the proposal was defeated, as well as another which fixed the salary at 1,200*l*. The committee will seek for candidates by advertisement, and they say they are determined to appoint the best man that is to be obtained. What they mean, no doubt, is the best man obtainable for so moderate a salary.

THE MYSTERY OF PROPORTION.*

THE expositor of "The Canon," for we suppose we dare not consider any modern man or woman as the author of such ancient speculations, has either from modesty, fear or reverence concealed his name. Indeed, it may be doubted whether the speculations which fill the pages were ever considered as less than heretical, and in many a pagan city whoever uttered them would be as likely to meet with punishment as he would certainly be in a Mediæval city when ecclesiastics controlled the law. From its danger the subject was always fascinating, and the science of the nineteenth century cannot prevent an expositor from devoting his life to it, and a publisher would not put his name on the title-page unless there was a likelihood that many purchasers were to be tempted by the announcement of "An Exposition of the Pagan Mystery perpetuated in the Caballa as the Rule of all the Arts," and as an enthusiast would add, "of all the sciences too."

But those who have patiently endeavoured to meditate on the mystery will at first be induced to doubt the competence of the expositor for what he has undertaken. For he has gone for a character of himself and, what is infinitely more unworthy, for an appreciation of the mystery to so erratic a being as Mr. CUNINGHAME GRAHAM. That gentleman displays his incompetence to comprehend the rudiments of so abstruse a philosophy by allowing such nonsense as the following to escape from his pen:—

If, in his researches, the author has brought to light some canon which may enlighten architects, and so redeem us from the outrages our builders heap upon us, if he can do even a little to stay the hands of Deans and Chapters from destroying buildings which, by the folly of the nation, have been committed to their care (like sheep to wolves), or put a stop to the restorer, that arch fiend who, in consuming thirst for unity, tears down a fine Renaissance doorway in a Gothic church and puts up instead what he thinks Gothic, his labour will not have been lost. Could he redeem us from Victorian Queen Anne, but mitigate the horrors of plate-glass, set bounds to all the Gothics ranging from Strangled through the degrees of Congregational and Convulsional down to Ebenezersque, could he but find a style in which our builders could express their thoughts and help them to build for us our churches, houses, theatres and bridges without adhering slavishly to bygone styles, the twelve shillings which I understand his volume is to cost will be well spent. Music and literature, with painting, surgery and economics, with boxing, fencing and others of the liberal arts, all have a style fit and peculiar to the times, but architecture yet remains a blot and a disgrace to those who live by it, and to all those who use the edifices which it makes and pay the makers' bills.

A man who raves must excite pity in those who hear him, but what is to be said of an expositor who accepts the words, however incoherent they are, as a guide to the meaning of his own work? "The Canon," as expounded in the pages, has nothing to do with plate-glass windows or the relative propriety of Renaissance and Gothic doorways, and to suggest, as is done by retaining the preface, that the pages deal with details of the kind comes perilously near an endeavour to obtain money by false pretences. The purchasers of the book will do well to tear out the preface and judge the exposition without the help of Mr. CUNINGHAME GRAHAM's interpretation.

What the expositor attempts is to explain the ancient, the esoteric doctrine of numbers. It is sometimes associated with the name of PYTHAGORAS, but he derived it from still older teachers, and there can be no certainty about when or where it originated. MACAULAY fairly suggests what was thought of it in the Academy when he describes PLATO as saying that the science of number "habituates the mind to the contemplation of pure truth, and raises it above the material universe, and that it would help to teach disciples to withdraw their minds from the ever-shifting spectacle of this visible and tangible world, and to fix them on the inimitable essence of things." MACAULAY's own opinion of the value of numbers differed from that of PLATO, but on that subject we need not enter.

The value of numbers was to an ancient mystic recalled by names as well as in other ways. Mr. RUSKIN is a modern mystic, and as such it was only natural for him to endeavour to discover occult meanings in the names he

found in SHAKESPEARE'S plays and elsewhere. His efforts seemed ridiculous to modern philistines, the late MATTHEW ARNOLD being one, who had not walked in the byways of ancient philosophies. To the Greeks, however, names, and especially proper names, were interesting because there was a numerical value attached to the letters composing them, and in that way many remarkable coincidences were discoverable. In "The Canon" examples of what is possible to be made out are to be found in many of the pages. There is no doubt the practice was sometimes abused, and SOCRATES was referring to such cases when he said:—"I believe that the primeval givers of names were undoubtedly like too many of our modern philosophers, who in the search after the nature of things are always getting dizzy from constantly going round and round, and then they imagine that the world is going round and round and moving in all directions, and this appearance, which arises out of their own internal condition, they suppose to be a reality of nature; they think there is nothing stable or permanent, but only flux and motion and that the world is always full of every sort of motions and change."

What can be done by the combination of letters and figures has been shown by the late Professor DE MORGAN in his "Budget of Paradoxes." For example, PETER BUNGUS shows very easily how the mystical number 666 is applicable to MARTIN LUTHER. If from A to I represent 1-10, from K to S 10-90, and from T to Z 100-500; we see—

M A R T I N L U T E R A

30 1 80 100 9 40 20 200 100 5 80 1

NAPOLEON III. and other modern notabilities have been subjected to the process with similar success, and it is a favourite mode of arguing against the Roman Church. A more amusing case is the following. Some years ago the Royal Society proposed to restrict the admissions of men of science to fifteen in each year, while noblemen could get into the Society *ad libitum*. According to the late Professor DE MORGAN, one of the members of the Council, a Mr. GALLOWAY, opposed the proposal, and inquired why fifteen, of all numbers, was fixed upon as the normal rate of increase:—

Was it, he demanded, because fifteen is seven and eight, typifying the Old Testament Sabbath and the New Testament day of the resurrection following? Was it because Paul strove fifteen days against Peter, proving that he was a doctor both of the Old and New Testament? Was it because the prophet Hosea bought a lady for fifteen pieces of silver? Was it because, according to Micah, seven shepherds and eight chiefs should waste the Assyrians? Was it because Ecclesiastes commands equal reverence to be given to both Testaments—such was the interpretation—in the words, "Give a portion to seven, and also to eight?" Was it because the waters of the Deluge rose fifteen cubits above the mountains? or because they lasted fifteen decades of days? Was it because Ezekiel's temple had fifteen steps? Was it because Jacob's ladder has been supposed to have had fifteen steps? Was it because fifteen years were added to the life of Hezekiah? Was it because the feast of unleavened bread was on the fifteenth day of the month? Was it because the scene of the Ascension was fifteen stadia from Jerusalem? Was it because the stone-masons and porters employed in Solomon's Temple amounted to fifteen myriads? &c., &c.

We have not space to follow out the connection between numbers and words, although it is an entertaining pursuit. When numbers and form are united, as in geometrical figures, the subject comes nearer to us, for it is a sort of basis to architectural proportion. In that most prosaic of books, CRESY'S "Encyclopædia of Civil Engineering," there is a chapter on principles of proportion which has been transferred to "Gwilt." CRESY covered and enclosed ancient and modern buildings with squares, triangles, circles, &c., and, as he believed, fixed the system once and for ever. He has had many later rivals, and apparently speculations of the kind are as old as systematic building. VITRUVIUS had a notion of the importance of the human figure as a standard of proportion for architects' work, but the mystics, including the expositor, carry the proportions far beyond temples or buildings made by hands. In "The Canon" we read:—

The architect Cesariano, who edited an Italian translation of Vitruvius published in 1521, has drawn the two figures, intended by Vitruvius to embody the proportions of temples

* The Canon: An Exposition of the Pagan Mystery perpetuated in the Caballa as the Rule of all the Arts. London: Elkin Mathews.

with an anatomical exactness not to be found elsewhere. The first glance at these two figures shows us that they are each disposed in the form of a cross. The man whose body forms the Jerusalem cross is relatively bigger than the other, whose limbs describe the St. Andrew's cross or saltire, their proportions being so arranged as to exemplify the duplication of the square. The square enclosing the greater man is divided horizontally and vertically into thirty parts, thus dividing the area into 900 small squares. His height being 96 digits, the perimeter of the square is 384 digits—the number of the soul of the world according to Plutarch—and if he were drawn into the Holy Oblation, then his body would extend through the seven orbits of the planets to the sphere of the Zodiac or fixed stars, and exactly resemble the figures of the Macrocosm which appear in the works of the mystic philosophers of the seventeenth century. The figure of the lesser man would occupy the square whose area is half that of the Holy Oblation. Now the Microcosm, whose body is disposed saltire-wise, like the letter X, exactly agrees with the description of Plato's Logos, whom the early Fathers considered to be identical with the Christos. And when the Microcosm, or Logos, is stretched crosswise in a circle, drawn within the Holy Oblation, the sides of the square surrounding his body measure 1,480 diameters of the sun, and the name Christos is numerically equal to 1,480.

All these conclusions may be included among the "delicias et fastum mathematicorum," but able men were for many a century occupied with them. Mathematical recreations of the sort "do remedy and cure many defects in the wit and faculties intellectual," to use Lord BACON's words; and by them men were enabled to take an interest in things which otherwise might be neglected. The expositor sets great value on the diagrams of Milan Cathedral, which are also given by CESARIANO. That building presents remarkable coincidences in its proportions, as indeed do many of the Gothic churches. But in "The Canon" there is little difference between Pagan and Christian churches, for it is believed that all great buildings were set out according to a common system of proportion. Hence it is said that "in the Parthenon we probably see the prototype of the arrangements of the Christian church, and also there is no doubt that SOLOMON'S Temple formed the pattern of the Christian church, and the ark occupied the centre of the holy of holies."

The mysticism that was exhibited in Gothic churches is explained by DURANDUS, and has formed an inexhaustible topic for modern investigators. From what is said by SPENSER in the "Faerie Queene," it would appear as if the fine gentlemen of the Court were acquainted with the subject. Thus, when ARTHUR and GUYON are introduced by the Lady ALMA into her castle, which is built of a material resembling Egyptian slime, like that used in the Tower of Babel, the building is thus described:—

The frame thereof seemed partly circular,
And part triangular: O work divine!
Those two the first and last proportions are;
The one imperfect, mortal, feminine;
The other immortal, perfect, masculine;
And 'twixt them both a quadrate was the base,
Proportioned equally by seven and nine;
Nine was the circle set in heaven's place,
All which, compacted, made a goodly diapase.

The lines have a meaning which is not clear to us, but they were plain to the poet's contemporaries. Afterwards those peculiar proportions were neglected, or they took the form we find in Sir HENRY WOTTON'S book. A little later a more general system was in favour. HARRINGTON, the author of "Oceana," suggested to NEWTON that the proportions in architecture coincided with harmonic ratios in sound. The reply of the great mathematician is remarkable. "I am inclined to believe some general laws of the CREATOR prevailed with respect to the agreeable or displeasing affections of all our senses; at least, the supposition does not derogate from the wisdom or power of God, and seems highly consonant to the simplicity of the Microcosm in general." If NEWTON had attempted to define those general laws aesthetics would now be a different sort of science.

As might be expected from his speculations, the expositor believes that remains of ancient philosophical doctrines of architectural proportions may be found in the ritual of the Freemasons. LAMECH is supposed to be the father of masonry, a name with a numerical value of 676, the square of 26, and 26, according to the expositor, is the number of Tetragrammaton, which, with the alphabet of

26 letters and the Sephiroth, are the foundation of all things. The value of the word masqny is also 676, and much else might be added.

The three Classic orders—Doric, Ionic and Corinthian—are said to show a mystical purpose, for "they apparently symbolise the Macrocosm, the Microcosm and the Bride or Virgin of the Caballa, the three personifications of the architectural canon." When we remember that architectural forms can be discussed in police-courts and are to some extent controlled by county and parish authorities, there is some relief in learning that the art was and can become an inexhaustible subject for the contemplation of mystics. For is it not gratifying to be assured that the proportions of the solar system or the harmony of the spheres "probably formed the harmonic canon of the architects, and it may be concluded they were known to VITRUVIUS"?

The value of "The Canon" arises from being a sort of record of the efforts which were made during ages to discover why buildings were impressive? At the present day it is not easy to answer so complex a question. The ancients endeavoured to solve the difficulty by a comparison of the proportions of various buildings, then taking one as a standard and fixing the relations of the parts with the aid of numbers. The dignity of architecture was further enhanced when it was found that what was true of a building was often applicable to the universe as a whole. If an apple could suggest the law of gravitation to a NEWTON, it was not surprising that ancient geometricians could find conformity between buildings and the Kosmos. "The Canon" is interesting because it suggests that building is not altogether to be judged by utilitarian laws, and has sublimities which are worth the attention of the theologian as well as of the architect.

ACCUMULATOR TRACTION ON RAILS AND ORDINARY ROADS.

IN connection with the articles which have appeared in this Journal on the subject of electric traction, it will be of interest to briefly notice a paper read on November 11 before the Institution of Electrical Engineers by Mr. L. EPSTEIN, M.I.E.E., who is a well-known expert and inventor.

Electric traction by means of accumulators, states Mr. EPSTEIN, "could, until quite recently, only be pronounced a failure, and all that even its most ardent advocates can plead for it is the substitution of the term 'qualified success.'" This is quite true, and in contrast to this the author places the "unqualified success" of the trolley system. Mr. EPSTEIN mentions, however, that the matter is now on a sounder basis, owing to the progress in the manufacture and experience gained in the use of secondary batteries. The reasons for this failure are stated to be covered by (1) inherent defects in the accumulators themselves, and (2) mistakes in their mode of application.

The author very rightly states that the accumulators should be employed in such a manner that they require a minimum of attendance, and points out that in the unsuccessful tramways this has not been done. "The common practice was to subdivide the battery into a number of groups, each contained in a tray, and the connection between one tray and the next, as well as at the terminals, both in the cars and in the lifts for charging, was most imperfect. Sliding contacts were generally used, which were open to attack by the acid spray. . . . Again, the pulling out and pushing in of these heavy trays was not always done with the requisite care, much to the detriment of the batteries, cars and lifts." The electrical leakage when charging, owing to the cells being saturated with acid spray, is mentioned as another fault.

Mr. EPSTEIN advocates the use of batteries treated as one permanent whole, "either by being placed in the cars or preferably slung to the frame, or carried on a separate car. When the conditions of working render it desirable the motor or motors could also be fixed in the battery car, which would then assume the character of an electric locomotive. The obvious advantages gained by this method are the absence of lifts or similar contrivances, good connection between cell and cell, no corroding contacts, no loss of current through leakage, less wear and tear of batteries and consequently easier management and reduced expenses."

The author then goes on to say that the Hanover and Paris examples show how this object has been attained. As the methods and results obtained in these two places were given fully in this Journal a few weeks ago, we will not repeat them here. With respect to Hanover, the disadvantage mentioned is that the battery has to be carried along the trolley portion, and its dead weight reduces the efficiency. A suggestion is made that the battery might be picked up (if slung under the car) at the end of the trolley section, and the charging of the accumulators could still go on from the trolley wire, but at fixed points instead of *en route*.

A great many figures are given as to the cost of accumulator working with the cells in a "dummy" car or bogey, and these are advocated for places where the traffic varies considerably, as they can be attached to any car and fewer cars than dummies can be kept, thus leaving time for charging.

The accumulator itself is then considered, and the following requirements are stated:—"Although lightness may not be the main consideration, yet it is a very important one. Again, the cell must not only be able to withstand jolting, without shedding of material, and high discharge rates without buckling, but, moreover, it must not decrease in capacity while in use, as this would necessitate alterations in the time-table relating to the charging of the batteries, and interfere with the general arrangement. The battery, furthermore, should not require frequent overhauling, and the repairs should be neither more numerous, nor more costly than those of any other part of the machinery." However, great improvements will have to be made before these conditions, especially the last, are complied with.

The author thinks that "The nearest approach to this ideal cell will probably be one of the Planté type, with a large extent of surface, the layer of active material relatively thin, but in most intimate contact with the metallic lead out of which it has been formed." In fact, Mr. EPSTEIN really goes on to describe the Tudor cell as used on the Paris tramways. This is a rather interesting result when it is remembered that Mr. EPSTEIN is the inventor of and was lately a maker of batteries on a different principle which were introduced for electric traction, but we think have since been abandoned.

A very interesting point is mentioned which is very little known—that is, the voltage of a battery falls very rapidly after the negative plates are exhausted, but that with the positive plate slowly. It is, therefore, advisable for traction purposes to use negative sections of higher capacity than that of the corresponding positive sections.

Overcharging is recommended in moderation as being useful, not in improving the electrodes, but for mixing the acid by the evolution of gas.

The question of depreciation on accumulators is gone into and a figure is fixed as the highest which should be allowed. This comes out at 35*d.* per car mile for 400 volts—240 amp. hours. This is stated to be greater than that at Hanover, but it is explained that at this place the battery seems too large. It is also, it will be remembered, a fact that the cost of accumulator traction is only slightly in excess at Hanover of the cost of trolley traction.

The latter part of the paper deals with electric motor cars, but there is not a great deal which is new in this. However, it is shown that if a battery has to have new plates even in eight months, the cost would only be 5*d.* per cab-mile, and if in two years 166*d.* per mile. But the cost of frequent inspection becomes of more importance than that of actual cost of renewals. "Reliability of the battery, obviating the necessity for frequent examinations and tests and for remedying partial defects, is again of much higher importance—within reasonable limits—than the lifetime of the whole battery."

A further point is that "lightness of batteries for ordinary roads is of much more importance than it is on tram lines, not only on account of the heavier energy expenditure which is necessary to propel a given weight, but the more so as the battery will represent a larger portion of the total weight of the vehicle as compared with tramcars." It is also suggested that there should be several charging stations in various parts of the town where cabs run, so that a call could be made at the nearest station for

a fresh battery, when the one used showed signs of being exhausted.

The discussion did not bring out many points of interest, and the criticism was all favourable to Mr. EPSTEIN. Some figures were given referring to the cabs of the London Electric Cab Company, which have already been given in this Journal.

Reference was made to the Birmingham Central Tramway system by two speakers, and the failure of this experiment was explained in the same way by them as it was explained in a general way by Mr. EPSTEIN in his paper, viz. chiefly due to defective methods of charging and handling, and no doubt to imperfect accumulators.

This paper is, on the whole, no very great addition to our knowledge on the subject, but the information obtainable has been collected from many sources, including the author's large experience, and placed before us in a convenient and pleasant manner.

WAREHOUSE AND FACTORY FIRE DANGERS.

By GEORGE H. BIBBY.

THE numerous buildings destroyed by fire in the City on November 19 were almost exclusively of the warehouse class, or else factories, workshops and buildings of a kindred nature. For the most part they were constructed in conformity with the modern requirements of various Building Acts (so far as regards the provision of means for the prevention of the spread of fire from one building to another), but with less consideration as to the means to be adopted for the prevention of fire extensions from one floor to another, and to the roofs.

If a building contain more than a given number of cubic feet, or if the nature of the business to be carried on is such that it appears to demand special precautions, these are very frequently limited to the division of the premises into one or more fire-tight compartments. They are formed by vertical partitions of brickwork extending from the foundations to a point above the roof, and with double iron doors at each floor level, or where these may be required, but such doors are obviously quite as likely to be left open (upon the outbreak of fire) by the alarmed workpeople, as too frequently are the doors of "water-tight" compartments of ships upon the occasion of collisions.

Further than this, the iron doors are very frequently of insufficient thickness, do not fit the openings closely, or are excessively large and too heavy to be moved easily, or are arranged to slide on rollers subject to considerable friction. Even when the doors have been duly closed, I have found, after a fire, that flames have passed through the small openings between the jambs and doors, and that the woodwork in floors and partitions (placed too close to the iron doors) had been ignited.

One of the chief causes of the spread of fires in warehouses, factories and workshops, is that the sides and soffits of the floor joists are exposed to its action, or, if covered at all, are ceiled with light boarding, instead of lath and plaster. After a very considerable experience in factory inspections, both in the provinces and the Metropolis, I have found that most factories and workshops (where not supplied with concrete or other fire-resisting floors) have only the joists and floor boards at each level, and are entirely without ceilings of wood or plaster, or of corrugated iron plates, as can occasionally be seen in factories.

A further cause of the rapid spread of fire within a building is that in very large numbers of factories and warehouses the means of communication between the various floors are usually wooden staircases or step-ladders, boarded on their soffits, and with boarded partitions dividing them from the workrooms. These and the wood-cased lifts to be found in many buildings have been known to convey flames from basement to roof with enormous rapidity, and if, as is frequently the case, there are no fire buckets, or if these happen not to be filled with water, or if there be no convenient means of refilling them (in cases when the first bucketful is ineffectual), the building is often doomed to destruction before the firemen can arrive.

When a great fire occurs and large numbers of buildings are almost simultaneously destroyed it is highly probable that some of the workpeople may be burnt to death, and without any knowledge of the circumstance coming to the public ear or even to the owners of the premises, for it is a common occurrence for one or two of the occupants of a warehouse or factory at meal times to take his or their food in some isolated apartment or behind packing-cases, &c., and then to sleep out a portion of the dinner hour; some of these may have no friends to inquire about them if missing after a fire, and the books of the firm employing them being burnt during the conflagration, no record may remain respecting their employment upon the premises at the time.

When the plans for a new warehouse have been passed and approved by the local authority, any precautions to be adopted in the event of fire remain entirely in the discretion of the owners and occupiers, unless these should desire to insure their property, in which case the surveyors to the insurance company may require certain works to be carried out to secure the safety of the premises before advising that a policy of fire insurance may be granted.

But if the plans are submitted for a factory or workshop the case is quite different, even if there be fewer persons engaged on the premises than in a warehouse, for under the Factory Acts of 1891 and 1895 (as well as under previous Acts) such premises are never quite free from periodical inspections by the Home Office officials, the sanitary authorities in the provinces and the London County Council in the Metropolis, and where explosives are manufactured or petroleum used, special inspectors are required to survey the premises.

In the provinces generally, the inspection of factories and workshops, under the provisions of the Factory and Workshop Acts of 1891 and 1895, must necessarily, under existing circumstances, be much less effective (as regards other than Home Office inspections) than the inspections by the officials of the London County Council, who are engaged in reporting upon the condition of all factories, workshops and laundries in London having more than forty workpeople employed therein). The chief reason why such inspections would be less effective in the provinces may be because the districts, being in many cases of limited area, it is impossible or inconvenient to employ officials specially upon such duties or with the necessary qualifications for the work. In London, however, such inspections for the London County Council have been upon a large scale, and chiefly carried out by officials who have had a lengthy previous experience as to the safety of theatres and music-halls and the precautions to be observed therein in the event of fire.

To prevent or delay the spread of fire from one building to another, it is most desirable that the ceiling of the top floor should be of fire-resisting materials. In a building of many floors it may often be impracticable to construct the floors throughout with fire-resisting materials, not only for economical reasons, but for various other considerations. But the extra cost of the fireproof ceiling is a much smaller matter, and such construction might well be insisted upon in districts where the streets are narrow and the buildings are lofty and crowded together. It is obvious that if each building forming a warehouse or factory be a "fire-tight" compartment, as regards the party-walls, the greatest danger is at the roof, and it is there that the heat would be greatest. In narrow streets especially (and certainly in the case of warehouses where valuable goods are stored) there should be fixed outside iron shutters to the windows. These, I believe, were first introduced in some of the windows of warehouses previous to the last great fire in Chicago, and with satisfactory results, for I have myself seen a building there which was so provided, and which remained almost unharmed in the midst of destruction on every side.

Ceilings of concrete and other fire-resisting materials are occasionally adopted in the construction of the top storeys of hospitals, workhouses, asylums and buildings of a similar description, and where a considerable surface has to be covered, and there appears to be good reason for adopting similar precautions in the erection of business premises. The chief objection to such ceilings is that owners and occupiers are very desirous of securing upon the uppermost floor the advantages of skylights or lantern

lights in the roof for certain processes of manufacture requiring the best light obtainable.

So far as I am aware, no public authority has yet laid down any fixed regulations either as to the construction of new warehouses and factories, or as to the alteration of existing buildings of that description, having special reference to the requirements of the Factory and Workshop Acts of 1891 and 1895. It appears, in fact, almost impossible to frame anything more than general rules for the information of those concerned with such work. The most important features of these Acts are connected with the safety of the workpeople employed in each building, and then only if more than forty persons are employed.

If the buildings should be of considerable area, two or more staircases should always be provided, built of fire-resisting materials, and enclosed in brick walls of adequate thickness, and with all doors useable as exits arranged so as to open outwards, or if towards two or more exits to swing both ways and in such a manner as not to encroach upon the landings or passage-way of the staircases. Any means of escape that may be secured by way of the roofs should be fully considered, and staircases or step-ladders provided so that there may be every reasonable facility for reaching the roof. Of course, when any building is so situated that escape over the roof to other premises would be impossible (as in the case, for instance, of a building much higher than others adjoining) special means for enabling the workpeople to descend from the roof to the ground should be considered, especially in those instances where it would be impossible to use a movable fire-escape, as is the case with a large number of buildings in the narrow courts and alleys of many of the provincial cities and of the Metropolis. Many erections can only be reached by means of a covered entry of very narrow dimensions. After a very considerable experience upon the inspection and survey of warehouses, factories and workshops, I have found very few buildings of these classes provided with sufficient means of escape from the upper floors in the event of fire or panic.

There are buildings which are provided not only with very elaborate and perfect systems of hydrants and hose, &c., with fire-buckets and other appliances, but also with external iron landings and ladders communicating with every floor. The efficiency of these, however, would often be negated by their position with regard to the windows, as in the event of fire, smoke and flame from these might render the ladders impassable. Some factories are not only provided with steam fire-pumps and other special appliances, but also with well-trained private fire-brigade men, who are periodically exercised in the duties they may be called upon to perform.

A not uncommon defect to be found in factory buildings, especially those of older date, is that iron window frames (with very small panes) are provided, through which it would be impossible for the workpeople to pass should the usual exits be unavailable by reason of fire and smoke. Windows of that class are frequently without any portions arranged to open, and cases have occurred where the workpeople have been burnt to death in the presence of a crowd, unable from the outside to break the ironwork of the windows in time to rescue them.

There are buildings which are not only so constructed as to offer every facility for the rapid spread of fire, but are made yet worse by reason of the large stocks of wood stored in drying-rooms, heated by steam pipes from one year's end to another. These apartments are frequently partitioned off by mere matchboard constructions instead of brickwork, iron, or other fire-resisting materials; and it is a matter for surprise that so many of these badly-arranged buildings should have escaped destruction long since.

If erected at all, those buildings should at least never be permitted in narrow streets and closely built-up districts, but they do exist in nearly all the large towns and in the Metropolis, and we may, therefore, from time to time expect recurrences of such disasters as those that have occurred in the Aldersgate district, St. Mary Axe, Tabernacle Street and elsewhere.

Mr. R. E. Middleton will read a paper on "The Pollution of Water and its Correction" at the meeting of the Society of Engineers on Monday next.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.

ON Monday evening Mr. Stephen Adam, Glasgow, lectured in the Leeds Institute on "Glass-Staining Art," with special reference to the position of the craftsman in art work. After describing the varied processes and glancing at the history of the ancient craft from the tenth to the nineteenth century, with the aid of cartoons and examples, the lecturer proceeded to say that he deplored the use of enamel or paint on glass surfaces, especially for church memorial windows intended to be permanent. He strongly advocated the pure "mosaic" methods of execution as practised in Mediaeval times. He pointed out with regret how many otherwise excellent windows carried out in "enamel style," such as those in College Chapel, Oxford, and in Glasgow Cathedral, were rapidly fading away. It might be said that there was nothing in art or nature imperishable, but certain stained-glass windows of the tenth, twelfth and thirteenth centuries in our English and continental cathedrals tell us to-day, and proclaim it in glowing "mosaic" colours—through which the light of centuries has streamed in subdued glory—that stained glass can be durable in ineffaceable beauty long after tombstone memorials have crumbled into dust. In conclusion, the lecturer contended that the aim and mission of the art craftsman in ennobling and beautifying our surroundings was higher than that of the artist who year after year wearied us by monotonous exhibits of subjects teaching nothing. On the motion of Mr. Bedford a hearty vote of thanks was awarded to Mr. Adam for his interesting paper.

"THE BROKEN CONTRACT."

POLITICIANS have taken much of the romance out of Egypt, and Mr. F. D. Clapham was wise to make timely use of an ancient tradition (or to reinvent one) for "The Broken Contract," the Egyptian Enigma which was to amuse the Architectural Association on Friday last. In a few years African as well as Egyptian mysteries will be too commonplace for a dramatist. The whole action of the Enigma takes place within or outside the tomb of King Amenemhat, of pious memory. At the opening several Egyptians, decorators by profession, are discovered looking round the walls of the tomb carefully, but there is no cranny to allow escape. Time did not count for much in Egypt, and a dramatist can afford to be liberal with it. The prisoners were walled in exactly 4,000 years ago, but they retained their voices as well as their youth, for they announced in vigorous tones why they were entombed. It was through a common fault with decorators, the neglect of time, and what was intended as a tomb was utilised as a prison. There they were left:—

For failing to complete this vault,
Although it was not all our fault.
Let our fate all builders warn
Their time limits not to scorn,
Nor extend their contract date,
Or they'll share with us our fate.

It is no excuse that their tender was the lowest, or that they had subsequently converted the business into a limited liability company with a still more limited interest in the contracts, and that a strike of decorators followed. Masters, men and handmaidens were immured, but owing to the skill of Painhesi, the court physician, and occasional slumbers during a century, the builders and decorators were kept alive, and by an accident the Princess Nephthis, the daughter of Amenemhat, involuntarily shared in the captivity. Her highness was an amateur who obtained prizes at the Thebes school of art. She was an economist also, and was therefore competent to make clothes-horses out of meat-skewers, arm-chairs out of packing-cases and art muslin. As a dutiful daughter, it was her ambition to paint the paternal tomb a brilliant grass green, which would scare the eyes of thieves. But her influence was profitable to the firm of Pempi & Merimies, for when the male decorators went on strike, the worthy pair "had a little plan," and, as they said:—

We advertised for girls, they work for much less than a man.
Of course we chose the pretty ones and gave them all smart frocks,
And took good care to see they wore the latest thing in clocks.
When working on a ladder it's a thing that always drew,
Their ankles being all well made,
They certainly increased our trade.

The princess moreover kept up the spirits of her companions by her faith in the future, for once at the Karnak races she was told by a gipsy that she was to be hidden from sight for many years, then she was to be released and was to marry her rescuer. Who could doubt such a prophecy and the hopes it inspired? The adventure was scarcely related and a song given about the tender memories of bygone days when an Architectural Association exploration party, headed by Professor Stonechat,

tumbled in through a hole in the rock. In reply to the usual questions about who they were and what they did for a living, the explorers answer:—

We students are
All on a par,
As doubtless you conjecture;
Our only aim,
To spread the fame
Of Art and Architecture.

It is needless to say the princess could not fail to fall in love with Stanley Chester, the selected one of the party. While the pair are billing and cooing in a style that is never ancient, the Egyptian firm comparé notes with the strangers about architectural affairs, but the moderns have to hide their diminished heads when they learn that once upon a time in Egypt "nothing was ever done without consulting an architect." Stanley, too, suspends love making for a time to chant about the model English architect:—

He has a wish when he leaves school
To be an Architect,
He wants to join the great A.A.,
He likes to be correct.
He sends his nomination form,
We give to him our votes,
He pays his sub., gets in return
The "Brown Book" and the "Notes."
He goes into an office where
He learns to trace and draw,
He wades right through the Orders, too,
And votes them all a bore.
He wins a travelling studentship,
The "Pugin" or the "Soane,"
He goes abroad and then he starts
An office of his own.
For he's a right good sort of chap,
A man we all respect,
The best of jolly fellows is
The budding Architect.

Although he is describing himself when he talks of the best of jolly fellows, by the laws of gipsydom and fortune-telling Master Chester has no claim on the princess, for Professor Stonechat was the first to tumble into the tomb, so the act closes with weeping and wailing, accompanied by the resolve of the chorus to make the princess and Mr. Chester happy.

As it is necessary in affairs of the kind to have recourse to an oracle, the Professor at the princess's desire is selected for the office. He is to be properly coached, and then by adopting the modern system of cooking, in which he must be an adept, a fortunate result will be obtained:—

You may perhaps have noticed what a lot of things are done
By cooking, yes, by cooking,
And it may be that a competition is very often won
By cooking, yes, by cooking.
On plan you find there's nothing underneath a three-foot wall,
A column in the attic perhaps has no support at all,
You can make your elevations too look either low or tall
By cooking, yes, by cooking.
For it's really very funny
How imposing plans may look,
When handled by a man who
Understands the way to cook.

The Association did not improve the occasion to advertise how much it does to promote the knowledge of cooking, but its services were not likely to be overlooked by actors or audience. The Professor's get-up as the oracle was not reminiscent of Egypt or Greece, but it was hardly becoming to describe the Professor as looking as silly as if he were one of the Council of the Institute. In spite of his appearance the Professor was sensible, and oracularly declared that the princess could bestow her hand on a budding architect. The other explorers also found charmers, and the Enigma ended with the departure of everybody for "dear old England" and a chorus of victory:

Clash the cymbals, trumpets sound,
Proclaim to every nation,
How after years the lost were found
By the Association.
So clash the cymbals, beat the drum,
Proclaim to every nation,
With what success they homeward come,
The great Association.

The music was by Mr. Leonard Butler. The following members (assisted by some ladies) took part in the play, and amused a very crowded house:—Messrs. Alfred Stalman, S. Constanduros, H. Seton Morris, A. G. Turner, Frank Collins, F. D. Clapham, G. B. Carvill, J. H. Wilson, P. Albert, G. Bailey, Douglas Carvill, S. Elston, G. H. Frow, Howard Holt, A. C. Kelly, A. Lovejoy, G. J. T. Reavell, W. P. Swaby, F. Thomas.

THE ART OF SIR J. MILLAIS.

A LECTURE was delivered at the London Institution on Monday by Mr. Whitworth Wallis on the pre-Raphaelite art of Sir John Millais. It accordingly covered the period of his work from his early student days, when he, Rossetti and Holman Hunt began to conceive the revolt against the conventionalism of the schools, in order to bring art back to the truth of nature by founding the pre-Raphaelite Brotherhood, down to 1860, when he began to introduce into his works the elements of romance. The works of his pre-Raphaelite days were illustrated by a series of lantern slides, which, though they did not exhibit the colouring of the artist, showed the composition of the picture and the standpoint of the Brotherhood. In the case of nearly every picture which was thus thrown upon the screen, Mr. Wallis dwelt upon the intense realism of the conception as a proof of the striving of the young artists to keep in touch with nature, and he quoted also the terms of ridicule with which the works were invariably greeted by the critics and the public on their first appearance. *The Carpenter's Shop*, for instance, in which the child Christ is represented as having injured his hand, and which was a very violent realistic departure from the Italian traditions and conceptions of the Saviour and the Virgin, was denounced by the critics of the time as even blasphemous. Such a reception, the lecturer said, showed how ignorant the public was to the true principles of art, and how necessary as an educative influence the revolt of the young artists had been. No such criticism would be levelled against a similar work now, so far had the influence of the Brotherhood contributed to the moulding of English opinion. Apart from the great number of works of wondrous technique, of deep earnestness and intellectuality, of extraordinary realism and of great achievement in the expression of emotion which Millais during this period produced, the lecturer seemed to regard this bringing back of art to the domain of nature as the crowning work of the Brotherhood. In half a dozen eloquent passages he spoke of some of the pre-Raphaelite paintings of Millais as the greatest and most impressive ever painted in England. Posterity would have to decide his position in the art history of the world, but so far as English painting was concerned he stood unquestionably paramount, and even if his days had been prolonged he could not have enhanced the brilliant record he had left behind.

LAW IN TASTE.

ON Saturday last Professor Courthope, the Professor of Poetry at Oxford, delivered the first of a series of lectures on "Law in Taste," supplementary to those he has already given on "Life in Poetry." He dwelt, in the first place, on the anomaly that the English, who in all other departments of life were most observant of law, refused to recognise its operation in the sphere of art and taste, and he ascribed the fact to the bent of the national character, at once sceptical and practical. It was said that no law of taste could be discovered, and that, if it could, it would be of no use. In answer to the first objection, he pointed out how universal in all ages and nations had been the endeavour to formulate a theory of fine art; and in answer to the second, he said that the prevailing anarchy of opinion was in itself an argument for trying to place our æsthetic perceptions and preferences on a basis of reason. His inquiry should be directed to this practical end. Starting with an acceptance of Aristotle's distinction between the mimetic and useful arts, he said that all fine art had a twofold purpose—imitation of an external object and the production of imaginative pleasure. A true likeness of the thing imitated was, of course, a primary requisite of art, but beyond the mere correct representation of nature, all fine art aimed at an ideal object. This object of imitation had been called in ancient times the beautiful, and in modern times the characteristic, but its absolute nature could not be ascertained. Since then all in this region was so uncertain it was necessary to estimate the quality of artistic imitation by reference to the pleasure which it produced. The necessity had been denied by modern philosophers, but in point of fact it was impossible to dissociate our perceptions of beautiful, ugly and sublime things from the perceptions of pleasure which accompanied them. The question he proposed for consideration in his first lecture was whether æsthetic philosophy, as such, apart from artistic practice, had revealed any law regulating ideal imitation and imaginative pleasure, and if no such law had been discovered by philosophy whether any other method of investigation could be pursued. In a brief sketch he showed the way in which his subject had been treated by philosophers in different periods, following the divisions in Mr. Bosanquet's "History of Æsthetic," a book which he strongly recommended to the study of his hearers. The periods which he noticed were the Greek civic period, the Alexandrian-Roman period, the Mediæval period, the period of the Renaissance, and the modern period following the French Revolution. Within these

limits he mentioned the leading questions which had been raised with regard to ideal imitation and the treatises in which they had been discussed. Then, turning to what had been said on the subject of imaginative pleasure, he noticed the reasoning of Plato, which had led him to conclusions like those of the English Puritans. From Plato he passed to Aristotle, whose views about artistic pleasure he warmly defended against the modern Hegelians, who had censured Aristotle for allowing moral considerations to enter into his æsthetic judgments. Aristotle, he said, was always thinking of man as the member of society and a State, and there was, therefore, in his mind an inseparable association between art and morality. The German philosophers, on the other hand, treated man merely as an isolated sentient individual, and, looking at him in this aspect, Kant and his followers were at least consistent in restricting their investigation of the nature of æsthetic pleasure to the perceptions of purely physical beauty and in excluding from it the pleasures of fine art. The Hegelians, however, who followed Kant in excluding moral judgments from æsthetic perceptions, claim poetry as falling within the purely æsthetic domain. This, he maintained, was inconsistent. An art like poetry could not be justly appreciated apart from the religious, moral and even political conditions of the society in which it was produced. Summing up the results of this survey, he said that, though æsthetic philosophy had raised questions of the greatest abstract interest with regard to the nature of the beautiful, it had discovered no law or principle which was of any assistance in the critical appreciation of works of art. Might we not be more successful if, looking away from the abstractions of philosophy, we proceeded inductively by observation of concrete works of art? Art preceded criticism; and the work of the greatest poets, sculptors and painters had been produced without any conscious application of the philosophic principles which were afterwards discovered in it. We knew, by the enduring pleasure it produced, that this work must have been produced in conformity with the law of nature and true taste. Here then were the living monuments of æsthetic law. But it would be idle to look for an universal law of taste, for though all great art proceeded from a single divine source of inspiration, which imposed its own unity on the artist's conception, yet, operating as it did within differently constituted minds, it manifested itself to the world in the most various forms and types. Moreover, these forms did not spring out of the isolated conception of the individual artist, but were very largely the product of the common perceptions of society, reacting on the imagination of the artist who had the gift of representative expression. We might, in fact, observe in every nation a well-defined character which gave a particular bent to its art and determined its law of taste. In what way could we construct from the observation of character in national art a standard of taste capable of checking the anarchy of individualism? By the common recognition of those works of genius in which the spirit of the great artist, representing his nation, has found the means of expressing itself with most life, freedom and spontaneity. It was the business of criticism to discover the law underlying such creations. Life in art and law in taste were, in fact, the opposite sides of the same principle. Life in poetry was the reconstruction in an organic form of the universal ideas or impressions which the mind derives from nature. Law in taste was a just critical perception of the conditions of life which constitute the organic unity of the poetic creation. The critic, like the poet, must, in a sense, be born such. He, too, must be the representative of society. He must have an instinctive knowledge of the source of the artist's inspiration, and he must be able to follow him sympathetically in all the processes of his invention, but he must also be able to comprehend his limitations by comparing his work historically with that of his predecessors and with work of the same order produced in other nations. By constant and patient comparison of this kind the critic would gradually form in his mind a standard of judgment by which to estimate the value of contemporary art. The Professor concluded with a hope that he might be able before his term of occupying the chair closed to illustrate the line of thought he had suggested. It was his intention in his next lecture to treat of the idea of unity common to all art as it was put forward by Aristotle in his "Poetics;" in the three following lectures to show how the idea of unity reappeared with various modifications in the criticism of the French, German and English nations respectively; then, in four lectures, to take Chaucer, Shakespeare, Pope and Tennyson as the types of poetical art in different periods of English history, showing how each preserved in his work the unity and continuity of national character which determines the law of taste; his last lecture would be devoted to considering the place which the training of taste ought to occupy in a system of liberal education.

The Parish Church, Knutsford, on the restoration of which 2,000*l.* has been spent, was reopened on Sunday last.

NOTES AND COMMENTS.

NAPOLEON I. played many parts, but few of his admirers were aware that he once was not afraid to undertake an architect's duties. In the archives of Ajaccio are a set of plans for a hospital at Oliveto which he prepared, the site having been selected by him. It is not unlikely that the site will at last be utilised, and that the Emperor's plans will have some influence on whatever design is adopted for the new building. There is at present in Ajaccio a civil hospital and a military hospital. As the town is gaining a reputation as a winter resort it is proposed to remove the hospitals and to erect a casino and a large hotel on the sites. A mixed hospital is therefore to be built at Oliveto. The plans of NAPOLEON might be described as being an early recognition of the pavilion principle, for three blocks of buildings are shown on them which are united by glazed galleries. The subject will shortly be considered by the Administrative Council.

PRINCESS CHRISTIAN has succeeded in securing upwards of 11,000*l.*, approximately a third of the sum required for the erection of the permanent building proposed for the Royal School of Art Needlework. HER MAJESTY'S Commissioners for 1851 have granted an admirable site, at a nominal rental (of 200*l.* per annum) subject to the proviso that the building is commenced within a fixed term now nearly expired. The Princess accordingly appeals for assistance to complete the balance of the amount required in order to have the building commenced before the year closes. For twenty-five years excellent work has been done in the temporary buildings of the school, and the grant given by the London Technical Education Board shows the appreciation of the training classes. The school is no longer confined to assisting ladies in reduced circumstances, but has been widened so as to embrace the training of technical teachers, such as are now employed to train women, both in art needlework and applied design, under the system pursued upon the Continent and elsewhere.

OLD stained-glass obtains high prices in Germany, for a collection of fifty-nine examples of various sizes from Schloss Langenstein was sold on Thursday last in Cologne for 223,000 marks, or over 11,000*l.* Most of the examples were purchased for museums. A window having for subject the *Crucifixion*, which was designed by HANS HOLBEIN, was acquired for the museum at Basle, the price being 29,800 marks. A *Mater Dolorosa* (5,100 marks), a *St. Wolfgang* (7,900 marks), an *Ecce Homo* (4,600 marks), and a *St. Christopher* (6,500 marks) will also enrich the Basle museum. They were all painted from HOLBEIN'S cartoons, and a more fitting place could hardly be found for them than a town where the artist lived for many years. Some windows designed by HANS BALDUNG GRIEN were likewise secured for the museum. A sum of 19,800 marks was subscribed to purchase a window for the Cologne museum. A figure of *St. George*, which cost 14,400 marks, and other saints sold at a lesser price, will be sent to the Berlin museum. The museums of Nuremberg and Solothurn will also receive additions from the collection.

It is hard on the competitors for the capitol at Harrisburg to have the conditions set aside, but it is adding insult to injury when the Supreme Court of Pennsylvania says they have themselves to blame for the dishonest conclusion of the affair. According to the sapient judges who form that tribunal, the competitors should have been aware that the commissioners for the building were acting illegally when they called in experts to examine the designs, for authority cannot be delegated in America. The *American Architect*, in commenting on the fiasco, says:—"Punic faith, however immediately profitable, is seldom advantageous in the long run, and unless the Legislature should take action this winter to redeem the good name of the State, Pennsylvania must take its place, in the eyes of the world, with the other communities of repudiators which have disgraced American civilisation.

Naturally enough, the Pennsylvania newspapers throw the responsibility for the scandal upon the present members of the Commission, as individuals; but the rest of the world will soon forget the personal part of the matter, and will remember only that the programme by which the best and most scrupulous part of the profession was deceived was signed by the Governor, the Acting President of the Senate, the Speaker of the House of Representatives, the State Treasurer, and the Auditor-General of the Commonwealth of Pennsylvania; and documents inviting confidence on the part of the public, and signed by these officials, will excite laughter for a century to come." As Mr. COBB, of Chicago, has contrived to carry off the contested prize, the *Inland Architect* of course takes a complacent view of the transaction, saying:—"Now that Mr. COBB has been appointed the matter can certainly rest, as this action of the Commissioners has placed all chance of any misuse of State funds beyond the power of manipulation by them or anyone else. Architecturally the design will be creditable, and if the building costs more in the end than was originally appropriated it will be at the wish of the people, and every dollar appropriated will be spent on the building and go as far as possible commensurate with good construction. While the appointment of Mr. COBB does not place the action of the Commissioners in regard to the original competition in a more favourable light, it ends the matter in a much more creditable manner than the outlook promised. The incident, as a whole, will cause architects to look with less favour than ever upon competitions for public buildings."

A TRAVELLING studentship of 50*l.* is offered by the Painters' Company for the encouragement of the study of decorative painting. The studentship is open to competition by students between the ages of twenty and thirty-five in any recognised school of art or other institution devoted to the study of applied art in any form, and situate within the limit of the larger metropolitan postal area. Each set of designs sent in competition must bear the author's distinctive mark or motto (but not his name), and the title and address of the institution by which they are forwarded; they must also be countersigned by the responsible officer of the institution. The set of drawings must be accompanied by a sealed envelope marked outside "Competition," and containing the author's name and address with the mark or motto borne by the drawings. The drawings and envelope to be addressed to "The Clerks of the Painters' Company, Painters' Hall, Little Trinity Lane, London, E.C." Not more than two sets of designs may be forwarded for one competition by any one institution. The following drawings must be submitted by each competitor:—1. A drawing from the antique or from life. 2. A study from an example of coloured ornament. 3. A set of original designs for coloured decoration as follows:—(a) One side with the recess of a vestibule 15 feet square and 15 feet high; (b) the ceiling of the same, including the soffit of the arched recess, scale $\frac{3}{4}$ inch to a foot (the details of the cornice and other mouldings are left to the competitor, who may add any moulded features at his discretion); (c) a portion of the ornament in the above drawn to one-third full size. The spirit and character of these designs will be considered rather than elaborate finish. All the drawings must be delivered at Painters' Hall on or before March 1, 1898. The successful competitor must be prepared to spend not less than six months in Italy in such places as the committee may direct.

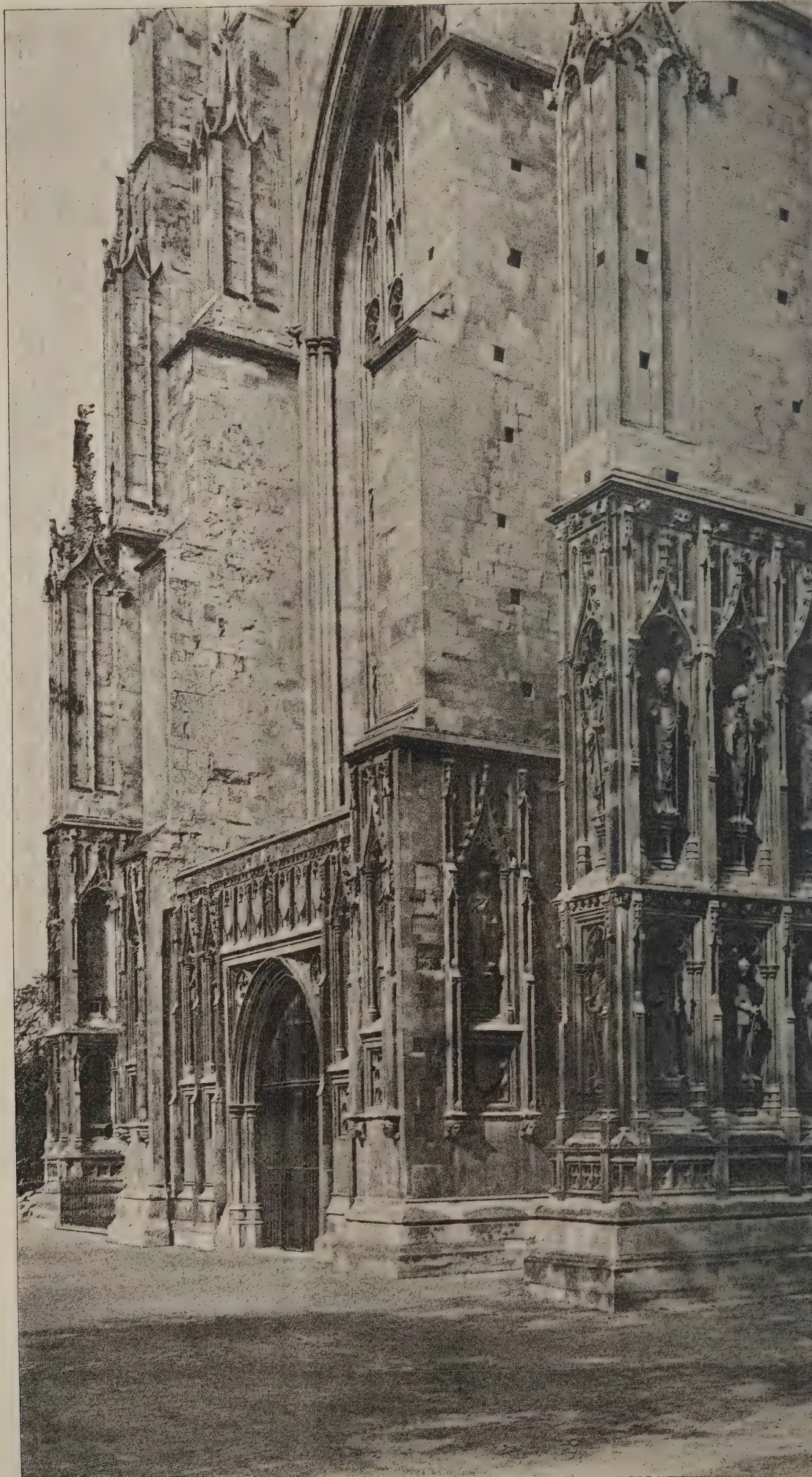
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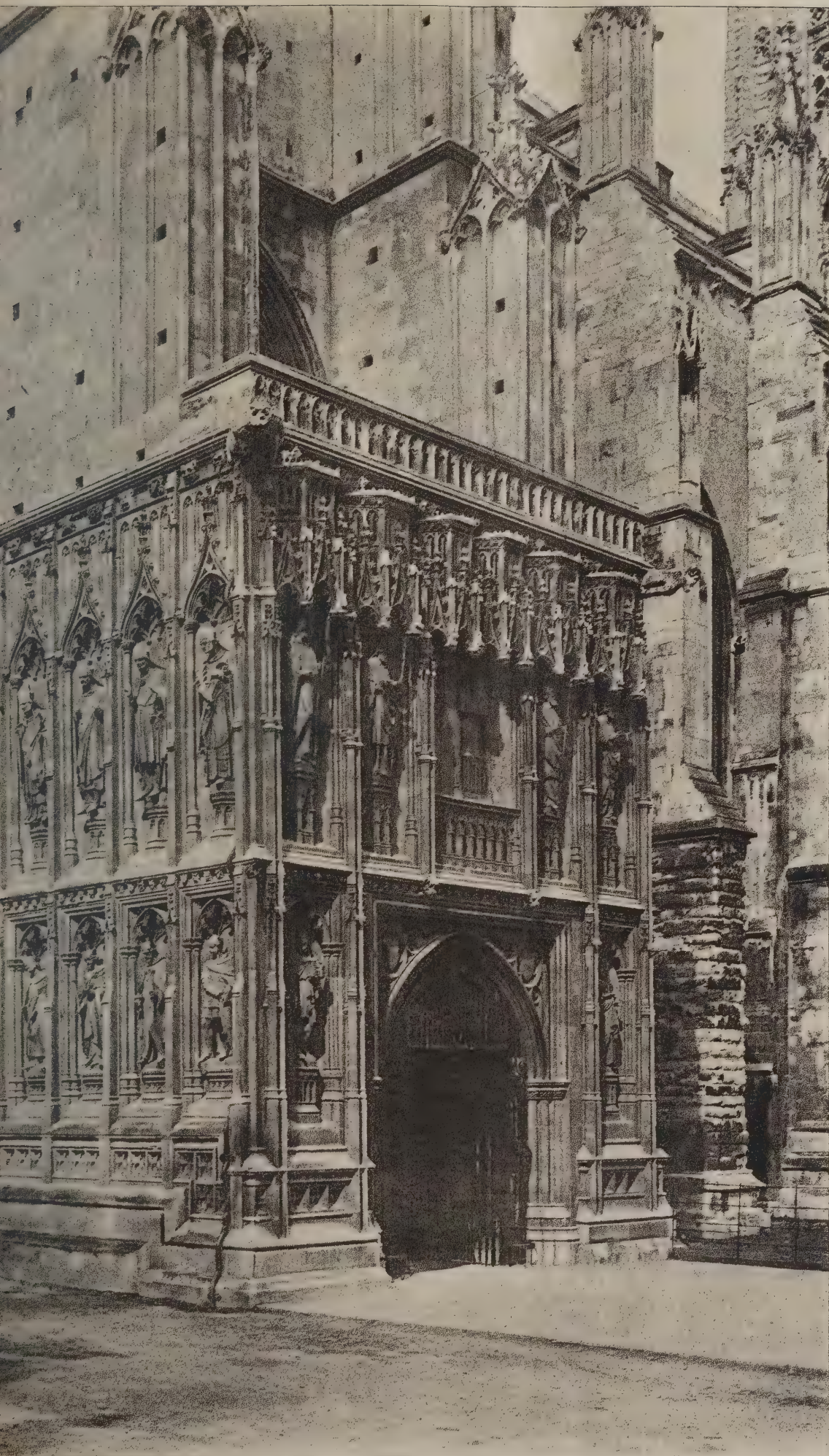
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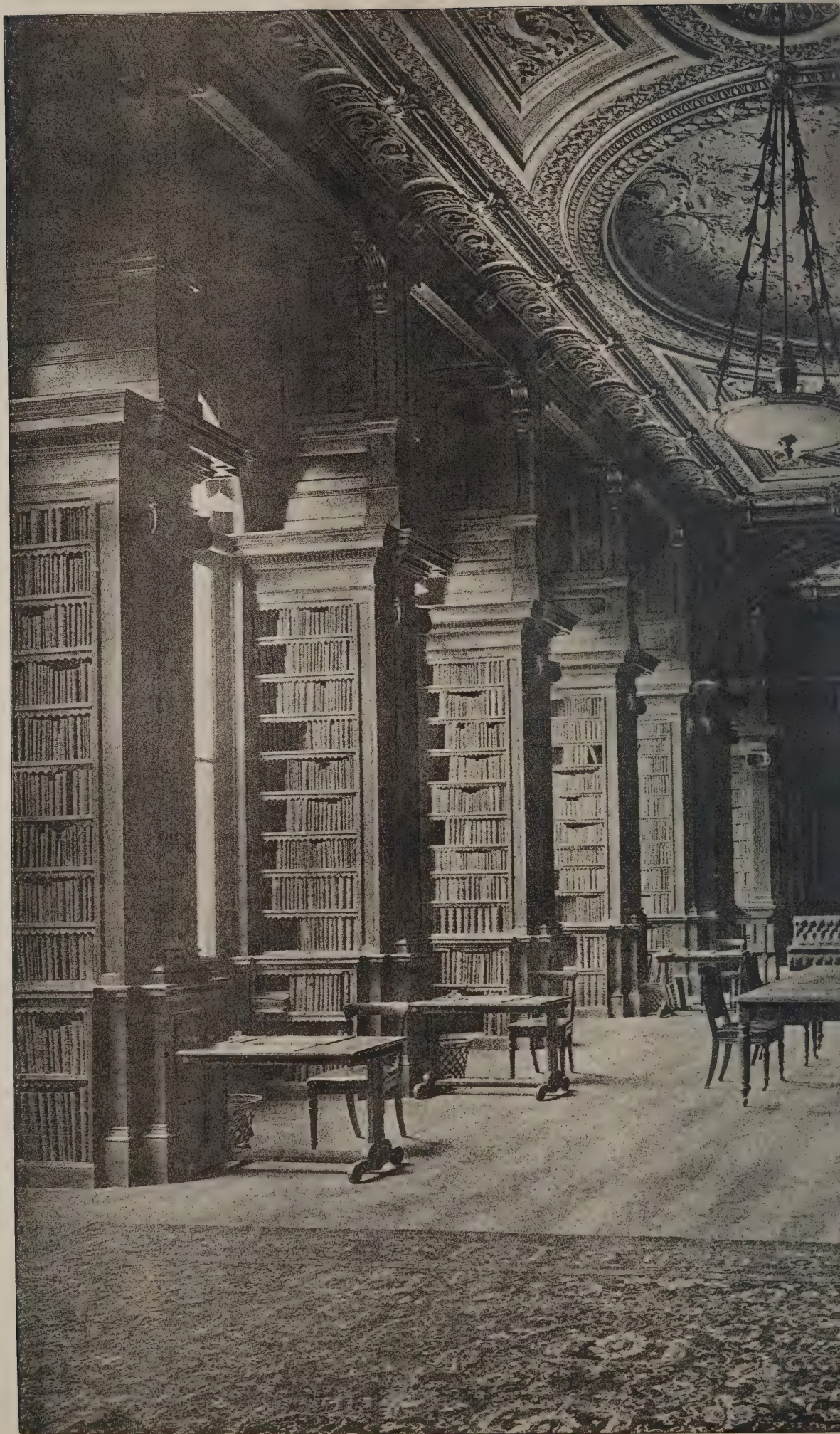
THE CORRIDOR, ALTHORP PARK, NORTHAMPTON.



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ENGINEERS, WESTMINSTER.

Architect



er: 3rd 1897.

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SOCIETY OF ARCHITECTS.

ON the 25th ult. the opening meeting of the session 1897-98 of the Society of Architects was held in St. James's Hall, when the following address was delivered by the president, Mr. T. Walter L. Emden, J.P. :—

It has been the pleasure of this Society to elect me to the chair of its President, an honour which I appreciate most thoroughly, and the more so inasmuch as the election has been unanimous.

I would tender to the Society generally, as well as to the members of council and officials, my most hearty thanks, not only for the support given me in this instance, but also for the pleasant relations which have existed between us ever since I became a member of this Society.

It may seem ungracious, but it certainly is not meant so, if I say that I do not believe in societies as at present constituted, and that for most of the years of my professional existence I stood aloof from them and only joined this Society because of its efforts to obtain a Registration Act for architects, and with a desire to help in this programme. I say this, not as being against such institutions which have sought to do good work and no doubt have done much, but because I find, and have always found, that while they purport to give the public an assurance as to the capabilities of an architect, practically without compulsory registration they cannot do so. There is no compulsory regular examination, and no diploma issuable under the law as in the case of other learned professions; indeed, while anyone can set himself up as an architect, without any examination, and without previous study, experience or competent knowledge, and as long as examination is voluntary, the best benefits of these societies are but small security to the public.

Examination is no doubt more or less insisted on before entering the Royal Institute and other societies; but this does not meet the case, as while the use of letters, indicating the connection of persons using them with any society, may mean that some examination more or less has been accomplished, many, indeed by far the greater number, do not belong to any society and yet practise.

Many of the most competent men practise without belonging to any society, so that it is seldom the public inquire, or care, if the professional man employed belongs to a society or not. Let me again point out, and insist upon the fact, that as anyone, never mind what his position is, can call himself (even be he a labourer, or, as in a known case, an undertaker) an architect, surveyor, or engineer, without let or hindrance; and as voluntary examination can afford no real protection to the public that the architect employed will design sanitary and properly constructed buildings, I can but conclude that, except absolute compulsion is enforced under an Act for Registration, nothing will accomplish the exclusion of the incompetent.

The Profession.

The duties of the architect, or master builder, no doubt originally covered the engineering efforts as well as the architectural efforts of the ancient world. Unfortunately, at the present day in England, and probably to a great extent because there is no State intervention in the shape of compulsory examinations (as in other countries), there has grown up in the work of the architect less knowledge of construction in its larger form, and a separating of engineering from the architectural work, and hence want of artistic design in our great engineering works.

The engineer has to be called in when a large or difficult work of construction has to be carried out, and the designs of our railway and other bridges, and railway stations, &c., show the want of artistic effort there is in dealing with what are now called engineering works, as distinct from architectural.

Could we, for an instant, compare modern aqueducts or viaducts with the ancients with advantage to the modern designer?

Much has been done of late years by various Acts of Parliament relating to buildings and for the preservation of public health.

A serious difficulty, however, is that each step requires an Act of Parliament framed more or less by men with incomplete knowledge or experience of the necessities, while the alterations necessary in the present Acts so indirectly affect the public that it takes years before even the most simple or urgent necessity for alterations or modifications in the law become apparent and obtains a remedy.

I cannot but think that much might be done if the Local Government Board could be made more regularly and consistently the recipient of information gained by local and other authorities of the various necessities in building and its sanitation. The Board should be authorised to set machinery to work to obtain from the various surveyors in the districts regular reports, and could therefrom draw information for the alterations necessary in our Public Health and Building Acts, invoking the action of Parliament in the same way as in a

question of insanitary areas by a provisional order. Much would thereby be gained and dangerous delays saved.

Undoubtedly, and more particularly, as far as London is concerned, the New Building Act is a step in the right direction, and one cannot but admire the courage and perseverance of Dr. Longstaff, L.C.C., who was chairman of the Building Act committee. The more so that he, a layman (so far as building was concerned), set himself to work to become master of the enormous mass of details and all the *pros* and *cons* and necessities for alteration, and should have succeeded in carrying through so voluminous an Act, as this necessarily was, to what must certainly be called a successful issue. No doubt it will prove of great advantage to London, and while its errors must be remedied as they appear, its benefits must not be forgotten, as the Act is a substantial step in advance.

One of the difficulties which has to be contended with by the professional man is the overlapping of the powers of the various authorities. It is a crying evil in London where the central authority deals with frontage lines, projections, construction and all such-like matters, and puts in action its own surveyors, that there is in each district the surveyor of the local body also dealing, more or less, with the same subjects and other overlapping duties.

If the central authority laid down the rules and regulations under such Acts as deal with these questions (after consultation with the local authorities) and the local authorities administered them, much expense to building owners would be saved, and to the public also, by preventing the duplication of officials and duties and avoiding further friction, as useless as it is delaying, and thus facilitating building operations to an enormous extent.

To pass a set of plans under the present system is not only a complicated, long and harassing process, costly to the building owner, but without increasing the protection of the public; indeed, is wasteful and unproductive of any benefit at all.

A very substantial fee might well be obtained from the building owner under the simpler system for the passing of and licensing plans, leaving the owner better off than now, and making the public purse the richer.

As a step in the right direction it ought to be possible, and I think it is possible (were an effort made), to so arrange the surveyorship for the authorities that one surveyor in each district should suffice, and that the central body should delegate (as I have suggested, after laying down the rules under which the local authority should administer) the active administration to them, and so avoiding overlapping and facilitating very considerably building operations.

Another complication in town building is consequent upon our system of leases and the necessary intervention of the surveyors to freeholder and intermediate owner; and here, as private rights are touched, it is difficult to frame laws to deal fairly with it, to save the uncertainty, expense and delay, and yet fully protect owners' just rights. Indeed, it is so difficult and delicate a subject to handle that it will be a bold man who accomplishes it.

I make it as a suggestion, but as that only, that the building owners should be at liberty, after notice given to the freeholder or superior landlord, to make the alterations he may deem necessary, subject to a right to the freeholder or superior landlord to formally object, and the objection (failing agreement) being heard and determined by a permanent official under the Local Government Board.

Sanitation.

I should like to turn for a moment to sanitation, and ask you to consider how much might have been accomplished by the present time, how many lives saved, and what spread of disease prevented, had the professional man to pass through examination and obtain an intimate knowledge of the necessity of sanitation first, before practising. What I say does not apply to individuals, many of whom have done great and important work in this direction. But can it be said the profession, as a body, has a thorough knowledge of this subject? By the neglect of each Government to provide for compulsory examination and the registration of competent men, they have now much to answer for in this direction.

In England, with our Free Trade principles, we have, I think I am right in saying, hundreds of systems and apparatus stated to be, and no doubt credited with being, good and capable of accomplishing sanitary perfection, but except by the test of experience, what examination into these claims is brought to bear, and specialists, each with their own specific, are called in instead of the architect, and no system is thoroughly or effectually exploited.

Experience may often be dearly bought by those who have to submit to the use of some so-called sanitary apparatus or arrangement of house or other drainage until its defects are discovered.

It is no one's business to say which is best, and even our local authorities pin their faith to different systems, no doubt recommended by their officials. How, then, can professional men be expected to deal more thoroughly than the authorities do?

Surely this is folly, when so much depends upon what is used.

Can it be wise in an age when vast numbers congregate together and great cities are created in our own Empire for such a state of confusion with regard to this most important factor—sanitation—to be allowed to go on unimpeded and almost unthought of until some great calamity visits us?

The fact is no public body and no authority likes to take the responsibility of recommending anything new; but I contend that the Local Government Board should be obligated by law to take up and examine into the necessities and lay down what should be done.

In latter years no doubt advance has been made, but until some such power as I have before suggested is delegated to the Local Government Board, and those whose duty it is to design and superintend buildings are compelled to pass a thorough examination, no thorough knowledge can be assured even though there depends upon it the life and the health of every individual citizen.

Art.

With regard to the question of art, undoubtedly much progress has been made during the Victorian era. When we look at the houses built not long before the accession of the Queen to the throne (such houses as form the various squares of London) we obtain at once a very fair exemplification of what was considered a good class of dwelling-house of that period. Compare these with a good dwelling-house of the present period. Sanitarily and constructively we have improved, but certainly in comfort, luxury and artistic design the advance made is strikingly great.

Take again the shop of sixty years ago, and compare it with the artistic design of much of the work of the present day, and the advance will again be strikingly seen.

If we turn from this to a higher branch of work, to our more public buildings in the shape of churches, hospitals, theatres, music halls, hotels, restaurants, &c., at once the luxury and artistic improvement are so marked that one can hardly believe the whole of it has been accomplished in the space of one reign. Moreover, when it is considered that the improvement has come about not because the State has lent its aid, but has been accomplished under many difficulties, it becomes a useful study to consider not only how much greater it would have been, but how much waste in its accomplishment might have been saved had compulsory examination and registration protected the investor and public. This advance, however, speaks much and well for the energy and artistic effort of the architect, and considering the difficulties he labours under should not be forgotten.

Too much credit cannot be given to those who have fostered and increased the strength of artistic effort in this country, overshadowed as it is by the question of almost everything having to be done by private enterprise, and that even in the most elaborate decoration of buildings for public use, the owner's first consideration must be that it shall pay.

I would, before leaving this subject, like particularly to draw attention to the great spread, among the people at large, there has been in Her Majesty's reign in artistic teaching. Many institutions and schools have grown up by the efforts of the City and London County Council and other corporations and public bodies in the establishment of technical schools, and much has been done to educate those who have taste and intelligence and are willing to devote their spare time to the study of artistic work.

A short time back a small exhibition was made at the offices of the London County Council of work turned out from some of its technical schools, the work for the most part (I think I am right in saying) of young people of about fifteen years of age.

The work consisted of some excellent examples of enamel, repoussé work, carving, painted glass and joinery, plumbing and other work. Without taking into consideration the comparatively short time for which these schools have been at work, the work generally was highly creditable, while the artistic work showed such promise as bid within a generation to take away the stigma which has so long been placed upon the English people, that they are wanting in artistic design and taste in their work as compared with that which comes out of the French and some other continental workshops.

It has always seemed to me a pity and a neglected opportunity on the part of trades unions that they do not make an effort to improve their workers, set up an examination in their trades for each union, and thus be able to assure employers as to the competence of the man employed, and enable, by its certificate, the workers to show which are its best men. It would certainly serve a useful purpose; more useful, I think, than some of the other work the unions do, and I believe it would place them in a better and higher position in public opinion.

I have often heard it stated that if the profession of architect were to become a registered profession dealt with by compulsory examination that the artists in the profession would be

hampered and prevented from taking up the profession; but when it is seen that not only many of those who are actual workers with their hands by day can in their evenings turn out such good work, this reason, against the compulsory registration of architects falls to the ground, as it would also if tested by the result of the efforts which in the old days were made by the great architects and artists who often enough struggled through years of hard work in manual and other trades to make themselves, as they eventually succeeded in doing, artists. Indeed, the original architect was the master builder.

It cannot be for a moment supposed that artistic effort can be deterred or kept back or even inconvenienced by a knowledge of construction and sanitation.

It would be as reasonable to say that a sculptor or artist should not know the anatomy of the body, as his examination in it would be detrimental to his skill.

I cannot think either that the Royal Institute give credit to such a reason, or they would not have established an examination for those who wish to enter their ranks.

Construction was the duty of the first designer of a building when there was no distinction of engineer and architect. As civilisation grew the ornamentation, or the artistic portion of the architect's work, grew also; but it grew out of construction, and should be the refining and finishing of it and consequent to it. The best specimens we have of architecture are those which by form and construction give necessity for the ornamentation.

Drawbacks to the Profession.

It would be difficult to say that the architectural profession was not a good one for young men to enter; but it can safely be said that it would be a better profession for them to enter if its status were more assured, as it would be if they had to pass a compulsory examination, proving their knowledge and title to professional position before assuming it.

It would by no means discourage those who were worth encouragement, while it would keep out the element of uncertainty and be an assurance to the public of the capability of the architect to design a building, and his capability also of seeing that the construction and sanitation were well carried out.

We are often told that vested interests must be considered, and such vested interest in the profession would mean admitting large numbers of incompetent men; but the delay in obtaining compulsory registration and examination only allows the evil to grow, and its establishment would stay it altogether, while death would, within but a few years, deal with the evil as it existed at the passing of the Act.

But I personally do not agree that this vested interest is such a large factor, at least where it absolutely covers incompetent men.

When Parliament intervened to protect the public from quacks, both as doctors and surgeons, and later as dentists, there was this same vested interest and incompetency; yet where is to-day? and all this has been accomplished during Her Majesty's reign.

No, the real difficulty is poor humanity, poor selfish humanity; those who fancy their position is now assured and forget others, and would keep them outside the pale, those who think that having some letters to add to their names, forget the public and the greater interests at stake, for their own more personal interests, and prevent, or at least do nothing to help, the cause this Society has at heart.

There is a strong feeling of jealousy in some quarters, and of a dog-in-the-manger principle (forgetful of all public duty) which causes opposition to what all are bound to acknowledge would be good and beneficial if accomplished.

This feeling raises difficulties of detail and petty points, enlarges upon them, and while many of them are so trivial as to have no real existence, they are used all the same to conceal the real desire not to help the cause of registration. I trust this course will not serve their turn, and will not succeed in preventing the remedy being eventually obtained.

It must, however, still remain for this Society to devote its energies to obtaining the support of Members of Parliament pledged to bring about registration, and to proving the great necessity of it to those who take the lead in work for the public good; for indeed, whatever assured position it may give the professional man, it is before all necessary for the public benefit.

I trust my words and earnest desire may accomplish something in the direction to which for many years I have lent my services, and I trust my poor efforts may succeed in raising an interest, a real and deep interest, with the members of this Society, and that this year will bring registration nearer accomplishment. I want the country members to call meetings in their own districts, to come to the Society's meetings, and I believe the calling and holding the meetings wherever possible will bring together a weight of opinion which will demand the attention (as earnestly as other not more important, but possibly more importunate, questions do) of your representatives in Parliament.

It is so often said by the more retiring men, and by those who have not so much self-assertion as others, and sometimes, too, no doubt, as an excuse by those who wish to save themselves work, "Oh! What can I do? I have no influence or position." That is not correct. All can at least influence his neighbour, all can help to make a meeting, and can at least communicate ideas to those immediately around him, and, as every grain is necessary to the formation of the whole stone, remember that even the smallest grain of your help is often of the utmost importance to the whole.

Let me then again ask the help of members (and I trust not ask in vain), large or small, to push forward the great work of registration, and I would ask, too, that it be freely given, so that in a few years—I hope in the reign of our gracious Queen—we can look with pride on a work done for the public good and for the elevation of the standing of the profession to which we belong.

THE HISTORY OF ARCHITECTURE.

A COURSE of four lectures on architecture—the Hermione Lectures—was delivered lately in the Alexandra College, Dublin, by Professor Aitchison, A.R.A.

Professor Aitchison commenced by speaking of early architecture. It had mostly been an effort of mankind to raise monuments to superior powers, and these monuments had been built to express man's awe, reverence, thankfulness and gratitude to those powers for benefits conferred; and as gratitude was defined as a keen sense of favours to come, so these temples were built to induce those powers to extend protection in the future over the nation and to grant it favours. Now, architecture was an attempt to emulate nature's organisms—that was, to make each building answer its purpose as perfectly as possible without excess of material, and to impress on it the character it should have, so as to excite those emotions that were proper to its use. The lecturer then took up the subject of Greek architecture. The golden age of Athenian architecture that set in directly after the defeat of the Persians at Salamis and Plataea produced an architecture of the greatest æsthetic perfection the world had yet seen. The supreme Greek mind seemed to have instinctively felt that simplicity was the road to the sublime. It was impossible to suggest anything more simple than the Doric style; but this simplicity was the result of elaboration, for no refinement that was needed for perfection was left out. The Greek temple was the glorified Greek wooden hut, eventually surrounded by a verandah. This traditional account of the origin of the Greek temple had in their time been treated as mythical, but he thought without success, for Pausanias told them that some of the original oak columns of temples were still preserved as relics, and Hittorf had collected from the paintings on Greek vases the gradual conversion of the wooden posts of early Greek buildings into Doric or Ionic columns; while M. Auguste Choisy had explained the origin of the fascias of the Ionic entablature by their original wooden construction. No Greek treatise on architecture had come down to them. Almost all they knew about Greek architecture, except from its remains, was found in Vitruvius, a Latin writer, who dedicated his work to Augustus. He gave them the names of the Greek architects who wrote treatises on architecture, and on the works they had executed. Having described fully the structure of the Greek house or hut, and the temple, the lecturer went on to say that the Greek orders, as they were called, were two, the Doric and the Ionic, and perhaps three, to include the Corinthian as well. The Greeks were practically the inventors of mouldings; and, as Viollet le Duc said, roughly speaking architecture was moulding, and though the Greeks were as sparing of moulding and ornament as a miser was of gold, what they did approached the nearest to perfection of anything man had yet done. The lecturer went on to explain some of the elaborate means that the Greek architects used to obtain their simple effects, and said the Greek architect had ample sunlight, and he made it play different harmonious tunes on his architecture from dawn to night. The audience must have seen imitation Greek architecture here and in England, but in both countries they had a misty air and feeble sunlight, even when there was any, so that for most of the year nothing was so ineffective here as Greek architecture, just as nothing was so effective in its native climate.

In the second lecture of the course "Roman Architecture" was treated.

The Professor said that in Roman buildings they first saw the arch, the vault and the dome brought within the pale of architecture, and the entablature abandoned, while the novel use of concrete, encased in a brick or stone facing, rendered gigantic buildings possible in every corner of the empire. The Romans undoubtedly borrowed some of their architectural notions from the Etruscans, though as a rule they continued,

with certain modifications, the debased architecture of the Greeks, for they had intercourse with Magna Græcia and Sicily at least a century before Flaminius defeated Philip in 197 B.C. After the irruptions of the Gothic and Renaissance barbarians only a few fragments of the golden age were left. The Pantheon, which was built at the expense of Agrippa in Augustus's time, was destroyed, it was believed, by fire, and the portico was believed by M. Chedanne to be a late and bad copy of the original; the Rotunda itself could not have been built before the days of Hadrian, for in all parts of its structure bricks of his day had been found. Vitruvius gave four orders of columns—the Tuscan, the Doric, the Ionic and the Corinthian, and after his day the Composite was added. The first instance that the lecturer knew of the use of the Composite was in the Arch of Titus at Rome. A fine example of the Tuscan order was to be found in the portico of St. Paul's at Covent Garden, London. The Doric was not much used by the Romans, and was mostly unfluted, though there was a fluted one of Diocletian's time, and one at Cora, but the latter was bad Greek. The principal example was that of the Theatre of Marcellus, where the Doric was without a base, and this they knew was built or completed by Augustus. The Ionic also did not take with the Romans. One must, however, consider that debased Greek art was in those days a living art. When one spoke of Roman architecture he was practically speaking of the Corinthian and Composite, for except in the examples which the lecturer gave, there were practically no Doric or Ionic columns, save in the piled-up storeys of the Coliseum. The infinite variety of Greek bases gave place to two in Roman work, one with two plain toruses and a hollow between, and one with two toruses and two hollows divided by two beads. The extreme simplicity and severity of the Greek entablature, even in the Ionic, which, beyond the sculpture, was only ornamented with a few carved mouldings, did not suit the taste of the Romans, who in their most ornate entablatures did not leave a piece of plain surface in the cornice, except in the face of the dentils. One thing was quite clear, that the loving study of mouldings, profiled so as to take full advantage of the sun and the atmospheric peculiarities that had so distinguished the architects of Athens, was abandoned, and coarse and almost stereotyped profiles of mouldings were substituted, for, as a rule, all the Roman mouldings were rough imitations of the Greek ones turned in by compasses. In the Roman monuments subtlety gave way to size, profusion of ornament and costly materials. However, the magnificence of Rome must have been unique, as every marble quarry in the empire, and almost in the then known world, had been ransacked for beautiful or rare marbles. Most of the great public buildings were covered with bronze tiles, plated with gold, and they found in some Byzantine churches inlays of mother of pearl. The Saracens in 663 A.D. took the vessels and cargoes that were conveying the gold-plated tiles of the Pantheon to Constantinople, and Bernini transformed the bronze coverings of the beams of its portico into the hideous baldachino of St. Peter's. The great epochs of Roman building were those of the end of the Republic and the days of Augustus. In treating of the orders, they found in the Greek ones, altered to meet the coarser taste of the Romans, the elements of Roman architecture, and where temples were the objects to which it was applied. The Greek knowledge of construction was adhered to, that was what was called the post and lintel style, and the Romans considered art to be the overlaying of the real building with columns or pilasters and entablatures as at the Coliseum. But though the Romans were not artists they were born constructors and had realised the importance of architecture to a nation more vividly than any other great race since the Greeks, and they were too practical to spoil their buildings even in the interests of what they supposed to be art. As soon as such enormous buildings as their baths became a necessity they had, as it were, to throw a tub to the whale. At what time they learnt to vault, and from whom they learnt it, the lecturer did not know, but they vaulted all the great chambers of their baths and sprang their vaults from the entablatures. They also wanted enormous windows to light vast halls, and this entablature cut the windows in half, so they kept a piece of the entablature over the columns which supported the groins of the vault, and cut the rest away. The grand halls of the baths consisted of a row of isolated columns on each side, each column carrying its own piece of entablature on which the groin points bore; with the vault between one column and the next, and so far as was known this went on to Diocletian's time, when the slice of entablature was frankly sacrificed and the arches sprang from the capitals. Professor Aitchison dwelt at length on the basilica, the palace, the triumphal arch and other classes of buildings, and said the one thing that the Romans held to be essential to great men and to great nations was dignity and magnificence, and this the Roman architects always managed to impress on their public monuments. Those few columns that still remained, half buried, of the Forum of Nerva, struck even the casual passer in a carriage as dignified

and almost sublime. They remembered Byron's apostrophe to the column of Phocas:—

Tully was not so eloquent as thou,
Thou nameless column with the buried base.

The lecture was illustrated throughout with excellent lime-light views."

The subject of the third of the Hermione Lectures was "Gothic Architecture." It was said that the third epoch of architectural advancement in the West selected to lecture on was Gothic, and though three epochs came between it and Roman it was so wondrous and so novel as to throw the others into the shade. The Professor, of course, spoke of the Christian art of the Romans after the seat of empire was removed to Byzantium, from which they got the name Byzantine architecture. This was one epoch, another was Romanesque, from which Saracenic Gothic sprung, and then there was the Saracenic. Remains of the last phase of architecture were found in Spain, in Portugal, in Sicily and its influence was felt in the South of France, in South Italy, in Madeira and the Canary Islands, and perhaps in certain parts of Germany, not to speak of its native habitat in Syria, Egypt and Mesopotamia, and those parts which the Saracens conquered and inhabited. Some architectural historians treated Romanesque as Gothic, and perhaps they were right in the sense of race, but the lecturer used the word Gothic technically for that period when the Romanesque had deeply felt the influence of Saracen teaching and of the Saracen architecture of the East. In treating of Gothic, he admitted that it was difficult to draw a line. Romanesque art was constantly improving, and from it Gothic sprung; still he thought it might be safely drawn at the period of the flying buttress. For western architects, Romanesque and Gothic had peculiar charms. They were still a little barbaric in their taste, and they still had a little of their ancestors' blood in their veins. The lecturer having traced in detail the development of Gothic architecture and described at length the method of treatment employed in the interior and exterior of Gothic buildings, continued by saying that the Gothic architects got so skilful that they tried at last to give the appearance of the skeleton of a plant to their buildings. Tracery grew so thin as to be scarcely perceptible. He must say a few words about Beauvais, as it was meant to be the triumph of French Gothic cathedrals. It was begun in 1225 with the avowed intention of surpassing Amiens, and its choir was still, he believed, the highest in the world, being 153 feet. In 1284 the walls bulged and the central tower fell. The rest of it was built in 1550-55, and the tower, intended to be 455 feet high and to rival the height of St. Peter's, fell down in 1573. The east end had double tiers of flying buttresses, supported by buttresses that ran up from the walls of the aisles to the height of the parapet of the chevet, and in the misty twilight of late autumn reminded one of the forests of banyan of which Milton spoke. However they might deplore the excess of ornament and elaboration in the Late Gothic, they could hardly say that it was not effective and striking. Even St. Wulfran's, at Abbeville, though most of its walling was covered with small panelling, which blurred the effect of the elaborate work in the gables of the doorways, and though most of the late tracery was ugly, was a building which, from the great projection of its buttresses and the vigour of its tower windows was effective. The little church of Notre Dame de l'Epine, at Châlons, was also impressive. Nor could anyone fail to be struck with the west front of the cathedral of Rouen, with the masses of shadow in its great central doorway and beneath the arch of the west window, with the picturesque gallery above it, and with its forest of pierced gables and canopies. Though they might deplore the attempt to make architecture immaterial, they could not be blind to the knowledge, skill and daring of the architects.

The subject of the last of the Hermione Lectures was "Italian Renaissance Architecture." The interest in Renaissance architecture, Professor Aitchison said, was of an entirely different kind from that which enthralled them in Gothic. The men of the Renaissance were actuated by entirely different desires from those of the Middle Ages, and were also of most vigorous physical and intellectual powers, but were by no means so overflowing with invention, and the architects were absorbed by a new desire of giving the simplicity and dignity of Classical architecture to their own architectural works, and being mostly artists they wanted to make striking pictures of their buildings in architectural language, and they were by no means troubled with any desire for feats of construction, for they were not constructors, and had Roman authority for massiveness. They had, however, a love for beauty that has been exceeded only by the Greeks. He did not think the Italian architects ever quite equalled in their works the dignity and impressiveness of Roman buildings, though there was this to be said in favour of them, they had only a part of the revenues of a great nobleman or a great city to expend, while the Romans had a part of the plunder and taxation of the civilised

world. It was, perhaps, unfair to judge of what the Romans could do from the trifling remains that were left, but he recollected nothing of theirs that possessed that exquisiteness of some of the best early Renaissance buildings, not to speak of the semi-architectural monuments of the Renaissance. He might, however, say that for style and beauty the Renaissance still held its own and showed its visual superiority over every sort of work that had been done since the palmy days of Athens. There was a long list of architects of the fifteenth century, from Benedetto da Magano to Michel Angelo, of whom, perhaps, Peruzzi and Bramante were the greatest; but these early Renaissance men were so full of energy and capacity that they could turn their hands with success to almost anything. One had but to read the account that Leonardo da Vinci gave to Sforza of what he could do, and the life of Benvenuto Cellini to see that these men could sing you a song or make you verses, build a ship or lead an army, paint a picture, cast a statue or engrave a dye with almost equal felicity and success. There was a native vigour about their minds and an inventiveness which rendered their work more interesting to us than when the whole of Roman architecture had been measured and mapped out, as it was by the middle of the sixteenth century. Buildings could then be made by recipe, and could be criticised by their supposed exact similitude to ancient Roman work. The architecture of the fifteenth century was done by men who still retained memories of a former style and of former austerity, and had been spurred to invention by the first sight of Roman models. The Palazzo del Consiglio at Verona, attributed both to Fra Giocondo and Formentone, the communal palace at Brescia, the church of the Madonna dei Miracoli at the same town, the Scuola de St. Marco and the Palazzo Cornaro-Spinelli, and the Manzoni at Venice, and some of the more striking tombs, would do more to raise their admiration for these works than a long list of more pretentious and duller works, although Palladio's great hall at Vicenza, Peruzzi's Massimi Palace at Rome, and Michel Angelo's staircase at the Laurentian Library and his chapel to the Medici should not be omitted, nor some of the lovely works of Bramante; in fact, there was hardly a town in Italy that had not got some masterpiece of the early Renaissance, for it was the mingling of Christian truths with Pagan myths that gave it one of its charms. The lecturer gave an interesting description of the Cornaro-Spinelli Palace at Venice, which, although small, was of very artistic device, and was supposed to have been designed by one of the Lombardi, a family which had produced as many architects as that of the Du Cerceau, in France. This palace, although a jewel in itself, would, but for its artistic perfection, be almost unobserved by the side of the gigantic Palazzo Vendramini and the large palaces on the Grand Canal. There was another small but most charming palace which Browning once bought, rather later than the Palazzo Spinelli. The lecturer next said a few words on the quaint inventiveness of these early Renaissance men, and proceeding described the two palaces built by Baldassarre Peruzzi for the Marquis Massimi in the Via San Pantaleone, the great charms of which were their plainness and elegant proportions. The lecturer then dealt with the works of Palladio, who conveyed the grandeur of expression of the antique. His basilica at Vicenza was one of his most impressive works. The Italian Renaissance came about by a triple influence—patriotism, intellectual freedom and taste. Italy, torn by faction or ground under the feet of execrable tyrants, loved to see buildings that reminded her of Italy's greatness. She hated to see a style that reminded her of ecclesiastical fetters and austerity, while the cultivation so earnestly pursued for more than a century made her long for dignity, grandeur, simplicity and breadth of ecclesiastical buildings. He had dealt with the four epochs of architecture, beginning from the time of the Greeks. Each period showed the peculiar genius of the people and their progress in intellectual development. It was true he had only given a glimpse of the perfection of Greek architecture, of the dignity and magnificence of Roman, of the soaring flights of Gothic, both constructively and æsthetically, and of the greater perfection and artistic beauty of the revived Roman, but he hoped he had whetted their appetite to know more about architecture and to take more interest in that of the present day. It was from the numbers, knowledge and taste of the lovers of every art that its perfectness developed. They could not believe that if the public generally were as dead to the flights and perfection of poetry as they were to architecture they should ever have had Tennyson. Did they think painting would have flourished as it did in Italy if the painters had not recognised that love of the people for it, and had not recollected the Cimabue who made the first step forward from the old Byzantine mechanism had had his picture borne in triumph through his ward, and that it was ever afterwards called the joyous ward. They must remember that architecture alone of all the fine arts told the history of the cultivation of the people at the time it was done in its own country, while the works of every other fine art could be and were

exported. They should remember the boast of Pericles to the Athenians, "We love the beautiful." If they did not love it nowadays, how could they expect to rival those who did? He hoped that the imperfect description he had given of the great progress that had taken place in old times would have some effect in making his hearers to see for themselves the glorious beauties of continental architecture during the periods he had dealt with.

Rev. Professor Mahaffy said he had been requested by the warden of the college to express their thanks to the lecturer. They knew the eminent position he occupied in London, and it was to the credit of the college that they had been able to secure such a distinguished lecturer on this most interesting subject. When he spoke of the small appreciation in which architects were held in England as compared with other artists, he (Professor Mahaffy) could see one way of consoling him. In most of the other arts men must produce the whole work. In the case of the architect he had to depend a great deal upon others. A great deal depended on the stained-glass, the carving of pillars, as well as in other details. On the other hand, the very name he holds was a name greater than that of any other artist. As such he was entitled to stand in the highest possible place in the society of artists. They were very proud in having been able to get from London such a distinguished member of the profession, and he hoped when the lecturer came back to them he would come not as a stranger, but as an old friend. Professor Aitchison returned thanks.

MANCHESTER SOCIETY OF ARCHITECTS.

THE thirty-third annual dinner of this Society was held on the 25th ult., at the Queen's Hotel. The president of the Society (Mr. John Ely) occupied the chair, and the company included the president of the Royal Institute of British Architects (Professor Aitchison). After the loyal toasts had been honoured, the President proposed "The Royal Institute of British Architects and its President." In the next few days, he remarked, would be celebrated in London the sixtieth anniversary of the foundation of the Royal Institute of British Architects. There was a Society of Architects in 1831, and in 1834 it was fairly launched on its career; in 1836 the first meeting was held, and William IV. granted them a charter, and the Society became the Institute, and sixty years last August Her Majesty the Queen became the patron. So it came to pass that the career of the Royal Institute was contemporary with the Queen's reign. The objects from the first were of a lofty order. They desired to include the most prominent architects of the day, those who were of unimpeachable integrity, and in every way to elevate the profession, believing that in so doing they were not merely advancing their own interests, but in reality promoting the interests of the public at large. Professor Aitchison, in his reply, urged the importance of architecture as a factor in a nation's progress, and pointed out how difficult it was for architecture to advance unless the public took an interest in it. There were special difficulties in the way of the architect, for whereas the products of genius in music and in painting could be exhibited all over the world, the works of the architect could not so be treated. Unless there was some strong love for a thing, or some considerable appreciation of it, he did not see how it was possible to expect persons to devote their whole lives to it, and more especially those who had a natural genius for it. It seemed to him that the public were considerably mistaken in the view they took of architecture, and he could wish that in such a town as Manchester particularly, where there was much mental activity and whose wealth was enormous, a greater interest were taken in the profession of architecture. He trusted that greater interest would be taken in this matter, and that it was not too much to hope that in the far-off time people would come from the east and the west, as they now went to Athens and Rome and Florence, to sketch and take note of the great works of architecture found within its precincts.

Mr. A. Darbyshire proposed "Our legal friends."

His Honour Judge Parry responded in a humorous speech. He had been asking himself, he said, what there was in common between the county court and the Institute of Architects. In his court people only, as a rule, sought to collect debts under 50%, and he did not suppose any architect would care to trouble about the collection of a debt under that sum. It would not be worth his while. Then there was the bankruptcy department; he thought that might interest the architects. He therefore looked at the statistics and found that building owners—thanks to the services of the architects—were frequently becoming bankrupt. He also found that contractors—probably owing to the certificates given by the architects—were also sometimes bankrupt, but he never found an architect going to the bankruptcy court. So he had come to the conclusion that whatever the reason why he was included in the "legal friends" of the Institute of Architects, his association with the county court and the bankruptcy court had nothing to do with it.

Mr. Lord, who also responded to the toast, took occasion to say that in having such a man as Mr. Parry as judge of the county court, Manchester was the most fortunate city in the kingdom.

The remaining toasts were:—"The Allied Societies," proposed by Mr. Holden, and responded to by Mr. Willink; "The President," proposed by Mr. W. Goldthorpe, and acknowledged by Mr. Ely; and "The Honorary Secretaries," proposed by Mr. Bennett, and replied to by Mr. Hewitt.

GLASGOW PHILOSOPHICAL SOCIETY.

AT a meeting of the Architectural Section of the Glasgow Philosophical Society held on Monday night in the Society's Hall, Bath Street, Mr. F. H. Newbery, headmaster of the Glasgow School of Art, read a paper on "The Sum of Tradition." Under this heading he dealt with the heritage of art, more especially as apparent in architecture, that had been handed down to the present day. The fulness of tradition, he said, should early be made known to the student, and he be called upon to choose for himself. There were three ways of treating tradition, first, to ignore, which was impossible; second, to blindly copy, which was foolishness; and third, to rightly use, which alone was wisdom. To do this last was, in the first place, to thoroughly learn the lessons tradition taught, and what these were was gone over by the lecturer. He insisted that tradition was not a fixed quantity, and that we ourselves by our works were daily adding to it. That which was for our fathers could be for us if it were found acceptable after proof, but we were free to ignore or accept according as the artist in us dictated. After all, it was curious to observe how little matter there was that was really original. In many cases it was merely assimilated material. Many artists were original because of their wisdom as shown in assimilation. The lecturer ridiculed the idea that the teachings of tradition could be summed up in a code and then taught as laws for the guidance of the student. Those who advised such impossibilities could neither be artists nor authorities, but outsiders incapable of producing a work of art themselves, or of understanding its traditions. After treating of the part that schools should play in the treatment of tradition, and mentioning that those alone who could produce a work of art could impart a right knowledge through lectures, he concluded by hoping that in the future there would be the freest possible form of art education. The students should be hindered in nothing, and should be allowed to attempt anything. What the student might have to do in after life that he should attempt under the freest conditions while studying, for the student was from the beginning the artist, and the mature artist ever remained a student.

THE EXPORTATION OF ANTIQUITIES FROM ROME.

THE Rome correspondent of the *Times* writes under date November 26:—An important decision regarding the export duties laid on such articles of commerce as fall under the very vague and elastic heading of "antiquities" has just been rendered by the Court of Appeals in Rome. As is known to all who have attempted to purchase such articles here, the export duty of 20 per cent. levied on them by a law which is an inheritance from the Papal Government, is not only a grave charge, but one which it is sometimes embarrassing to determine, the value of such things being purely fantastic. The law, known as the *Pacca edict*, applies only to the late Papal territory, each one of the ancient realms of Italy having still its ancient regulation, the duty from Tuscany being 1 per cent., and that from the former Austrian possessions *nil*. The Roman Court has decided that it only applies to such objects as are recognised as "precious"—i.e. as of exceptional artistic or historical value. The limitation is as vague as the old definition, and perhaps the best results of the decision will be to compel the Government to pass a general and rational law, under which the possessor of an object having value from its antiquity shall be free to carry it out of Italy. Professor Villari, when Minister of Public Instruction, proposed a sensible and comprehensive law, which, while imposing a small duty and the necessity of a permission to export, for the purpose of controlling the exportation of the heirlooms of the nation, made it indispensable for the Government either to purchase or permit the exportation. This law, like most of those which the public good has called for, has ever since lain covered by the petty legislation for electoral purposes, which impedes all useful reforms other than those demanded by the constituents of the ministerial deputies. If an object is precious and indispensable to the honour or history of Italy, it is reasonable that its exportation should be prevented, but only by purchase, for it is an outrage that a man may not dispose according to his interests or necessities of articles which are his unquestionable property.

ARCHITECTURAL ASSOCIATION OF IRELAND.

ON the 23rd ult. Professor Aitchison, president of the Royal Institute of British Architects, and Professor of Architecture at the Royal Academy, delivered a lecture on "The Architecture of the Renaissance," to the members of the Architectural Association of Ireland, in the Leinster Lecture Hall, Molesworth Street. Mr. R. C. Orpen, B.A., president of the Architectural Association of Ireland, occupied the chair, and there was a large attendance, which included many members of the Royal Institute of Architects, Ireland. The lecturer, in an instructive manner, described the various epochs in the development of architecture that ultimately led to the Renaissance. The principal points of the lecture were illustrated by limelight views. Mr. C. Orr manipulated the lantern.

TESSERÆ.

Wren and Freemasonry.

ACCORDING to Lessing, the English word *masonry* should be *masonry*, for it is derived from the Anglo-Saxon word *massoney*, a secret commensal society; which last word again comes from *mase*, a table. Such table societies and computuses were very common amongst our forefathers, especially amongst the princes and knights of the Middle Ages; the weightiest affairs were there transacted, and peculiar buildings were appropriated to their use. In particular, the *masones* of the Knights Templars were highly celebrated in the thirteenth century. One of them was still subsisting in London at the end of the seventeenth century, at which period, according to Lessing, the public history of the Free-masons first commences. This society had its house of meeting near St. Paul's Cathedral, which was then rebuilding. Sir Christopher Wren, the architect, was one of its members. For thirty years, during the rebuilding of the Cathedral, he continued to frequent it. From this circumstance the people who had forgotten the true meaning of the word *massoney* took it for a society of architects with whom Sir Christopher consulted on any difficulties which arose in the progress of the work. This mistake Wren turned to account. He had formerly assisted in planning a society which should make speculative truths more useful for purposes of common life. The very converse of this idea now occurred to him, viz. the idea of a society which should raise itself from the praxis of civil life to speculation. "In the former," thought he, "would be examined all that was useful amongst the true; in this all that is true amongst the useful. How if I should make some principles of the *masonry* exoteric? How if I should disguise that which cannot be made exoteric under the hieroglyphics and symbols of *masonry*, as the people pronounce the word, and extend this masonry into a Free-masonry in which all may take a share?" In this way, according to Lessing, did Wren scheme; and in this way did Freemasonry arise. Afterwards, however, from a conversation which he had with Nicolai, it appears that Lessing had thus far changed his first opinion (as given in the "Ernst und Falk"), that he no longer supposed Sir Christopher simply to have modified a *massoney* or society of Knights Templars, which had subsisted secretly for many centuries, and to have translated their doctrines into an exoteric shape, but rather to have himself first established such a *massoney*, upon some basis of analogy with the elder *massoney*.

Patronage of Art in England.

There are two ways in which a nation can honour art—by the development of native genius and by the acquisition of works which shall kindle and inform it. In both respects England has been peculiarly hindered from running the race with other countries. And there are two different points from which the taste and demand for art may start—the one the court and the other private individuals. England began, as was natural, from the first. The fashion showed itself in the English court as early as in any other north of the Alps. Henry VIII., probably in mere emulation of his more genial brother Francis I., formed a small collection, but the taste, if he had it, was not transmitted to his children. It is true Ticozzi mentions Titian's having painted a picture, *Di Divoto Argomento*, for Queen Mary, but Elizabeth at all events had no sympathies of the sort, and it was well, as Horace Walpole says, that her successor had none either, or he would have introduced as bad a taste into the arts as he did into literature. Taught, therefore, probably by the precepts and example of the Earl of Arundel and the Duke of Buckingham—the first enlightened patrons of art in England—the two sons of James I., though of a descent—Scotch on one side, Danish on the other—little favourable to such tastes, developed an early partiality for paintings and were both enthusiastic collectors from their youth. Prince Henry, who died at the age of eighteen, had already formed an interesting cabinet. To Charles I., however, belongs the merit of having gathered

together a gallery which, as a whole, has never since been equalled in England for extent and quality. The chief contents had been accumulating for 150 years in their native soil. The family of the Gonzaga, Dukes of Mantua, were second only to the Medici in the patronage of the arts, and the purchase of the great Mantua gallery constituted the main body of Charles's irreplaceable collection. We may well say irreplaceable, since thirteen Raphaels and forty-five Titians, the one including *The Pearl*, the other *The Venus del Prado*, with numerous gems of Correggio, Giorgione, Palma Vecchio and others, can hardly be drawn together again in a single gallery even by English wealth and energy. Their spoils enrich to this day Vienna, Paris and Madrid. The restoration of the house of Stuart brought back, it is true, a portion of the dismantled gallery, but it did not bring back the taste, this had taken flight more irrevocably for the time than the pictures themselves. Hampton Court, St. James's and Windsor were again adorned, but the scale of excellence was far lower. Whitehall alone recalled in some measure its former glories, for here were deposited the pictures which the States-General had restored, together with such as Charles II. had been elsewhere able to reclaim. But a fatality worse than revolutions awaited them. The palace took fire, and Raphaels, Leonardos, Giorgiones, Titians and Holbeins perished miserably in the flames. Next ensued fresh political disturbances—the country again changed its rulers, and, as respects art, certainly not for the better. Neither Dutch nor Hanoverian sovereigns sought recreation from the toils of government in the refined company of the arts, religion disowned and luxury did not adopt them. At the beginning of the last century we might be said to be comparatively destitute of this great element of civilisation, which was neglected alike by court and nation. Foreigners came to spy out the nakedness of the land and write theories on the incompatibility of mercantile pursuits and æsthetic sympathies. Voltaire himself sneered at our apathy and denied our capacity for the fine arts, but the sneers and denials of the arch-infidel were doomed to be as false as usual. The Englishman bided his time. He had much to do before he could be ready for artistic enjoyments, and his first step, sordid as it might appear to his more elegant neighbour, was to put himself in a position to afford them. The last century, ugly and uninteresting though it may look to our present more fastidious eyes, was essentially a time of recovery. Great affectation and odious taste there was, when any taste was pretended to, as we see in many a passage alluding to the arts in the Vicar of Wakefield and other writers of that period. But the frippery lay on the surface.

Hogarth and the Foundling Hospital.

Hogarth was requested by the governors of the Foundling Hospital to design an allegory which represents several children already admitted to the institution, the boys with mathematical instruments, the girls with spinning wheels. Over the door of the building from which they are proceeding are the king's arms: a porter is bringing in a child, followed by Captain Coram, whose benevolent countenance is directed towards a kneeling woman. In the background are deserted infants variously exposed. The whole design is intended to excite public commiseration for the helpless objects of humanity. This composition was engraved by a foreign artist, F. Morellon la Cave, and printed as the head-piece to the power of attorney delivered to those ladies and gentlemen who were appointed by the trustees to receive subscriptions towards building the hospital. At that period, 1749, the infants were received at a house hired for the purpose in Hatton Garden, for such was the zeal of the ladies in particular for providing an asylum for these deserted infants, that a sufficient fund was raised for this benevolent purpose before the foundation was laid for the present spacious hospital. Hogarth's exertions in forwarding this good work were so marked that he was elected a governor of the fashionable institution at the time he painted *The March to Finchley*, which was estimated by him to be worth 300l. Its celebrity alone for a long time attracted thousands of spectators, all of whom contributed their mite to the charity. It was not, however, the original intention of Hogarth to present this picture to the hospital. The gift was owing to a fortuitous circumstance. The *etat* which followed this most interesting composition grew naturally out of a national feeling associated with its subject. It represented the march of the foot guards in the depth of winter to meet the insurrection in the north. A print was proposed to be published from this to be engraved by Luke Sullivan. This was accomplished, and a masterly effort it is of the joint talents of painting and engraving at this period of British art. It was, moreover, the precursor of all the subscription battle-pieces that have appeared since. The following announcement of this proposal may be now regarded by many as a literary curiosity:—*General Advertiser*, April 14, 1750.—"Mr. Hogarth is publishing by subscription a print representing *The March to Finchley* in the year 1746. Engraved on a copper-plate 22 inches by 17. The price 7s. 6d. Subscriptions are taken in at the Golden Head in Leicester Fields, till the 30th of this

instant and not longer, to the end that the engraving may not be retarded. *Note*.—Each print will be half a guinea after the subscription is over." By this document we perceive how simply an affair of subscription was announced in these honest days. No quackery, no puffery, no long exordium of its political or moral effects, no expatiatory remarks on its merits as a work of art. It is an open, plain announcement of a sterling seven shillings and sixpenny-worth of talent, take it or leave it. "Now is your time, my loyal customers, for, in a few days the price of the commodity will be augmented almost 50 per cent." This was a straightforward business between the painter and the public, and the affair was settled in fourteen days. How the picture became an heirloom to the Foundling Hospital arose as follows:—In the subscription-book wherein the loyal and the lovers of art inserted their names, was written a proposal, which offered each subscriber of an additional three shillings for the print a chance for the original picture, which Hogarth pledged himself should be delivered to the winner as soon as the engraving was completed. The number prescribed was two thousand, but the whole subscription was not filled, and the result was published as follows:—*General Advertiser*, May 1, 1756.—"Yesterday Mr. Hogarth's subscription was closed, 1,843 chances being subscribed for. Mr. Hogarth gave the remaining 167 chances to the Foundling Hospital. At two o'clock the box was opened, and the fortunate chance was No. 1,941 which, belonging to the said hospital, the same night Mr. Hogarth delivered the picture to the governors."

Paintings at Carlton House.

In the year 1783, George IV., then Prince of Wales, having nearly completed his twenty-first year, and having until that period resided with his royal parents at Windsor, at the Queen's Palace, or at Kew, it was thought becoming his dignity, as heir-apparent, that he should be provided with a residence and suitable establishment. Carlton House appearing an eligible site, George III. sent a message to both Houses of Parliament on the subject. That to the House of Commons was announced by Lord John Cavendish, and that to the House of Peers was presented by the Duke of Portland. In this important business the two houses concurred without a dissentient voice. The alterations at Carlton House Palace commenced in 1783, under the direction of Holland, who held until his death the appointment of architect to the Prince. It was objected by some fastidious connoisseurs that there was a deficiency of pictures of the great Italian schools in the gallery. But these objectors should have considered that the suite of domestic apartments in which treasures of art constituted the principal ornaments was not sufficiently lofty to admit of larger works, the ceilings not being 9 feet high. Indeed, from the necessity of adapting the old apartments to the modern style, this inconvenience could not be avoided. Hence scarcely any but pictures on a small scale were admissible. To this circumstance was owing the gratification of the most select display of Flemish and Dutch cabinet pictures that existed in any one gallery in Europe. The larger paintings, with the exception of a few portraits of the royal family, were distributed on the walls of the state apartments, which occupied the floor above, wherein the ceilings were sufficiently lofty. In these were disposed four pictures by Reynolds—*The Death of Dido*, *Count La Lippe*, *Iphigenia*, and the commanding figure of the *Marquis of Granby*. It is said that the hint for the last was derived from a woodcut, which Sir Joshua accidentally obtained as a head-piece to a penny pamphlet. This may readily be credited, as a mind like his could discover, in the slightest accidental sketch, that combination of forms upon which so great a work might be constructed. This hero of the House of Rutland—in popularity another Wellington—was personified by the pencil of the greatest and the least in art. The "Granby's Head" was a common sign, and innumerable graphic subjects, high and low, contributed to his fame. It is a remarkable, indeed an unaccountable fact, that George III., who was an acknowledged connoisseur, should not have patronised Sir Joshua Reynolds, indubitably the greatest English portrait painter; for, excepting the two magnificent portraits of the king and his consort in their coronation robes, which were painted for the council-room of the Royal Academy, Reynolds was never honoured with any commission by these august personages. The two whole-lengths of their majesties, which formed part of the collection in the lower suite of apartments in Carlton House Palace, were the work of Allan Ramsay, a painter no more to be compared to Reynolds than he to Jupiter. West, Zoffany, Gainsborough, his nephew Du Pont, Copley, Coates and Sir William Beechey principally divided the royal patronage in the portrait department. George IV., however, justly appreciated the talent of this illustrious artist. In Carlton House Palace were several of his finest works. The celebrated whole-length of the Duke d'Orleans, a specimen of his extraordinary powers as a colourist; the Duke of Cumberland, no less exquisitely wrought; and also the Duke of Cumberland, of Culloden fame, were in the entrance-chamber to the state apartments, the last two in

the robes of the Garter. In the great crimson drawing-room was a portrait, half-length, of Lord Erskine, then in his zenith of fame, which was painted expressly for George IV. These, with the *Count La Lippe*, the *Dido*, the *Iphigenia*, some of which adorned the same apartment, were evidences of the king's taste for the works of the great master of our native school.

Mediæval Art.

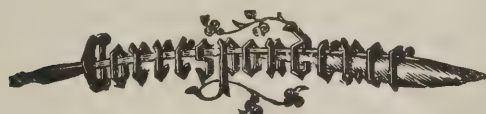
Self-adaptive and comprehensive, Gothic architecture dealt with equal good fortune with themes most diverse in their character and demands: for it, the cathedral was not too vast, the memorial cross too pathetic, the mansion too much broken in detail or merely domestic in its uses, the bridge too utilitarian or the dove-cote too small. From cradles to tombs this art-science, for such it was, could supply the wants of men wherever men were found capable of applying it. A woman's girdle or a woman's robe, the crozier of an archbishop or his gorgeous vestment, were alike fit subjects for it. With all this freedom and scope, in dealing with which it was the sole rival of equally glorious and beautiful Greek art, Gothic design kept, each in its province, the elements of those arts which, in its great system, were subordinated. In its chief works—those architectural—the skill of the painter, glass-stainer, mosaicist and sculptor lent their powers to one end, the glorification of architecture. Restrained thus far, the wall-painter confined himself to his office; he produced decorations, not paintings, in the modern sense, and in forms that the law made conventional did not lose sight of the artist's highest aims. The glass-stainer, with a distinct idea of his duty to make an integral portion of a building, did not attempt to reach that development of painting, *per se*, at which he has, with means far inferior, since foolishly aimed. A stained-glass window was not proposed to be a mere transparency, ridiculous with diaphanous figures of animals, trees and men, but a gorgeous space of dyes, a mosaic made, by the aid of light itself, ten times more brilliant than petrous mosaic could be. The mosaicist spread splendour upon the whole wall-space where splendour was required, fired by his golden grounds the vaultings, and lit up dim spaces with light that followed day; servant and not intruder, of old he knew the limits of his power, and even when painting rose above architecture, honestly plumed himself, not upon imitating painting, but upon producing that which painting could not produce.

Canova's "Theseus."

When the group which had so long formed the subject of Canova's secret solicitude and unwitnessed labour was finished, in order to give full effect to the surprise and *éclat* of its first exhibition an entertainment was given by the Venetian ambassador to the most celebrated artists, men of letters and other distinguished characters then in Rome. No previous intimation of a work thus carefully concealed had yet transpired; a model of the head of his victorious hero, purposely prepared by the artist, and placed in the apartments destined for the reception of the guests, was the first announcement of the new production. This beautiful and novel object, in such an assembly, naturally attracted universal attention; and the whole company by degrees had collected around it. Various were the opinions on its forms, its expression, its subject, and keen were the disputes to which it gave rise. All were agreed that the cast must have been taken from a work of Grecian sculpture and of great merit, but they were divided on what it represented, and where the original was to be found. Some affirmed that they had seen it in such a collection, some said it was in a different gallery, part maintained that such a personage of antiquity was portrayed, others asserted a contrary statement, in short, the acknowledged beauty of the piece was the only common sentiment which experienced no opposition. Seizing the proper occasion, when he perceived everyone to be thus deeply interested in the affair, "Ebbene," said the ambassador, "andiamo a vederne l'originale;"—"Come, let us terminate these disputes by going to see the original." All were astonished. What, the antique, about which so many conjectures had just been made, in the possession of their host! It seemed hardly credible, and they eagerly followed to where Canova's "Theseus," victorious over his cruel foe, in all the brightness of recent finish, and placed to the best advantage, was disclosed to view. The effects produced by this unexpected sight it is impossible to describe. Every feeling was absorbed in surprise, delight and admiration. The work was universally pronounced to be one of the most perfect which Rome had beheld for ages; and artists who afterwards pursued the sculptor with the envious malice of inferiority were now silent, or hurried away by the unrestrained enthusiasm of the moment. "To the end of life (in fine della memoria)," said one of his friends, "Canova retained a fearful recollection of his feelings at this time, and was often heard to say that death itself could not be more terrible than the mental sufferings which he endured while the earlier of these occurrences were passing."

Freemasons' Hall, Great Queen Street.

As Inigo Jones designed some buildings in Lincoln's Inn Fields and in the neighbouring Great Queen Street, it was customary to describe Freemasons' Hall as one of his works. Prior to the alterations made from time to time during the last half century, it presented an appearance that gave plausibility to the statement. It, however, belonged to much more modern date than the period of Inigo Jones. Both the hall and the tavern were erected from the designs of Thomas Sandby, R.A., professor of architecture in the Royal Academy, whose annual lectures at Somerset House on that science were the admiration of the artists and others who attended them for thirty years. Sandby was grand architect in the Grand Lodge of England. The hall was built by subscription, and a large silver medal was struck in the year 1780, and presented to the subscribers to commemorate its erection, and bears the following inscription round it:—"Grand Lodge of Freemasons in England;" on the face of it:—"To Thomas Sandby, G.A., in grateful testimony of a liberal subscription towards completing their Hall." All the ornaments in the friezes, ceilings, windows, &c., were cast in plaster of Paris by Cox from original models, designs of masonic emblems invented and disposed by Thomas Sandby, solely for the appropriate decorations in the hall, and now existing nowhere else. The moulds were deposited in Sandby's house in Windsor Great Park, of which he was deputy ranger, where they went to decay without a duplicate copy remaining.



The Cripplegate Fire.

SIR,—If the roofs of the warehouses had been covered with copper the fire would have been arrested at the beginning, as no flames could have escaped through the roofs. Coverings of zinc blaze in a strong heat as easily as wood, and lead immediately melts and runs down in a stream to the great danger of firemen. Copper does not melt even in a very strong heat, and instances are on record of copper roofs remaining intact after the interior has been completely burnt away. To secure this desirable result it is of course necessary that the copper sheets should be welded together. If the sheets are laid separately with loose roll caps, as is too often the case, then the separate sheets might crawl up with the heat; but if the caps are welded on, so that the roof is practically one sheet of copper, then as long as any supports remain the house, even if completely gutted, has a fireproof covering through which no flames can escape.

In the very important inquiries now being conducted as to how to render buildings in London fireproof, this surely is a consideration that should not be lost sight of.—Your obedient servants,

EWART & SON.

346, 348 and 350 Euston Road, London, N.W.:

November 27, 1897.

Shoddy v. Fireproof Construction of Buildings.

SIR,—Since the recent great fire in Cripplegate the papers have been replete with sensational descriptions and censorious correspondence condemning the said inefficiency of our fire brigades, and their alleged obsolete extinguishing appliances, also the erection of high buildings in narrow streets, &c., whilst the unnecessary employment of combustible materials for their interior construction appears to have been ignored.

As the wisdom of the adage, "Prevention is better than cure," is generally admitted, this oversight seems remarkable. It is an undisputed fact that a vast quantity of inflammable material is still unnecessarily used in the construction of most (even modern) buildings; indeed, many seem veritably designed to catch fire and get burned out.

Everywhere around us we see evidence of this deplorably cheap and conservative practice, in the dangerous forms of wooden roofing, flooring boards and joists, staircases and landings, stud and lath partitions, matchboard ceilings and linings and divisional compartments, &c., lead gaspipes, &c., when an additional outlay on the structure of not more than 10 per cent. could insure the employment of fire-resisting materials throughout, which would render the building practically fireproof.

With our present system of "jerry" building it is wonderful that greater loss of valuable lives and property does not occur than is the case.

As there are numerous approved and tested fireproof constructions and fittings on the market, it seems high time that legislation should be brought to bear to prohibit the use of unnecessary inflammable material in buildings. At length a "Fire Prevention Committee" has just been inaugurated in our Metropolis, with the view, among other laudable aims, of

pressing for some such reforms with reference to building construction. Of late the authorities have awakened to the fact that priceless treasures are still stored in some of our museums of the combustible nature at issue, and a select committee has recently reported to Parliament on the subject, but as yet I believe no decision as to the amelioration of this risky state of affairs has been arrived at. The dearth of papers which have been read before our learned and technical societies and institutions on the matter is rather remarkable. I understand, however, that one is shortly to be read on the subject before the Society of Arts.

From 1853 till 1891, I am informed, not a single paper on the topic in point was presented or read before the Institution of Civil Engineers, and I know of no other since that date. In this respect we seem to be behind many other nations, as also with regard to fireproofing tests and experiments.—Yours truly,

London: December 1, 1897.

J. B. SMITH.

GENERAL.

The Design of MM. Auburtin and Umbdenstock has been adopted for the building in the Paris International Exhibition which will be used for objects belonging to the Army and Navy. The prize of 2,000 francs was awarded to M. Bertone, and M. Bréasson obtained the prize of 1,000 francs.

Mr. F. Punchard will read a paper on Monday next, at the meeting of the Surveyors' Institution, on "The Royal Commissioners' suggested amendments to the Agricultural Holdings Act, 1883."

The Society of the Inner Temple have given notice of an intended application to Parliament next session for an Act to modify and amend section 28 of the Thames Embankment Act, 1862, and to authorise the Society to erect and maintain buildings upon so much of the reclaimed land belonging to them as lies between the southern extremity of the buildings proposed to be erected in extension of King's Bench Walk and the northern side of the tunnel of the Metropolitan District Railway.

The Swiss Archaeological Society, in the course of the excavations at Windisch, the old Roman colony of Vindonissa, in the canton of Argovie, have discovered large Roman villas and an amphitheatre, besides a large quantity of coins, pottery, bronze, ironware, and some large silver vessels which are said to only have their equals in the famous treasure-trove of Hildesheim, in Germany, brought to light in 1868.

The National Sculpture Society of New York will exhibit next year a comprehensive collection of photographs and other illustrations of sculpture and sculptured monuments in America.

The Third Ordinary Meeting of the Liverpool Architectural Society will be held at the Law Library, Union Court, on Monday, December 6, when a paper will be read by Mr. J. A. Gotch, F.R.I.B.A., on "The Domestic Architecture of the Renaissance: Elizabeth — James," illustrated by limelight views.

Mr. Henry Clarke, a member of the Corporation of London, having expressed a desire to contribute a painting to the value of 1,000 guineas, commemorative of the Queen's visit to the City, for the art gallery at the Guildhall, the commission has been entrusted to Mr. A. C. Gow, R.A. The picture will represent the Jubilee Service outside St. Paul's Cathedral, and will include the whole of the façade of the cathedral and the personages assembled there. Her Majesty will of course be the central figure. The work will not be completed until 1899, when it will be included in the exhibition of the Royal Academy.

Messrs. Ashley & Armstrong, of Berners Street, W., have been awarded the first premium of 26*l.* 5*s.* in the competition for the Village Hall, Byfleet.

Mr. William Goldstraw was on Wednesday appointed building surveyor to the City Council, Liverpool, at a salary of 450*l.* a year.

The New Building erected in connection with the Royal Sick Children's Hospital in West Graham Street, Glasgow, for the accommodation of sisters and nurses, was formally opened on the 26th ult. The building includes bedrooms for six nurses and two sisters, sitting-room, dining-room and other accommodation, in addition to a lecture and demonstration-room and administrative offices. The new building will give much-needed relief to the main hospital in Scott Street. The cost of the work is about 3,000*l.*

Recent Excavations at Windisch, the old Roman colony of Vindonissa, in the canton of Argovie, have yielded important results. Large Roman villas and an amphitheatre have been discovered, and, besides a large quantity of coins, pottery, bronze and ironware, some large silver vessels have been discovered, which are said to only have their equals in the famous treasure-trove of Hildesheim, in Germany.

The Architect.

THE WEEK.

AT the opening of the new Academic Hall with which Mr. M'EWAN has enriched the University of Edinburgh, the tribute due to the architect, Dr. ROWAND ANDERSON, was not left unpaid. Sir WILLIAM TURNER, one of the professors, in the course of his speech said:—"We have but to look around to satisfy ourselves that the University now possesses a Hall of splendid magnificence, worthy of the genius of the architect and of the constructive skill of those who have been employed to give effective expression to his design. It is graced by the art of the painter and sculptor; our ceremonies will also be enlivened by the strains of the most noble of all instruments of music, and nothing has been left undone to give to it the form, proportion and colour which in their combination may well entitle us to call it beautiful." The applause with which the words of Sir WILLIAM TURNER were received testified to the appreciation of the building by those who were fortunate to witness the opening ceremony. Dr. ANDERSON has ably served the generous donor, for the Hall is an enduring memorial of which any citizen of Edinburgh might well be proud.

THE late Mr. W. S. CROSS, who died on the 1st inst., was one of the oldest members of the Surveyors' Institution, having joined as a Fellow in the year 1873. He was in his seventy-fourth year. Mr. CROSS was for some years surveyor to the Sun Fire Office, and subsequently acted for the Duke of BEDFORD'S London estates. He enjoyed a large practice as an architect. Among his public buildings may be mentioned the Strand Union Workhouse, Edmonton; Camberwell Infirmary, Casual Wards and Receiving Workhouse, Bear Yard, W.C., besides numerous private residences, warehouses, &c. As a rating surveyor he acted for the Strand Union, St. George's Union and various other parishes and vestries, and was engaged in most of the large rating appeals. The business will be continued at the same address by his son, Mr. W. T. A. CROSS, in partnership with Mr. A. A. KEKWICK (who was associated with the late Mr. CROSS for over twenty years), under the name of W. S. CROSS & KEKWICK.

THE presidential address of the new Society of Designers was delivered on Tuesday by Mr. G. C. HAIRÉ. Three lectures will be delivered during the session. On January 25 Mr. T. R. SPENCE will read a paper on "The Element of Design in Painting," Mr. S. W. PROVERB will read one on "Design for Wall-Papers" on March 8, and on May 3 Mr. EDWIN FOLEY another on "Design for Furniture and other Woodwork." The offices of the Society are in Clifford's Inn. Mr. J. SCARRATT RIGBY is honorary secretary.

ACCORDING to a statement distributed among the congregation at the Bicentenary Service in St. Paul's Cathedral on the 2nd inst., the following works have been completed by the decoration committee:—(1) Removal of organ screen; (2) organ moved, enlarged and improved; (3) choir stalls moved from east to west side of choir; (4) eight mosaics in the dome (SALVIATI); (5) marble reredos; (6) Bishop's throne in sanctuary; (7) eight statues in dome; (8) mosaics in roof of choir, mosaics in spandrels of choir, mosaics in panels behind choir, mosaics in panels on north and south sides of choir; (9) six painted glass windows in apse, six painted glass windows in choir; (10) arches of north side of choir cleaned, gilded and touched with colour; (11) eight pilasters in choir covered with marble. The works in course of construction are:—(1) Mosaics in the four quarter-domes under the dome; (2) decorating the stonework at the sides; (3) ornamenting the interiors of the upper storeys above the quarter-domes; (4) painted glass windows in north and south transepts (Duke of WESTMINSTER); (5) painted window at end of north aisle of choir (Countess Dowager of CARNARVON). The

works wanted immediately are:—(1) Mosaics in six saucer-domes in north and south aisles of choir (three on each side), at 1,000£ each; (2) mosaics round the drum of the dome above the whispering gallery, cost 10,000£; (3) mosaics in the saucer-domes in transepts and nave, cost about 1,500£ each; (4) mosaics in the panels of the choir aisles, &c. Then will follow the completion of the decoration in the nave, transepts and aisles of choir, nave and transepts. WREN regarded the construction of the fabric of St. Paul's as an incomplete design. He intended to fill the dome and the roof of choir, nave, transepts and aisles with mosaics. He left brick vaulting, covered with plaster, for the purpose, with holes to suspend the necessary scaffolds. His scheme was cut short by the building committee. The cathedral had cost 1,500,000£, and the committee had sat for more than thirty-seven years. They would undertake nothing more.

It was stated at the Congress of Archaeological Societies that Mr. W. H. RICHARDSON, F.S.A., had prepared a preliminary list of effigies in parish churches, and it was thought that with the assistance of this list steps could now be taken to form a catalogue. Accordingly it was resolved to recommend to the committee to include in their lists effigies of all dates, all busts and portrait medallions, but not incised slabs nor brasses. It was suggested that particulars of incised slabs might be invited for a future catalogue. It was also recommended that notes of repairs to the effigies should be asked for, and notes of the original position and location, so that these might be placed on record. A resolution was passed to the effect that a memorandum be sent to the various local archaeological societies, suggesting the desirability of placing themselves in communication with the Ordnance Survey officers for their districts, so as to promote the record on the survey of the earthworks within their districts, and where possible to determine their age by excavations. It was also agreed that a memorandum should be drawn up calling the attention of the county councils to the extreme importance of promoting the safe keeping of such ancient documents as come into the custody of the parish councils. Many corporations have not only carefully calendared all the old documents in their possession, but in some cases have printed, or are printing, the results. The attention thus given to the matter has brought to light many ancient documents the existence of which was unsuspected. Inquiries should also be made for any old maces, staves, seals and other badges of office not now in use that may be in existence, so that they may be carefully preserved. The councils of the various county archaeological societies will no doubt be glad to render any assistance required in their districts, and in default of the existence of such a society in any particular district the standing committee of the Congress will be glad to give advice on the matter. Mr. RALPH NEVILL, architect, is honorary secretary of the Congress.

AN inquest was held recently in Dublin which revealed the necessity for a more rigorous superintendence of builders' work than exists in that city. Two labourers were killed by the fall of a wall in a house that stood at the corner of Cope Street and Anglesea Street, and which was about to be rebuilt. The men were removing a chimney-breast, and while shifting the bricks in the cellar the whole wall suddenly collapsed, and the two men were buried in the ruins. When taken out they were dead. Mr. BEARDWOOD, the architect, in his evidence said that when the adjoining house was built the wall was cut into, and the whole of the bond work was destroyed in consequence. There were five piers formed, and there was no doubt that the wall was weakened or disintegrated by the insertion of the piers. A trespass of that kind should not be tolerated, but in building regulations, as in other matters, there is a good deal of laxity in Dublin. Apparently there was no agreement between the owners on the subject. The jury found that the men were accidentally killed, and expressed the opinion that the wall should have been shored up before the chimney-breast was removed.

SCOTTISH ECCLESIASTICAL
ARCHITECTURE.*

IN this third and concluding volume of their comprehensive work, in which descriptions and illustrations will be found of all the remains of churches in Scotland, the authors treat mainly of the Last Pointed period. Independence was beginning to assert itself more definitely in architecture. During the fifteenth century there was some kind of organisation which secured more or less correspondence in the churches of western Europe, but occasionally amidst Third Pointed characteristics we see a nearer approach to a Scottish type than was witnessed in the preceding centuries. As was common in the North, it is in the abbeys and collegiate churches we must seek the more elaborate examples rather than in the parish churches. Although a crisis in ecclesiastical affairs was nigh, the Third Pointed period presents few indications of decay among priories or chapels. It is also possible, without any sacrifice of time or principle, to include some examples of work in cathedrals in the third volume.

Iona recalls primitive times, but the church did not attain the rank of a cathedral until 1507. The authors believe that "the choir, south aisle and sacristy are all of a late period, probably about 1500; the entire building bears evidence of having been in whole or part re-erected about the end of the fifteenth century or the beginning of the sixteenth century." The influence of early work is seen in the ornament. In 1561 the Act was passed for "demolishing all the abbeys of monks and friars," and the islanders were as eager to show their respect for the new edict as any of the townsfolk of the mainland. In Dunkeld Cathedral works were also executed up to nearly the end of the fifteenth century. An effort was made to confine the reform of the building to "all kinds of monuments of idolatry," and it was enjoined that the desks, windows, doors, glass and iron were to be preserved unharmed, but the building as well as its contents were doomed by the people. St. Machar's Cathedral in Aberdeen was fortunate in having a succession of prelates who were enthusiasts for building. The nave and western towers were the work of Bishop HENRY LEIGHTON, and date between 1420 and 1422. His successor roofed the building, and it was covered with lead and ceiled about 1518-31. But the late as well as the early work succumbed to those whom ORME designates "sacrilegious church robbers" in 1560. Paisley Abbey was in course of restoration when the order was given for its "purging." The third volume of Messrs. MACGIBBON & ROSS's work treats therefore of destruction on a great scale as well as of construction.

The Reformation could hardly be accomplished without some effect on church buildings. If JOHN KNOX was an iconoclast he was not a vandal, and he was too much of a statesman to advocate the wanton destruction of substantial churches which could be utilised for the services he was eager to introduce. He was, moreover, too confident in his power to suppose that old associations would be revived by worshipping in the old buildings, and Scotland at the time was not rich enough to erect new churches in every parish in order to gratify the desire to start afresh in all things. KNOX no doubt desired to see monasteries and nunneries cleared away, for in his eyes they were the nests of vultures; but once the agents of destruction were let loose, he was not strong enough to restrain them when they were indifferent to his commands. Hence we read in the volume we have under consideration how St. John's Church, Perth, where JOHN KNOX preached, "has the unenviable notoriety of having been the centre whence issued, in 1559, the unruly mob who in a short time demolished the splendid monasteries and other numerous religious houses of Perth and the neighbourhood, and whose example was only too readily followed by other communities throughout the whole country." But the church did not suffer except by the removal of objects which were offensive to KNOX. It was converted into three places of worship for the Reformers. In other towns where KNOX was not present to save them the buildings were considered to be almost as dangerous as the images or pictures. After the first excitement of vengeance a time of

indifference followed, which was no less unfortunate for the buildings. We read, for instance, how in 1606 the Presbytery of St. Mungo's Church, Borthwick, declined to "stent" themselves for the repair of the building, and offered to sell the vestry as a family burial-place to anyone who gave enough money to pay for the repairs of the choir. Similar cases were not uncommon.

The most remarkable building described in the third volume is the collegiate church of Rosslyn, which dates from the beginning of the fifteenth century. It is one of those Gothic buildings in which the carvers were beyond the control of the architect, and, as was to be expected, made their own work preponderate. The majority of visitors consider the church to be the most perfect example of Gothic in the North, for romance has added to its attractions. According to the old tradition, WILLIAM ST. CLAIR, the founder, "brought artificers from other regions and forraigne kingdomes" to erect it, and FERGUSON does not hesitate to say "there is no detail or ornament in the whole building which may not be traced back to Burgos or Belem." Wherever the artificers came from, their work must have cost a large sum, and yet, according to Sir WALTER SCOTT, the ST. CLAIRS, whose titles would have wearied a herald, were never so wealthy as an English yeoman. How were they able to pay for so excessive a quantity of sculpture? That is a question which often arises in connection with Mediæval architecture, and to which an answer is not readily forthcoming. Rosslyn Chapel, from the excess of its ornamentation, is commonly accepted as an unique work, but it can be demonstrated that it has much in common with other northern buildings. Glasgow Cathedral is one of them:—

The leading principles of the design are really Scottish, and it will be found on careful analysis that Rosslyn Church presents a rich and finished epitome, both as regards constructive and decorative elements, of the Scottish ecclesiastical architecture of the Third or Late Pointed period. The plan of the east end of Rosslyn Church so closely resembles that of the choir of Glasgow Cathedral that there is hardly room to doubt that the latter was the model after which the former was designed. The disposition of the pillars in the two buildings agrees exactly, the side aisles in both being connected by an eastern aisle, which in each case has a central pillar in the east arcade, and in each edifice a series of chapels beyond this aisle forms the east end. The details, as is natural, seeing that the buildings are about two centuries apart in date, are entirely different, but it is curious to observe how in both cases even the minute parts of the design are remarkably alike. Thus the triple niche over the central pillar of the east arcade at Glasgow finds a counterpart in the same position at Rosslyn. The east wall and gable of both choirs occupy the same relative position, rising above the eastern aisle and chapels. Churches with an eastern aisle are not unknown in England, such as Abbey Dore, Herefordshire, and Romsey Abbey, Hampshire; but the former has three openings in the east end, thus showing an arch in the centre; while Romsey Church, Glasgow Cathedral and Rosslyn Church have the peculiarity of having a pillar in the centre of the east arcade.

Rosslyn as a fifteenth-century work indicates the dexterity which was to be found in Scotland, and if rigorously controlled it would have produced more beautiful works than the collegiate chapel. In many of the churches which are illustrated in the volume we find skilful examples of scientific stone-cutting, showing a desire to conquer difficulties for the sake of exercising power. But when church work in which a love of art was displayed ceased to be considered meritorious, constructive and artistic skill became of little account, and therefore a part of the price which had to be paid for the Reformation was a suspension of architectural progress.

Nevertheless, unless we are mistaken, there were more churches erected to suit the reformed ritual in Scotland than in England during the sixteenth and seventeenth centuries. As there were, however, two parties, Episcopalians and Presbyterians, who held different theories about what constituted a reformed ritual, there could not be evolved any national plan of church architecture. As the authors remark:—"During the century which followed the Reformation there were two styles of ecclesiastical structures erected in the country, one style showing some reverence for the house of God in its form and decoration, and in the appropriateness of the Divine service; while the other seemed to be designed, both in its buildings and forms of

* *The Ecclesiastical Architecture of Scotland from the Earliest Christian Times to the Seventeenth Century.* By David Macgibbon and Thomas Ross. Vol. iii. Edinburgh: David Douglas.

worship, to be as far removed as possible from any outward or visible sign of inward sweetness or grace." The remarkable phenomenon is consequently presented in the authors' work that the close of it has a correspondence with the beginning, for in both parts we find buildings so simple as hardly to deserve the designation of works of architecture. Occasionally there are interesting features, such as the tower at Anstruther Wester, a Renaissance window at Ballingry, various bell-cots, the west window of Michael Kirk, Ogstoun; the Tron steeple, Glasgow; the painted ceiling of armorial bearings in Grandtully Chapel, the gateway of Turriff churchyard, &c. There are some curious monuments, foreign as well as native.

For memorials of themselves the old families were willing to be liberal in expenditure. But for a long period after the Reformation there were no wealthy townsmen, and they are the main support of church-building in Scotland. Hence it was as the authors' say:—"Most of the churches of the seventeenth century are either very poor imitations of Gothic work or tasteless examples of plain walls, while a few contain the germs of what might have been wrought into a picturesque style founded on the Domestic architecture of the period."

According to SHAKESPEARE, "Never anything can be amiss when simpleness and duty tender it," and the plainness of the Scottish temples should be taken as evidence of the utmost reverence among the worshippers. Architecture must succumb to a higher power when occasion requires, and if properly considered the unadorned kirks of Scotland have an interest which compensates for the absence of beauty within or without. It may be well to point out that there is another theory of the origin of the severity of the churches in Scotland. It was expressed by DE QUINCEY as follows:—"Strange, indeed, that the Scottish Church should have been the favourite Church of the poor, which began so undeniably upon the incitement of the rich. They, the rich and the aristocratic, had revelled in the spoils of the monastic orders at the dissolution of the Romish Church. Naturally unwilling to resign their booty, they promoted a Church built upon a principle of poverty and humility; a Church that would not seek to resume her plundered property." According to DE QUINCEY's theory the simplicity exhibited in church buildings throughout Scotland arose from the penury of the landowners. But it can be said, in reply that the rich and the aristocratic in England were liable to a similar temptation, and possessed at least similar power over their tenants, but were unable to create a Church resembling Scotland's. The northern proprietors could not have succeeded unless there was a desire to see the externals of religion expressed in a more simple form than was adopted prior to the Reformation.

That in the North there has been a change of disposition, and neither ministers nor laymen are so much afraid as were their predecessors of the dangers to their faith which can arise through the agency of architecture, is most creditable to the reasoning powers of Scotsmen. They have emancipated themselves from fallacies, and when we consider what principles were involved that was no easy task. There are places where a finial of a cruciform shape is still supposed to be an allurements to heresy, but anyone who will compare the modern Presbyterian churches in Scottish towns with those which figure in the latter part of the work of Messrs. MACGIBBON & ROSS, will have to admit that in no country in the world has there been a more marked victory over prejudices against architecture. It is not merely an improvement in taste which is displayed, but likewise the adoption of an exegesis which is inspired by consideration for human needs and human weakness in what may be a degenerate age.

The 1,600 illustrations which are found in the three volumes of "The Ecclesiastical Architecture of Scotland" form therefore a series which has interest for others besides students of architecture. They exemplify the changes of religious thought in the North, as well as many political and social changes. The greater number of the subjects are similar to the churches in England, but the seventeenth-century churches of Scotland can be claimed to be her own. The early Christians could not build except in a rude way, while their reformed successors, although competent builders, as is evident from their

domestic works, were afraid to display their skill when a church was to be erected. Thus it happened that the circle was completed and extremes met in Scottish ecclesiastical architecture.

Messrs. MACGIBBON & ROSS have not treated their subject as if they were controlled by a restricted professionalism. The volumes are not to be taken as supplying subjects for imitation in modern building. Much in them is inspiring, especially for those who wish to see a national style, but the work appeals to a wider circle than architects, builders and patrons. It therefore deserves to have a place on the shelves of every library belonging to Scotsmen at home or abroad who wish to preserve records of the history of their country.

ELECTRIC CURRENTS AND BUILDING MATERIALS.

THE report of the special committee of the American Institute of Architects appointed to consider this subject, which was presented by Mr. JAMES B. COOK to the Convention at Detroit, which we published a few weeks ago, contains many statements which are novel, if correct, and which we venture to think are incorrect. It appears that there is a standing committee to investigate, not by experiment, but to theorise generally upon subjects which we should think are rather beyond them; and if, as it is stated, this is only the first of a series of such reports, we may expect some very remarkable things later.

The report starts by giving an introduction to "phenomena of electricity," and apologises for "wandering somewhat remotely from the text." We should have thought an apology was also needed for wandering from subjects known to them into the unknown, and for giving the results of their wanderings as facts. The first half of the report devoted to the subject consists of a consideration of the atomic theory, the universe, the ether, the atmosphere, light, heat and almost everything imaginable which does not practically concern the subject.

We would suggest to our readers that the matter dealt with is one which needs experiment to make it of any value, not a result of a string of hypothetical theories which may or may not be true strung together by a committee. The committee also predict the results of experiments, "and when well investigated will prove to be a very destructive agent, particularly on iron or steel." We would suggest that a committee of architects without other aid are hardly the proper authority to bring up a report on a subject like this.

In the first "wandering" part are the following:—"The earth is but an atom of the whole universe. We find it has an envelope . . . extending up 45 miles." We would ask has such an extent of space been explored?

Again, "Investigation tells us that there is an atmospheric envelope to all planets and stars, but the kind of atmosphere is unknown." This is surely news, but we did not think that all the planets and stars had been investigated.

"The transmission of light, heat, electricity and sound is due to this ether medium." The committee are totally wrong when they state that sound is transmitted by the ether. It has, of course, been known for a long time that the whole theory of acoustics depends upon the fact that sound-waves are the compression and rarefaction of a material medium, such as the atmosphere, and the results of experiments have proved this. Can the committee explain why sound is not transmitted through a vacuum, as they rightly assume that the ether is existent in a vacuum?

We will not go further into the committee's "theory" with which we are at variance, although it contains some truths, from which, however, erroneous conclusions are drawn. One of the conclusions is that:—"In regard to the application of what has been said to the introduction of electricity into buildings, the question naturally arises, Has it any harmful effect upon the materials in the construction? We answer, if our theory is correct, Yes, for by induction in all the materials electric excitation is set up, thereby lessening the cohesive force of the atoms of the materials, and thereby in course of time disintegration takes place. The greater the conductivity of the material, such as iron or steel, the quicker the process, and the less the

conductibility the slower the process, such as all vitrified matter." Now this conclusion is perfectly new. No difference in the cohesive force of molecules or atoms has, to our knowledge, been detected except when a change of state, supplied by heat, has taken place. A copper wire is just as strong while carrying electricity as when not doing so, and an electrified body is as strong as an unelectrified one. Further, if this statement were true, the atoms would separate on disintegration, but the utmost that has ever been known to occur by the application of electricity in any form is a weakening of material due to its temperature being raised by the heat generated; this phenomenon is, with a given current, more marked as the conductivity of the material decreases, which is the opposite of the committee's conclusion. Energy has never escaped from a steady current by means of induction. When electrolysis occurs, the effect is a purely chemical one, and no disintegration occurs, only a change from a metallic condition to a more complicated condition of a metallic salt. The electric current merely allows the chemical action to go on. Induction does occur in adjacent metal if the wires carrying the current are far apart. This induction sets up eddy currents in the metal, which, however, are at too low a pressure to cause electrolysis.

A further point is that the report states, "Passing wires through metal conduits increases the induction," and that "a vitrified covering seems to offer the best protection as to induction." These statements are known to be absolutely incorrect. The true facts are that a metal pipe or a vitrified covering has no effect in resisting induction; the only way to confine the induction into a given space is to enclose it in a magnetic material. This is the only shield to induction. Thus, if the metal pipe is of iron the conclusion the committee draw is the exact opposite of that found by experiment. Further, no harm has ever been known to result from induction. Leakage of electricity has caused harm, not by induction, but by electrolysis. This leakage is best prevented by good insulation, and by enclosing both wires in a continuous earthed sheathing of metal—the very method the committee condemn.

There is one good recommendation in the report, which we gladly seize upon, and that is that all metal-work should be connected together and finally earthed. This is an excellent remedy for the effects of electrolysis due to a conductor becoming uninsulated, and also an excellent device for the protection of the building from lightning. Unfortunately the reason given is such that the credit of the suggestion must be taken away. The reason is given as follows:—"By this means we think the vibratory forces will, at least, be reduced to a minimum." The committee invite investigations on the subject, and hope to confirm their opinions by these. Fortunately the investigations have already been carried out, and the results go entirely to disprove the recommendations in this report.

We conclude by saying that a little knowledge is, indeed, dangerous. We feel certain that architects will continue to recommend electricity as an illuminant on the established grounds of safety, convenience, and from the artistic point of view, notwithstanding this report, and would add that the vibratory force of a gas explosion has in it more potential harm than the "electric conditions destroying cohesion, and producing as an ultimate result disintegration and the dissolution of all things," as explained by the committee.

GLASGOW ECCLESIOLOGICAL SOCIETY.

THIS Society met in the hall of Woodside parish church on the 2nd inst., the Rev. D. Watson, of Woodside Church, in the chair. A paper was read by Mr. William J. Anderson, architect, on "Churches of Brunelleschi and the Early Florentine Renaissance." The lecturer discussed the historic and scientific value of a retrospective view of architecture in so far as we could reconstruct the life from the husk, the soul from the mummy-case, but declared that not all the king's men could make the dry bones of a phase of art live again in an atmosphere uncongenial. Architecture must first serve a great utilitarian purpose, definite and necessary to the time, and often to the time alone. By economic laws it adjusts itself to this purpose, and perfects itself in so doing. Its opportunities of artistic expression are limited by its scope and by all the surrounding conditions. But the world's evolution is so slow or irregular in movement that the house which has served as the dwelling-

place of one generation has served for its successors and may even be reoccupied by a life separated even by a thousand years. Two instances of this hermit-crab principle are conspicuous in the history of Europe. The first when the home which the Roman emperors prepared was believed to be the appropriate residence of the Catholic world of the Renaissance, and the second when, under the influence of the Gothic revival, the cathedrals and abbeys of the Middle Age were deemed to be the true models for the material home of the Anglican Church to-day. What was now wanted was not any recrudescence of Mediaeval imagery or Byzantine symbolism, but a view of church building which was in harmony with the greater thoughts that were the inheritance of the age. Expression rather than symbolism should be sought in church architecture, and if a church had calm dignity, solemnity, simplicity, permanence and such qualities, other symbolism and style was superfluous. Brunelleschi's churches had these qualities in more than ordinary measure and, although his work led to a revived Latinism, he was no copyist. Rather he was one who discovered and revealed the ancient world. Since then we had passed through three stages in regard to it—initiative, archæologic and scientific—but before us dawned another aspect, in which we should learn by wider and fuller knowledge to be ourselves. Until our education enables us to build upon the larger tradition supplied by all architectural history we must make the best of the traditions of the Renaissance, under whose influence we still live. Illustrations were given of nearly all Brunelleschi's architectural works, including the churches of Florence, the Badia de Fiesole, and many of the works of the school he originated. Particular attention was given to decoration of the buildings by sculpture, the purest, most human and sweetest in expression of all the ages, and in this connection several of the works of Donatello, Luca della Robbia, Ghiberti, Jacopo della Quercia and others were shown on the screen. A discussion followed, in which the comparative merits of Gothic and Renaissance architecture were discussed. It was suggested that in Gothic there was a greater feeling of unity, inasmuch as the ornamentation was almost of necessity part of the structure, while in Renaissance it had more the appearance of something superimposed upon the architecture. The thanks of the Society were given to Mr. Anderson for an exceedingly able and interesting lecture.

THE ARCHITECTURAL ASSOCIATION.

A MEETING of this Association was held on Friday evening last, the president, Mr. Hampden W. Pratt, in the chair.

The minutes of the last meeting were read and confirmed and the following gentlemen were elected members:—Messrs. C. J. Barker, A. St. John Diamant, A. G. Ross, J. Henry and W. H. Williams. Mr. A. G. Angel was reinstated a member.

Votes of thanks were passed to those who assisted in the entertainment at the conversazione on November 26, and also to Messrs. R. Phené Spiers, Alfred H. Hart, W. H. Atkin Berry, W. G. B. Lewis, A. C. Dickie and members of the water-colour class for lending drawings for exhibition at the conversazione.

Mr. F. J. Osborne Smith read his paper on

The Planning of High and Endowed Schools for Girls.

During the past twenty-five years a goodly number of these schools have been established, and for a lesser number special buildings have been erected.

The requirements have naturally grown, and experience has, as usual, taught many valuable lessons to all concerned.

High schools, I may remind you, are superior day schools for girls of all classes above those provided for by the Elementary Education Act. There were no high schools twenty-five years ago; the word "high" was not used as applied to schools until the incorporation of the Girls' Public Day School Company, Limited, in June 1872. The starting of this company to establish and maintain in London and the provinces superior day schools forms an epoch in the education of the larger half of the inhabitants of England. It was an attempt to meet and correct the defects pointed out in the report of the Schools' Inquiry Commission:—"Want of thoroughness and foundation; want of system; slovenliness and showy superficiality; inattention to rudiments; undue time given to accomplishments, and these not taught intelligently or in any scientific manner; want of organisation."

The first school was opened in January 1873 at Chelsea, in an old house adapted for the purpose. There are now thirty-four schools belonging to this company, and various others have been established by limited liability companies, which were formed usually to establish individual schools.

Existing buildings, more or less adapted for the purpose, formed the first homes of many flourishing schools now housed in buildings the planning of which is based upon the knowledge thus gained. Work carried on in buildings originally

erected as private residences or for other purposes revealed almost hourly weak places where time was lost, where adequate supervision was impossible, and where it was hopeless to combat the evils attendant upon temporary and ineffective means of ventilation, low and small rooms, narrow staircases, weak floors, falling ceilings, small and dark cloak-rooms, small fireplaces, insufficient light and other defects.

These drawbacks to effective teaching were well remembered, discussed and digested whenever a new home was in view, and the new school-house, planned and erected for a definite purpose, became at once an added pleasure to the daily lives of both mistresses and pupils and an effective aid to education.

It is difficult to find existing buildings suitable for high schools or that can be made efficient without great expenditure; this sometimes leads to two or more houses (not necessarily adjoining) being occupied by one school—a most trying arrangement for the teaching staff.

To follow in detail the growth and development of these schools in the adapted buildings would make an interesting paper by itself. I propose to dwell this evening upon the types of plans which experience has proved to be best suited for the work which is carried on in high schools.

One of the most prominent characteristics of a high school should be cheerfulness produced by ample lighting, plenty of sky visible, possibility of the sun himself being able to peep into every room, pleasing wall surfaces, good pictures, &c.; all these, except perhaps the last, form a part of the design, and if the architect will make tempting provision for hanging pictures in suitable positions, the pictures will soon follow. Gloom, semi-darkness and all the opposites to bright airiness should find no place where children are being taught.

Spaciousness, too, is an important quality to secure; ample floor space is here meant—not loftiness. Classrooms need not be lofty to be healthy; an excessive cubic space above the pupils' heads makes ventilation and warming more difficult, and is simply enclosed space in the wrong place. It is obvious, also, that inasmuch as it is found desirable to limit the number of children in a class to thirty or forty, the floor space must be limited to dimensions which will enable the mistress to keep the pupils well under control, to speak to them all effectively without strain and have access to each desk without disturbing the pupils at adjoining desks. These considerations, as well as those of access to the room, space for and around the mistress's desk for teaching apparatus, &c., must be regarded as determining the extent of floor space, even when it is not urgently necessary to keep always in mind the cost of every cubic foot of space you may wish to enclose.

When the room is warmed by the usual open fireplace, the best position for that cheerful, if wasteful, contrivance must not be overlooked, because it also demands a portion of the available floor space.

The relative positions of the door and fireplace in relation to the windows deserve more consideration than is usually given. Waste of space necessarily arises where both door and fireplace are not situated at the end of the classroom occupied by the teacher. It is not convenient for the fireplace to be in the centre of the end wall, sometimes it may be well placed near the door. The corner of the room on the right hand of the teacher is a position with many advantages.

The fireplace should contain some form of ventilating or warm air producing grate, with fresh air brought to it from outside well above the ground, all inlets being short and accessible for cleaning; the air-chamber for warming the incoming air ought also, for cleanliness sake, to be readily accessible. In large rooms, or where there are two or more external walls, it is sometimes found desirable to supplement the fire by hot-water pipes under the windows or along the wall opposite to the mistress. Open fireplaces should not be omitted from schools of this kind without very full and serious consideration of the means to be employed to warm and ventilate the buildings, and especially the classrooms.

This slide shows a form of classroom for thirty pupils, which from its frequent use may be accepted as convenient both in shape and size. The dimensions given are certainly not extravagant, but they are found sufficient when adequate means for ventilation are provided and used. The allowance of floor-space per pupil is 13 feet 6 inches super (or 13.65 feet, to be quite accurate), and the cubic space 163.8 cubic feet per child.

Space should be provided between the walls and desks for access for supervision, and to enable the children and mistress to write or draw upon the slates or blackboards upon the walls. Movable blackboards are inconvenient appliances, but as they are less costly than continuous slates the inconvenience still prevails in too many instances. It is possible still to find classrooms with windows, blackboards and desks so arranged that it is impossible for all the scholars to read what has been written or drawn for their instruction.

The ceilings should be as much as possible unobstructed by beams or other timbers which prevent the ready flow of air or check or divert the air currents.

A point which affects the health and comfort of teachers is the provision of windows at the back of the children. If these windows happen to be in a south wall the evil becomes very trying. A teacher told me a few months ago that one of his eyes was seriously injured from having to face a south window. Moreover, under such conditions some of the pupils' features are in shade, and it is not possible to distinguish the effect of the teacher's remarks upon the children, which is so very desirable, and adds to the interest and pleasure of teaching. Except in cases of special difficulty, it is possible to effectively light any classroom, large or small, from windows in one wall only. An additional window may be useful for obtaining direct sunlight in an otherwise sunless room, or for securing cross ventilation not otherwise obtainable, or for other sufficient reasons, but it will in any case be found desirable to make that window smaller than the rest, or to place it in a corner of the room, or to arrange means of regulating the light from it when required.

The chief use of the assembly-room or central hall is to accommodate all the pupils at one time daily, and its size is fixed accordingly. If the school is thought likely soon to expand beyond a nominal standard this room may be built to accommodate a maximum number of possible pupils; in other cases, where a smaller number of pupils are provided for, with no reasonable prospect of extension, the assembly-room may be of lesser dimensions. As will be noted further on, this hall may serve for access to the classrooms upon two floors, a consideration by which its height is often determined. Naturally, the supplementary purposes for which it is used also affect the floor space, shape and dimensions.

This important room should be near the principal entrance, and have ample means for access; it was a common defect in the earlier schools that only one entrance was arranged. This should be regarded as inadmissible, except in very small schools.

The position of this room in relation to the classrooms is probably the most important factor in determining the general plan of a school.

Side-lighting for this hall is preferable for the sake of ventilation. Where top-lighting is used, great care and judgment are required to avoid too much glass, which, moreover, should be placed as near the sides as possible, in order to prevent deep shadows being cast upon the floor from the balconies. Centre top-lights are rarely successful for schoolrooms of any kind.

Good acoustic conditions ought to be secured for this room.

For convenience of consideration, plans may be divided into three types, viz.:

1. Those which have the principal classrooms and the assembly-room separated by corridors, as in this slide.
2. Those where the classrooms are grouped round a central hall.
3. Those which have classrooms on one, two or three sides of the assembly-room, leaving the fourth side an external wall.

The difficulties of a contracted or otherwise comparatively unsuitable site—while increasing the architect's interest and enjoyment of his work—often lead to varieties of treatment not included in either of these types. These may be regarded, however, as exceptional plans adapted to special situations rather than typical examples.

Sometimes a feeder is fostered in the form of a Kindergarten-room, which should be exceptionally cheerful, on the sunny side of the ground floor, near to the pupils' entrance and to separate lavatories.

A spacious room for drawing purposes facing north or east, with as much floor space as can be afforded, and wide doorway, fitted with cupboards, rails and shelves for models, racks for boards, drawers for paper drawings and materials, a sink, dark blinds, &c., well lighted from one side or end. Usually the best situation for this room is upon the top floor.

Laboratories for teaching chemistry and physics (separate rooms for each if possible), with impervious floors, ample side or top lighting, and special means for ventilation, fitted with working tables, with water, gas and electricity laid on. Also a small room for balances, cupboards for stores, apparatus, &c.

The size of the laboratory must depend upon the extent to which science is taught in the school. It should be lofty, well-lighted, with the windows just above table height, and extending to the ceiling; ventilation must be specially studied, particularly the means of readily producing cross currents of air at the levels of the work-tables and ceiling.

It is convenient sometimes to plan a separate building for science teaching.

A covered playground fitted as a gymnasium.

A luncheon-room for mistresses and pupils, with the kitchen and offices and housekeeper's rooms adjoining.

These domestic rooms should be planned with a separate entrance, and be cut off from the schoolrooms with prompt access from the kitchen to all the school entrances, and from the school to the dining-room. On no account should any of the noise or odours from the domestic rooms be allowed to enter the school proper.

Well-lighted and ventilated cloak-rooms, not less than

9 feet high, and large enough to afford floor space for fittings. The best position for cloak-rooms is, of course, near the pupils' entrance; stands for cloaks should be about 6 feet apart from centre to centre, and about 1 lineal foot of stand space should be allowed for each pupil, with means for drying wet clothes.

A sitting-room for assistant mistresses should overlook the playground and its entrances, and be reasonably near to the head-mistress's room. A small cloak-room and lavatory are convenient and desirable adjuncts. It should not be less in size than an average classroom. The glass line of the windows should be nearer the floor than in the classrooms; in this, as in other respects, the room should be regarded as a work-room and sitting-room combined.

The head-mistress's room with secretary's room and a small waiting-room must be near the chief entrance and the platform end of the assembly-room. Neither of them need be so large as a classroom, but from the windows of the head-mistress's room it should be possible to see the main entrances to the building. This room is a work-room and also a reception-room; it should be well lighted, cheerful and convenient, with a lavatory near at hand.

Stairs should be of reasonably fire-resisting materials which will not become slippery, have easy gradients, wide treads and shallow risers, suitable for the younger children, thoroughly well lighted and at least 4 feet wide, to enable two files of pupils to pass each other. Those to cloak-rooms or where there is an exceptional amount of traffic should have hand-rails on both sides to prevent accidents and be, say, 5 feet wide.

The position, form and size of the staircases are most important; no greater inconvenience in a school can be conceived than a carelessly designed staircase in the wrong place. A building designed to accommodate more than, say, 150 children should have two distinct staircases, as far apart as possible, but both near the assembly-room.

Winders and circular or elliptical staircases are inconvenient and ought never to be planned for these schools wherever it is possible to avoid doing so.

The rise of each step should not exceed $6\frac{1}{2}$ inches; 6 inches is better when obtainable; 11 inches should be the minimum width of the tread (from nosing to nosing). Staircases need not be lofty, if sufficient head room and ample lighting be secured.

Lavatories with wash-basins to accommodate, say, 5 per cent. of the pupils at one time, and closets for, say, 3 per cent., can be in most cases conveniently arranged on two or more floors in a separate wing or other suitable position, disconnected from the main building by a staircase or well-ventilated corridors.

A bicycle store or shed has now become an essential requirement, as girls now ride to school in great numbers. It has been said that "one want creates another," and covered stores for cycles, now they have apparently come to stay, must be considered and placed as near to the pupils' entrance as may be safe and convenient.

Last, but not least, a spacious levelled playground for tennis and other games, small border gardens for the pupils' botany specimens, cricket and hockey meadow, &c.

The endowed schools have often extensive playgrounds. Trees upon the site should be judiciously preserved for their own sake as beautiful objects, and for the sake of the shade afforded in hot weather.

Seven feet is a desirable width for main corridors, which should not be of less height than the rooms adjoining. Windows at each end are essential, and there should be ample lighting throughout, especially at points where they deviate from a straight line.

Having thus briefly noted the requirements, let us now consider the three types of plans before mentioned.

It will be seen that in this type the assembly-room is treated as a separate room, and does not afford access through it to other rooms. It can therefore be used for drill, singing lessons, special classes and other purposes, without causing inconvenience and hindrance to work going on in the classrooms, and also without the work going on in the assembly-room being interrupted by children passing through from the classrooms.

That is an obvious advantage provided at the cost of constructing the corridor.

The corridor constitutes the chief variation between this type and another, as will be seen later on. In this design the most important storey is the first floor, which is approached by covered stone steps (see perspective). The head-mistress's room is on the right of the vestibule and a waiting lobby on the left; two classrooms and a corridor are entered from this lobby; other classrooms are on the right, and two at the left in a line with the assembly-room.

Two well-lighted staircases, one at each end of the corridor, lead from the ground floor to the second floor, and there are large borrowed lights between the assembly-room and corridor, and over each classroom door.

On the second floor are classrooms over those below, a small laboratory over the head-mistress's room and vestibule; one of these classrooms is fitted as a science lecture-room, and a large studio at end of assembly-room. On the ground floor are the pupils' entrance, with cloak-rooms on the right and dining-room on the left, a gymnasium under part of the assembly-room, mistress's room, lavatories, tradesmen's entrance, kitchen and offices, two rooms for special work, furnace chamber, fuel store, serving-room, &c.

There is access to the playground at three points.

Most of the classrooms are lighted from the south-east, the assembly-room faces north-west and the studio north-east. This school accommodates 320 pupils, and is found, after being in use for twelve years, to be convenient and suitable for the purpose. The playgrounds attached to the school are exceptionally extensive for a high school. Classes are held there under the trees in summer.

Where the rooms are grouped round a central hall some of them will be less cheerful than others, owing to the diminution of direct sunlight. The noise of drilling and singing will interfere more or less with the work going on in the adjoining classrooms, and the passing of children from the classrooms to other parts of the building will tend to disturb the work going on in the assembly-room. To set against these drawbacks, which are possibly more apparent than real, there are many advantages, viz. compactness of plan, economy of space, increased facilities for effective supervision, &c.

The assembly-room gives access to two storeys of classrooms, the upper ones being entered from a gallery arranged on all four sides.

This form of hall is easier to light than would appear at first sight. In fact, one has to be very careful indeed to avoid having too much lighting surface, which, it must never be forgotten, is also chilling surface in cold weather and heating surface in summer time. It is a common and fatal error to underestimate the value of a square foot of top-light—fatal to comfort, convenience and health.

The assembly-room is occasionally used also for prize distributions, lectures, concerts, private theatricals and similar functions, and by this plan the adjoining rooms and galleries can be used to increase the accommodation for visitors and parents.

Plans of this type are a variation upon the central hall type, inasmuch as there are no classrooms upon one side from which the hall is lighted through windows in the only external wall. In this form of plan the classrooms are grouped along the quietest or most cheerful side of the building, the assembly-room, studio, laboratory, cloak-rooms and other rooms occupying positions which are less important in this respect. Galleries are required only on one or two sides, and the drawbacks of the central hall type of plan are somewhat less in this type.

The conditions of the site usually settle which type of plan shall be used. There are, of course, some sites where all sorts of variations and adaptations will be found necessary.

Some peculiar and exceptional opportunities for skilful and picturesque planning arise when one has an existing building to utilise and fit in.

The width of doors to classrooms should be limited to dimensions which will permit the passage of the usual movable furniture; 3 feet to 3 feet 3 inches is usually sufficient. Those to studios, corridors, cloak-rooms, dining-rooms, entrances, &c., should be wider, with pairs of doors hung folding or to swing, as may be found desirable.

Glazed upper panels in doors, and also a second door leading from one classroom to another are very useful in assisting supervision and maintaining discipline. Glass panels are sometimes objected to for apparently good reasons, but they are usually found to be convenient.

The essential points to be borne in mind regarding windows are:—

The chief lighting for all rooms, except those for science teaching, should be in one wall only, that on the left-hand side of the pupils, with an extra window conveniently arranged where possible for cross-ventilation or extra sunlight.

The glass line should be as near the ceiling as possible, and not nearer the floor than 3 feet 6 inches or 4 feet in classrooms, and the glass should be clear, except in lavatories and a few other positions.

The window frames should be as near the outer surface of the wall as appearance, Building Acts and other circumstances will permit, to afford means for obtaining admission of air without interfering with blinds, &c., and also to allow the maximum of floor space to be used without the desks being placed too close to the glass.

All windows should be made so as to be opened easily by children and to the fullest extent possible, and should be constructed to permit portions of them to remain open if desired while work is going on, without the possibility of downward currents of air being felt by the pupils.

The most suitable kinds of windows are those which can be

opened most readily, and which when open will not admit rain or expose the occupants of the room to strong currents of air.

French casements and centre-hung sashes, although very useful in some positions, are not as a rule desirable for classrooms. Double-hung sashes, with hopper casements over them hung to the transome are a common and useful form of window. Hopper casements hung to sill and to transome, with centre or side-hung sashes between them, are found convenient, and comply with the conditions above referred to.

In the wall opposite to the windows, openings near the ceiling, fitted with hopper casements, are extremely useful in obtaining cross ventilation of the rooms during the intervals for recreation and when the school is closed.

Fireplaces are conveniently arranged in the wall facing the children, not in the centre, if it is possible to place it either near the door or in the corner near the windows, especially when warm air grates or stoves are used, as then the cold air inlets are short and accessible. It is very important that all stoves or grates used for warming the air should be capable of being taken to pieces to allow the air channels to be kept clean.

Cloak-room Fittings.

Stands from 5 feet to 6 feet from centre to centre; seats and boot-racks, with hot-water pipes below them, are usually provided. Where this is not possible, other means for occasional drying of damp clothes are desirable.

Cement, asphalt, tiles, wood blocks, or similar materials capable of being readily cleaned are most suitable for the floors; cement or varnished wood for dados.

Lavatory Fittings.

The water should be laid on to the basins and water-closets direct from the high-pressure mains, or from cisterns placed at a considerable height above the lavatories.

The diameter of the pipes will depend, of course, upon the size of the lavatory ranges or the number of closets to be served, as well as their position below the main cistern. A very important point to bear in mind is that the closets and lavatory basins are often all in use during the same time, therefore all service pipes must be exceptionally large. There are so many disadvantages connected with the small flushing cisterns which water companies insist upon, that other methods of flushing the closets are arranged when water is supplied through a meter, such as lead-lined trough and spindle valves over water-closets or continuous cistern. The stoneware trough and automatic flushing-tank arrangement for water-closets partially avoids these difficulties; but a separate water-closet apparatus and flushing arrangement has many advantages over the trough method. Ranges of water-closets in or adjoining a building should be invariably separated from the corridor or stairs which gives access to them by a well-ventilated lobby or passage, in which may be placed the lavatory basins. These lavatories should be roomy enough to allow pupils to pass freely to and from the water-closets while others are using the basins.

The height of the lavatories and water-closets need not exceed 8 feet 6 inches or 9 feet; a separate window for each water-closet, inlet ventilators near the floor of the lobbies or lavatories and outlet flues from the ceiling level up to above the roof are desirable.

Walls.

Walls must, of course, be built of sufficient substance to resist heat, cold and moisture. Hollow walls in very exposed situations are useful, in spite of their disadvantages; but solid walls of good materials are better for ordinary positions. All openings in walls, flues, chases, &c., should be made accessible for cleaning.

The greatest care should be taken, and thoroughly effective means should be adopted to prevent moisture penetrating the walls from above downwards, or from the ground upwards. Solid damp-proof courses, formed of asphalt, slate, cement, &c., ought alone to be used, being much more effective than the various glazed perforated substitutes.

Roofs.

Roofs, if of the usual wood rafters, and slate, tile or lead coverings, should be close boarded, and have some non-conducting material under the outer coverings.

Floors.

Floors of classrooms should, if possible, be impermeable, and covered with wood. Where wood joists are used special care should be taken to insure rigidity, and provide effective means of checking the passage of sound and air through the floors.

Floors of all lavatories and science-rooms should be solid, with hard, non-absorbent coverings. The use of porous breeze concrete for such floors is not to be commended. Wood floor coverings should be polished, and have skirting fillets of sufficient width to keep the desks from injuring the wall surfaces.

Ventilation and Warming.

The cost of forming and maintaining a system of mechanical ventilation, and the desire for an open fire for the sake of cheerfulness and prompt control, account for the fact that in most of the schools of the kind under consideration the open fireplace has been utilised.

If a school building be designed to allow currents of air to sweep entirely across it during the pupils' absence, and each classroom be provided with two 9-inch by 9-inch or 14-inch by 9-inch shafts or flues from the floor to above the roof, with inlets to each at floor and ceiling levels, in addition to a large warm-air grate and suitable windows, it is found in practice that reasonably adequate means for warming and ventilating are thus economically obtained.

Their effective use depends greatly, of course, upon the mistresses in charge of the rooms, but it is an exception to find a head-mistress who is not keenly alive to the value of the means afforded and familiar with the use of them.

Vertical inlet tubes, deep sill fillets to windows and the various valve ventilators, are all useful as aids when kept clean; but unless air is warmed before it enters a school the inlets will remain closed during six months of the year when fires are in use. This fact accounts for the popularity of the various ventilating grates, most of which can be taken to pieces periodically for cleaning, and work best when doors, windows and ventilators are closed.

The assembly-room, corridors, cloak-rooms, lavatories, laboratory, entrance-lobbies and staircases can be more conveniently warmed by hot-water pipes. It should be possible to raise the temperature in the corridors, cloak-rooms, lavatories, &c., to about 50 deg. or 55 deg. during cold weather, for the purpose of preserving a fairly equable temperature inside the building and protecting the sanitary arrangements and water services from disorganisation by frost.

The small pipe medium-pressure apparatus is found very useful for warming schools, on account of the small quantity of liquid used, enabling heat to be produced in less time than with larger pipes. These small pipes, moreover, can be used under skylights and in other positions where the larger pipes could not conveniently be placed.

The practice of arranging hot-water pipes in channels below the floor of the spaces to be warmed, with open gratings above them, is unnecessary, wasteful and dangerous, because of the difficulty of keeping the pipes and channels free from foul matter from boots and floors. Enclosing hot-water coils in ornamental casings is objectionable for the same reason.

The last word upon warming and ventilating crowded rooms has not yet been said; the present methods are not perfect. The air in streets is polluted in a manner which it is to be hoped will be regarded with amazement in the near future, when thick clouds of unconsumed fuel, foul exhalations from so-called sewer ventilators at the level of the roadway, and the fibrous filth from wood pavements are no longer allowed to adulterate the precious air, which ought to enter our houses unsullied by such dangerous and unpleasant companions. At present the windows and doors are often closed and the air refused admittance because it cannot enter alone.

Air in buildings will always require warming in winter, but it need not require washing and filtering as it does now.

The problems met with in endowed schools for girls are very similar to those in high schools, and are solved in much the same way.

Endowed school governors are too often not overburdened with funds, the endowments having been usually severely taxed to provide new buildings for the education of the boys before it was thought desirable to make similar provision for girls.

In conclusion, I venture to hope the movement for giving increasing facilities for secondary education to girls will continue, and that those of us who form part of the lesser half of the population will assist with all our energies in this desirable work, even if it should lead to provision being made for training and encouraging women to study architecture in the coming new home of this Association.

Mr. Banister F. Fletcher proposed a vote of thanks, and raised several questions, among others whether there was any type of window Mr. Osborne Smith preferred. The mullion type, from being more academic, appeared more suitable to this class of work. If double-hung windows were used they could not do better than adopt the detail of those of the London School Board. For steel casements the N.A.P. were to be preferred.

The motion was seconded by Mr. Seth-Smith, and was supported by Mr. E. Howley Sim, Mr. Langton Cole and others.

Mr. Osborne Smith, in reply, said mullion windows were costly, and that was an important consideration which often prevented their use.

It was announced that the next paper by Mr. L. A. Shuffrey on "House Painting" would be read at the meeting on December 17.

NOTES AND COMMENTS.

WHEN it was proposed to assign the Galerie des Machines in the Champ de Mars to the two rival societies of French artists for their exhibitions in 1898 and 1899, almost the first stipulation was to have two separate entrances, at each of which payment was to be made. That arrangement was adopted. As a result of communications between the two presidents, M. PUVIS DE CHAVANNES and M. EDOUARD DETAILLE, the arrangement has been set aside. While each Society can adopt its own regulations as if they were far apart instead of being under one immense roof of steel and glass, there will be a common entrance; and what will be more agreeable to economic amateurs, the payment of a franc will insure entrance to the two exhibitions. After so remarkable a consequence of the negotiations it is not easy to see why a further approach should not be attempted and the two societies become united.

THE preceding commissions on water supply for the Metropolis have proved that the subject is almost endless, and may be investigated for many months without discovering any novel source or new system of storage and distribution. The Commissioners who are now sitting have acted wisely by announcing on Monday that they will not reopen the questions on which a report was prepared by Lord BALFOUR's commission. In that report it was concluded that the water supplied to consumers in London was of a very high standard of excellence and purity, and was suitable in quality for all household purposes, and that by the construction of storage reservoirs and the carrying out of other works a daily supply of 420,000,000 gallons could be obtained from the existing sources of supply in the valleys of the Thames and Lea. This quantity, it was estimated, would be sufficient to supply thirty-five gallons per head to a population of 12,000,000 persons, or about three-quarters of a million in excess of what the total population of Greater London, together with the outlying parts of London, would have become in 1931 if the present ratio of increase were maintained. At Monday's sitting not much progress was made with the inquiry, and the case for purchase by the London County Council was not strengthened by the admission of Mr. CRIPPS, the Parliamentary agent, that arrangements had been made to transfer the powers over the water-supply of the parts of the metropolitan area in Surrey, Kent, Essex, to the respective county councils. There would also be transfers to Hertfordshire and Middlesex, West Ham and Croydon, if desired. There would, consequently, be no one controlling power, and the evil of the existing system would be revived under another form.

THE second publication of the British fire protection committee was to contain the opinions of some American experts on modern forms of building construction. But owing to the calls on the executive by work in connection with the City fire, the pamphlet will not be issued for a few days. In the meantime Mr. SACHS's paper on the Paris Charity Bazaar fire has been reprinted with a report of the discussion at the Architectural Association, and appears as a substitute. Several papers, essays and summaries are in preparation and will be issued at short intervals. The Stationery Office has placed a collection of Acts of Parliament, Blue Books and official publications relating to fire protection at the disposal of the committee.

THE progress of the new church in the parish of St. Andrew's, near Bradford, will be watched with interest, for the construction involves some delicate questions in ecclesiastical law. The plans were prepared by Messrs. T. & H. HEALEY, of Bradford. A site was given by Mr. G. E. TURNER, of Horton Grange, who also promised 2,000 guineas towards the endowment fund, while his mother offered to give 1,400l. to the same fund and 1,000l. to the building fund. It was proposed to lay the foundation-stone on the 1st inst., but the Bishop of RYON desired

to have the ceremony postponed, as his lordship had the offer of another site in the parish. Mr. TURNER, however, laid the foundation-stone, but apparently there were no clergymen to witness the proceedings.

THE French medallists are not so eager as architects to take part in competitions. The Government arranged to have a medal produced which is to commemorate the voyage of M. FAURE, the president, to St. Petersburg. In order to obtain a satisfactory design the Ministry of Fine Arts applied to the principal medallists in France to send in sketches. Very few artists have responded to the appeal. The models sent in are, it is understood, of a suitable character, but it is evident that the competition system is not equally acceptable to all artists in France, for in the present case there has been a marked failure.

LORD EXETER has appealed to all who are interested in the preservation of sacred and historic monuments for further aid towards the restoration of Peterborough Cathedral. The south-west and central gables of the west front, and the north transept and the eastern chapel, are an immediate cause of anxiety. To cover these repairs, 7,500l. is required. The skill shown by Mr. PEARSON and his assistants in taking down and restoring the old stone work is a security, says his lordship, to any who are alarmed lest the old features should be sacrificed, and is a guarantee that money sent to the Dean of PETERBOROUGH to forward the committee in their work will be spent upon that which Mr. PEARSON reports to be absolutely indispensable.

THE organisation of the Perth Architectural Association is now established. Mr. G. P. K. YOUNG is the first president, Mr. R. J. GILDARD is vice-president, and Mr. W. M. PAGE honorary secretary. The meetings are to be held in the lecture-room of the Natural Science Society on Wednesdays. The following papers will be read during the session:—"Dean of Guild Court Procedure," by Mr. JOHN ANDERSON; "Reasonable Supervision," by Mr. JOHN SMART; "The Graphical Solution of Problems in Architectural Dynamics," by Mr. JOHN Y. GRAY; "Gasworks Construction," by Mr. ANDREW WILSON; and "Some Account of the Arts in Southern Italy and Sicily," by Mr. F. W. BEDFORD, of Leeds. The committee have also arranged for visits to buildings in progress.

THE Americans are ahead of us in the utilisation of steel. Inspired, no doubt, by the report of the cage which surrounds the hut of the unlucky Captain DREYFUS, it was decided to immure the prisoners in the new penitentiary for Erie County in cells that form a series of cages. Along the outer walls is a corridor for gaolers 3 feet in width. The cells are enclosed on the side next the corridor by hexagonal steel bars of the strongest material, which are placed about 6 inches apart, arranged in such a way as to form a structure no part of which can be easily separated. The doors, ceilings, and side walls of the cells are formed of steel plates. The cells are therefore under the observation of the guards in the corridor, and it is not possible for the prisoners to communicate with their neighbours. The heating and ventilation is so arranged as to prevent communication by the pipes. The cells open on a balcony which is formed of steel bars, and extends throughout the different floors up to the roof. Consequently there cannot be any of the accidents which are common in English gaols, and which are caused by prisoners throwing themselves or their keepers over the barriers or hand-railing. In these balconies the prisoners can take exercise. The balconies lead to a watch-tower, from which the officers as well as the prisoners are to be observed. It is anticipated that in addition to the security which is offered by the gigantic cage, economy of space and of the expenses of administration will be secured. America has introduced many alterations in prison discipline, and the new cage will probably lead to other improvements.



FROM A PHOTOGRAPH BY ALEX. A. INGLIS, EDINBURGH.

McEWAN HALL.

DR. R. ROWAN.

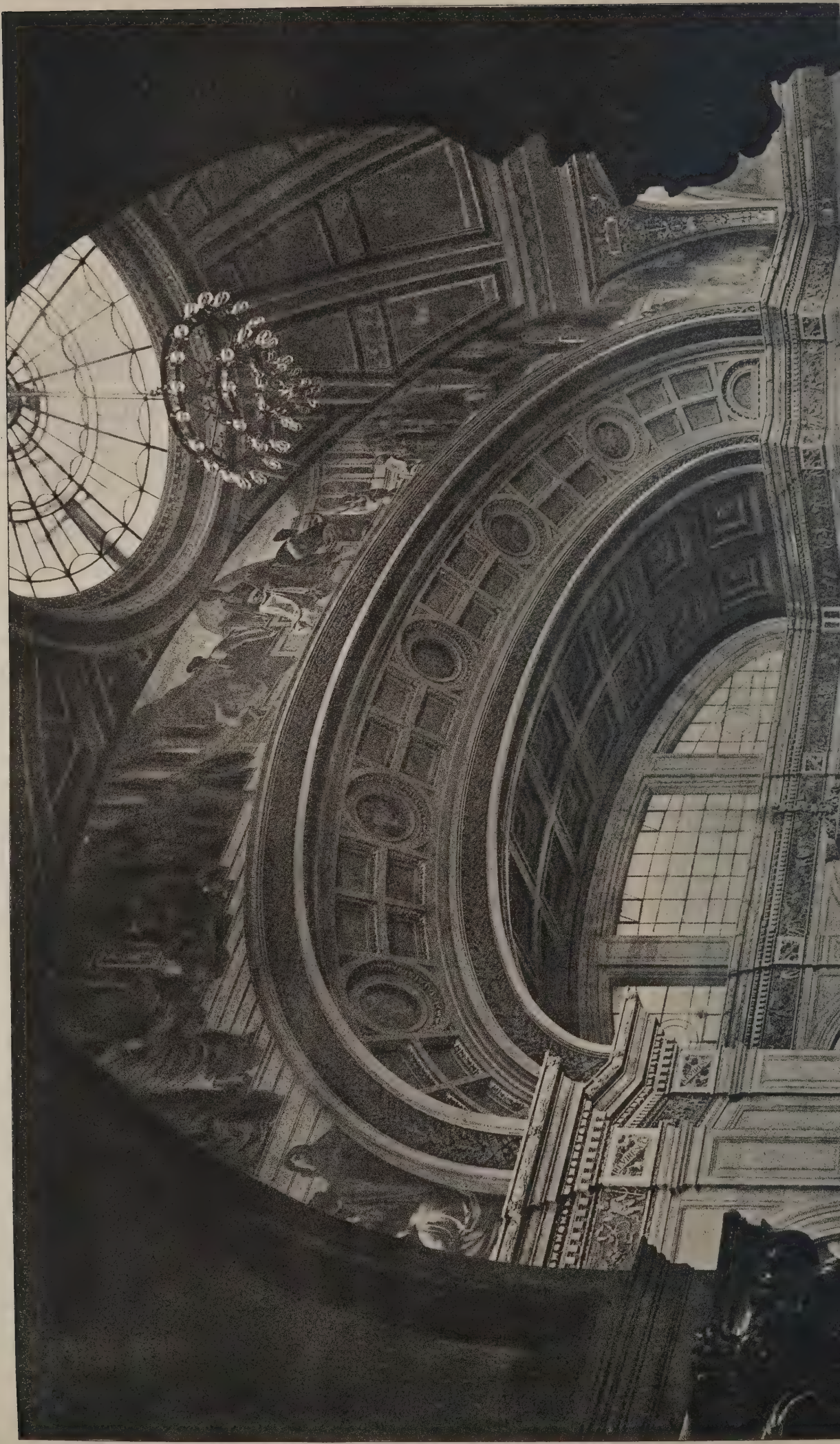
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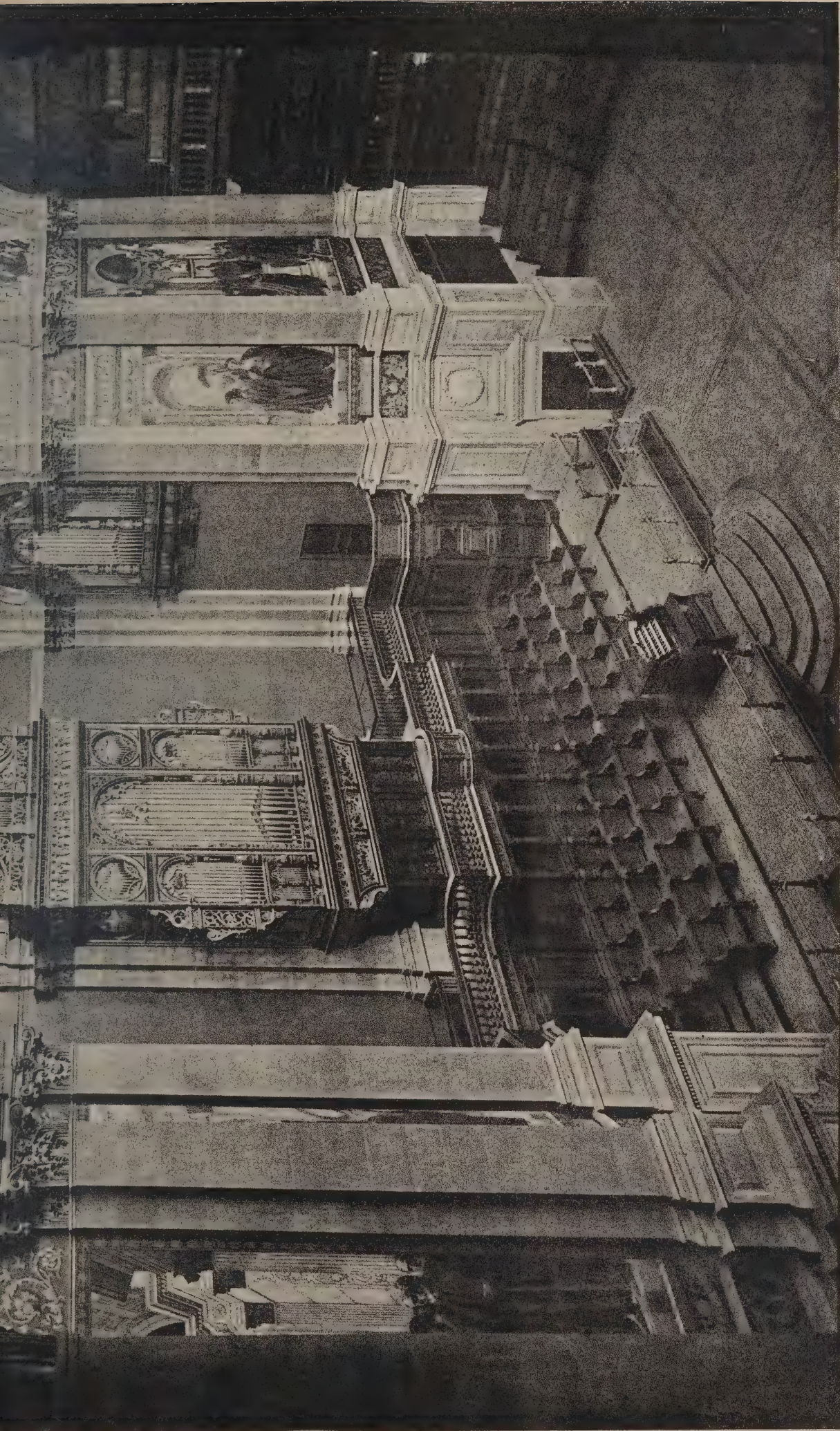


INK-PHOTO, SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

RGH UNIVERSITY.
SON, Architect

The Architect, Dec: 10th 1897





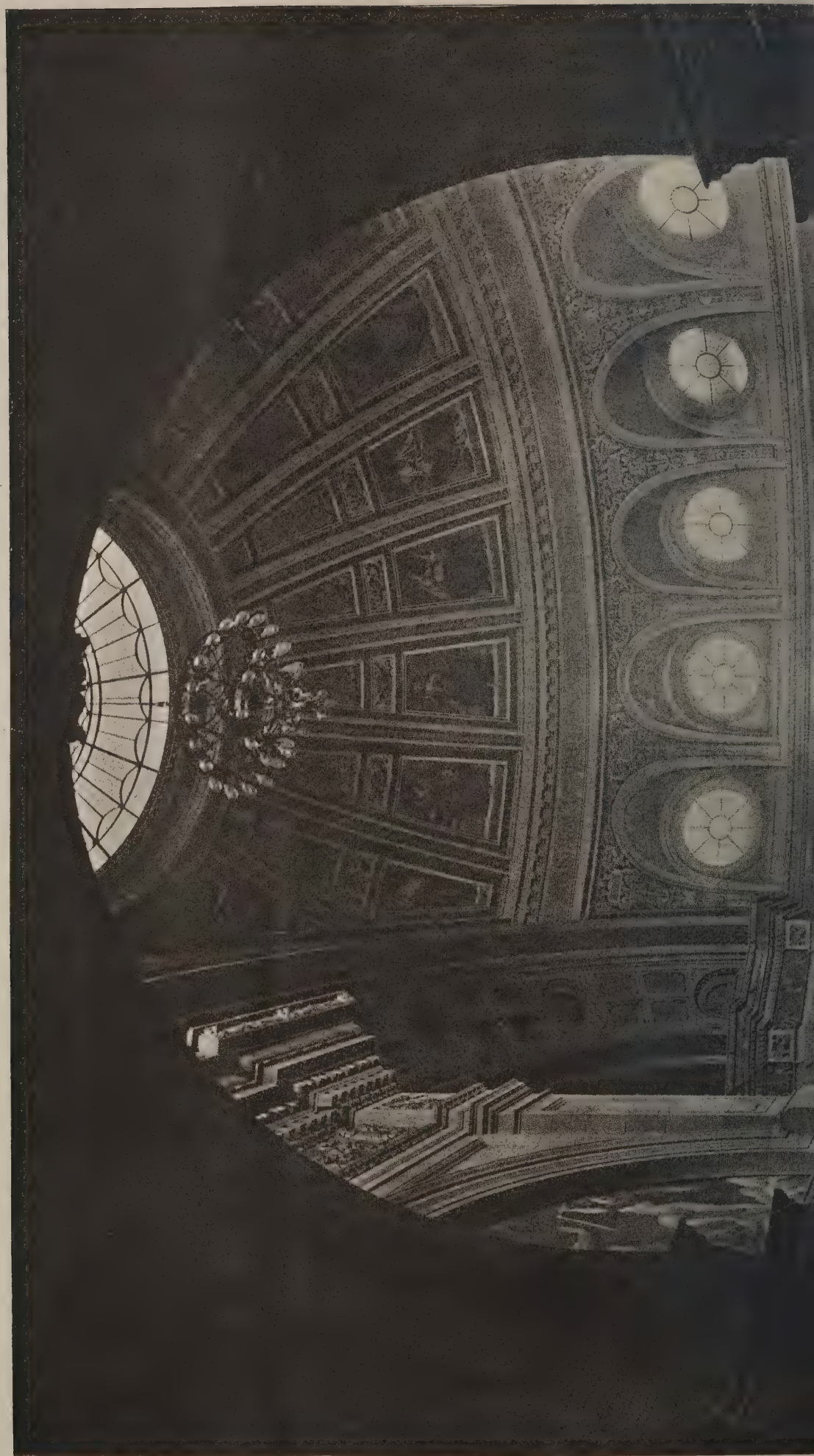
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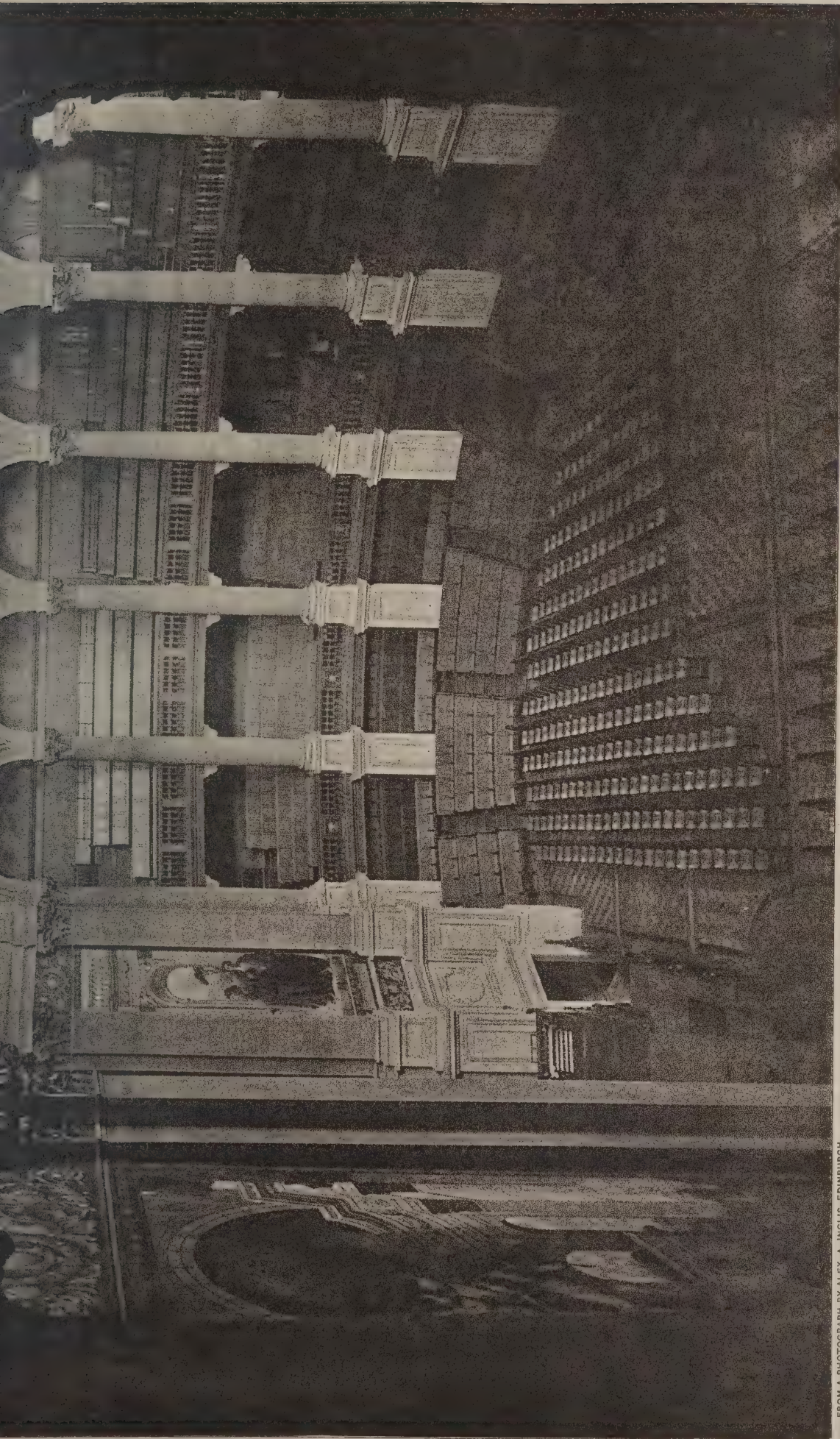
INTERIOR PHOTOGRAPH BY J. G. & S. EAST HARDING STREET, FETTER LANE, E.C.

MCEWAN HALL, EDINBURGH UNIVERSITY.

Dr. R. ROWAND ANDERSON, Architect.

Öhr Architect, Dec: 10th 1897.





FROM A PHOTOGRAPH BY ALEX. A. INGLIS, EDINBURGH.

INK- PHOTO, SPRAGUE & CO. 4 & 5, EAST HAYDON STREET, PETER LANE, E.C.

McEWAN HALL, EDINBURGH UNIVERSITY.

Dr. R. ROWAND ANDERSON, Architect.





PHOTOGRAPHED BY S. E. BOLAS & C^Y. H. LUDGATE HILL, E.C.



19X-PHOTO SPRAGUE & C. 245, 247 HANDING STREET FETTER LANE, E.C.

Y: CLOISTERS, LOOKING NORTH-EAST.

(CHAPTER-HOUSE.)

ILLUSTRATIONS.

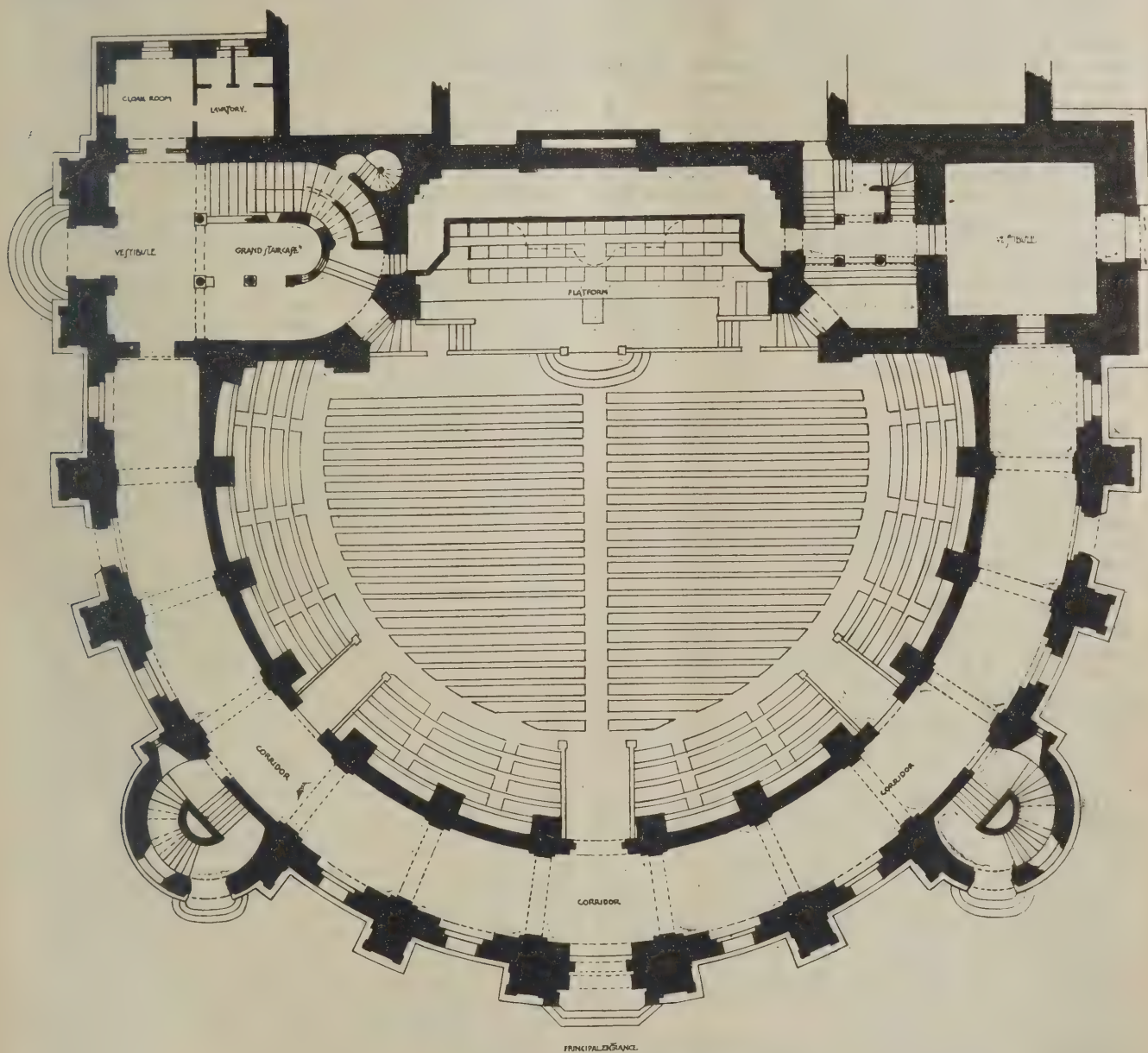
M'EWAN HALL, EDINBURGH UNIVERSITY.

THE plan of the Hall is based on the form of the ancient Greek theatre. This form was chosen as best suited for an auditorium, and one likely to insure good acoustic results. The architectural treatment is the same as the rest of the new University buildings, designed by Dr. ANDERSON, and of which we have published some illustrations, viz. Early Italian Renaissance. The flat side of the semicircle abuts on the Medical School on the west, while the principal elevation is directly opposite on the east.

Here is situated the principal entrance, 30 feet in height and 16 feet in width, flanked on each side by double pilasters and crowned by a semicircular pediment contain-

This section is divided from the upper by a band of Italian ornament, with panels at intervals containing the coats-of-arms of JAMES VI., the City of Edinburgh, the University of Edinburgh, the donor of the Hall, the late Sir ALEXANDER GRANT, a former principal of the University; the Right Hon. A. J. BALFOUR, chancellor; the late J. CHRISTISON, W.S.; Sir WILLIAM MUIR, principal, and Sir WILLIAM TURNER, trustees of the Hall. The upper of the three horizontal sections is arched in red stone, and is surmounted by an architrave, frieze and cornice and an open balustrade. The height of the outer wall from the base to the top of the balustrade is 64 feet.

An interior wall concentric with the outer encloses the Hall proper, and rising above the outer wall, to which it is joined by flying buttresses, supports at its summit the



ing a carved representation of the ceremony of conferring academic degrees. Besides this, there are other six entrances to the Hall from the outside. The external wall is divided vertically by projecting buttresses, containing niches for statuary. It is divided horizontally into three sections; the lower section is panelled and is pierced by the circular windows which light the interior corridor; the intermediate section is blank, with the exception of one panel which contains the inscription recording Mr. M'EWAN's gift to the University in these terms:—

Hanc Aulam Academicam
Gulielmus M'Ewan
Universitati Edinburgensi
Libens Animo Donavit
M.D.CCCXCIV.

dome-shaped steel roof, which is surmounted by an ornamental lantern 30 feet high. The total height from the street level to the top of the lantern is 130 feet.

The outer and inner walls of the Hall are 12 feet apart. The space between them is, on the ground floor, utilised as a corridor. This corridor is divided into compartments by pilasters, and is vaulted, the panels of walls and vaults being filled in with fine red brick. The flooring is of marble mosaic. The corridor runs round the entire auditorium, and gives communication between the various staircases, entrances and exits. The entrance to the principal staircase, which is placed in the south angle, is from the quadrangle of the University buildings. This staircase is oblong in form, and is carried on pillars and arches

which are vaulted. Its broad shallow steps are guarded by a balustrade of stone. The groined ceiling is decorated in colour, the main features being a series of coats-of-arms, including those of the rector, Lord BALFOUR OF BURLEIGH, and the late rector, the Right Hon. T. P. B. ROBERTSON, besides those of the already mentioned dignitaries of the University which find place on the outside wall. On the mosaic flooring of the landing are panels containing the arms of the donor, the city and the University.

From the first landing of this principal stair access is gained to the reception-rooms set apart for the assembling of the *Senatus Academicus*, distinguished guests, &c.

The staircases leading to the galleries are placed in the round projections at the south and north-east angles of the building. Two staircases are placed in each projection, one leading to the first gallery, the other to the second, so that the two currents of people going to and coming from these parts of the house are kept entirely separate from one another. This plan of double staircases gives much greater facility of entry and exit.

From the corridor on the ground floor entry to the Hall is gained by five separate doors.

The dimensions of the Hall are spacious, the internal diameter being 106 feet, while the height to the dome light is 90 feet. This gives an ample floor space and provides abundant room for the placing of two galleries.

The area floor is laid with blocks of oak in patterns, and in order to allow of its being used for other than formal academic functions the seats on it are of a movable character, only round the circumference are four tiers of fixed *fauteuils*, also in oak.

The wall is panelled in oak up to the height of the first gallery.

The galleries are placed over the corridors on the ground floor in the space between the outer and inner walls of the Hall, the inner wall being opened up to the interior of the Hall by means of an arcading of thirteen bays, each 15 feet in width, and rising from the floor to the top of the arch, a distance of 48 feet, upon columns of red Corsehill stone, supported as far as the balustrade of the first gallery by square-moulded freestone bases and surmounted by gilded Corinthian capitals.

The pews in the galleries are of oak, placed on a sloping platform, and the galleries are guarded by an open balustrade of the same material. These balustrades have central panels, those of the lower gallery being filled with appropriate designs carved and gilded. At the wall head is a carved stone frieze and cornice, above is a coved clerestory with circular windows 7 feet in diameter, while the whole Hall is covered in with a dome constructed of steel and panelled with wood.

In the centre of the dome is a circular light 22 feet in diameter, which with the clerestory windows lights the Hall in the daytime.

The flat side of the Hall, that abutting on the new University buildings, is reserved for the platform, and the arrangements of it are especially designed for University ceremonies, as the Hall is primarily for academic purposes. At the back of the platform is a series of stalls, constructed of solid oak, for the members of the *Senatus Academicus*, University Court, &c., with special seats in front for chancellor, rector and principal.

As, however, if restricted to its original purposes, the Hall would only be used two or three times a year, Mr. M'EWAN expressed a desire that its uses should be extended, and that it should, as much as possible, be made available for civic functions and for concerts of a high class. Following up this idea a magnificent organ, probably the finest in Scotland, has been placed in the hall. Considerable difficulty was experienced in arranging for the placing of the organ in the Hall, which was never intended for one.

The construction of the organ was committed to the Hope-Jones Electric Organ Company, and as the nature of their mechanism admits of the organ being broken up into sections, a position was ultimately contrived for it.

The organ gallery, carried on carved oak pillars, projects over the back row of stalls, and the great organ is placed immediately above. Two other sections of the organ are placed high up on each side of the platform recess. All these are enclosed in handsome carved oak cases, gilt and

coloured, corresponding to the rest of the woodwork of the Hall. A movable orchestra has been constructed capable of accommodating 300 people.

The framework is of light steel, the floor and seats being of wood. It is made so as to fit over the stalls on the platform, and can be taken to pieces easily and as easily put together again.

The Hall is lit by electricity. Before arriving at the present arrangements a long series of experiments was made by the architect and the electric engineers, Messrs. KING & Co., as to the best method of lighting the Hall. The result is considered by all who have seen it to be most satisfactory. A large pendant hangs from the dome. Above the cornice, but concealed, is a series of lights round the whole circumference of the Hall; these throw a light on the decorations of the dome. The galleries are lighted by placing lamps concealed behind the pillars and the lower beams of the gallery fronts. The result of this concealed disposition of lamps is that the hall is lighted without the eye being distracted by numerous small brilliant points of light from the lamps.

The complete design for the Hall included a great tower at the north-west angle rising to a height of 230 feet. The lower part of it only has as yet been executed; it has been carried up to the height of the roof of the Hall.

The great object of the architect in designing the Hall was not to give it the appearance of a hall designed to hold the maximum number of people in a given space, but to give it as much of a monumental character as possible, consistent with the requirements of a good auditorium.

The architect is Dr. ROWAND ANDERSON, H.R.S.A. Mr. E. L. CLARK was his clerk of works. The decoration is by Mr. W. M. PALIN.

The illustrations were reproduced from excellent photographs by Mr. A. A. INGLIS, of Rock House, Calton Hill, Edinburgh, who has published a series which represents all parts of the building.

CATHEDRAL SERIES.—CANTERBURY: CLOISTERS, LOOKING NORTH-EAST (SHOWING END OF CHAPTER-HOUSE).

CATALOGUING AT SOUTH KENSINGTON.

THE following evidence about the catalogues in use in the Art Library of the South Kensington Museum was given by Mr. W. H. James Weale, the late keeper, before the select committee on Museums of the Science and Art Department:—

Lord Balcarras: I should like to ask you with regard to your catalogues. It has been stated in the press frequently, and I wish to know from you as the responsible officer, whether it is the case that there are numbers of a single book in the library, apparently for no particular reason, the only explanation given being that the catalogue is so ineffective and incomplete that you really do not know what books you have got in the art library. I should like to hear your observations upon that point?—It has been my great difficulty in the library to find out what it contained. The reason for that is that apparently there had never been any rules drawn up for the cataloguing of books. One person catalogued a book in one way and another in another, and I found it extremely difficult to find out when a book was offered whether we had a copy of it in the library. It depended more on the memory of one or two attendants than on any other means of finding out. I will give you an example. Before I was keeper of the library I was one day working there, and a German gentleman came in and asked for the "*Repertorium für Kunstwissenschaft*," a review constantly in use in Germany. He was told by the attendant that it was not in the library. I overheard this, and I said, "Oh, yes it is, I had it yesterday," and I mentioned where it came from. The attendant got it, and then it was found to be catalogued in the library under the head of "Art.—*Repertorium*," and there the title was given; but of course no person would look for the "*Repertorium für Kunstwissenschaft*" under the vague title of "Art"; they would naturally look for it either under the word *Repertorium*, or under the name of the editor, or at least there ought to have been cross references from those two. Then, again, I was once asked by an assistant-keeper to purchase a volume upon German architecture, by Dr. Dohme.

Whom did you say you were asked by?—My then assistant-keeper, or one of them rather. I would rather not mention names because he is deceased. The book came in, and then it was at once seen that we must have it in the library; it is the first volume of "*Geschichte der Deutsche Kunst*." There are five volumes—one on architecture, by Dr. Dohme; one on

sculpture, by Dr. Bode; one on painting, by Janitschek; one on engraving, by Luetzow; and one on industrial art, by Dr. Falke. These five volumes were only entered under the heading of Bode.

Is that the name of Dr. Bode?—Yes. His volume on sculpture was put in the catalogue, and of the other volumes there was no mention and no cross references, and I found it necessary to undertake what has really been a very arduous task—the re-cataloguing of the whole library.

I do not think you have quite answered the point that I wished to bring out. You have told me that the catalogue is arranged upon no definite rules, with the result that the cross references and entries are misleading. I asked you whether the result of that had been that either in your prints and drawings department or in the art library proper you had bought more than one copy of a print or drawing or book. Do you understand what I ask?—Yes, perfectly. I have occasionally, I believe in seven or eight instances, myself bought books under the impression that they were not in the library, after a very diligent search in the catalogue, and on the shelves in the section of the library in which I thought the book would be found. I may say also that before my time (I have just put a few notes together as instances) I find a book bought and catalogued under the name of Bourguignon (Hubert François), and I find another copy bought a few months afterwards catalogued under the name of Gravelot, one copy being quite sufficient in the library. There are very many cases of this sort. [Sir John Donnelly has kindly pointed out that I was mistaken in saying that the second copy of Bourguignon, the work referred to, was bought a few months after the first, and that it was purchased in ignorance of the first copy being already in the library. I regret that I should have made this twofold mistake. I should have said that the first copy, a very fine one, with proof engravings, was bought for 2*l.* 10*s.* of Mr. Quaritch, and the second, an ordinary copy, for 7*l.* 7*s.* It must not, however, be supposed for a moment that this was a solitary instance, and I wish now, speaking deliberately, to repeat and to emphasise my assertion that duplicates have been constantly purchased owing to wrong cataloguing, owing also to delay in cataloguing, and thirdly, owing to defective or incomplete cataloguing.]

Sir Francis Powell: Are you speaking of what took place before you entered?—I have mentioned that I have myself bought seven or eight books which I could not ascertain were in the library, the catalogue being defective. These books had been purchased before my time (these that I am speaking of now), and they are entered in the catalogue in different ways. For instance, there is one that is entered under "Scotland.—The British Antidote," and another copy of the same book under "Bute, John Stuart, Earl of," the fact being, as I have found out, that the second-hand bookseller's catalogue from which they were bought had them entered in that way; our catalogue slips, instead of being properly drawn up, were simply copied from the second-hand bookseller's catalogue. There are very many cases of this sort. Then, as regards prints, there is no proper catalogue of prints. I have found quite recently, within the last few days, a print of which we have five copies varying in price; the best copy was bought for 3*s.* and the worst copy for 1*l.* 5*s.*, bought long after the 3*s.* copy.

Chairman: When were they bought?—All before my time.

Sir Henry Howorth: You attribute this to the want of a proper inventoried catalogue?—Certainly.

Lord Balcarras: I understand that in most libraries there are rules, are there not, for cataloguing?—Yes.

The Bodleian and the British Museum, for instance?—Yes, very strict rules.

Why do you not have rules?—It was the first thing I did. I came into office on August 20, 1890. To my astonishment, I found there were no rules whatever. I then set to work, taking the British Museum rules for my model, and slightly altering them to suit the particular nature of the art library. I mean in this way: the British Museum officers catalogue an illustrated book under the author's name; they add "plates," but they give no more information. Now, supposing the illustrations in a book should be by an artist such as Vergil Solis, or any other great artist, I should put "so many illustrations by Vergil Solis," and "so many by Joost Amman," and then cross references from the illustrator, which makes those illustrations immediately available to the student.

However, you have got your own library rules now?—Yes.

I want to know whether you can substantiate your statement that there are very many cases of this. Are there any other cases?—An immense number.

Will you please specify a few?—I can specify several. "Ioannes Bochius. Descriptio publicæ gratulationis . . . in adventu Ernesti Archiducis Austriae, 1595." First copy bought November 30, 1863, 14*s.*; second copy bought March 17, 1868, 16*s.* 6*d.*; and third copy bought March 28, 1868, 1*l.* 18*s.*, eleven pence for the second copy, and more than double the price paid for it. Now the strange thing is—I do not wish to men-

tion names—that almost all these duplicates have been bought of one bookseller—the same bookseller.

Give me another case.—Charles Empson. "Observations and Correspondence relative to various Ornaments of Gold, &c.," 1838. I have just asked Sir Edward Maunde Thompson what he considered the value of it, and he said 3*s.* 6*d.* The first copy was bought on April 20, 1874, and was bought for 7*s.* 6*d.*; the second copy was bought on July 9, 1880, and was bought for 2*l.* 5*s.*, the book being an utterly useless book for circulation certainly. It refers to a few Mexican gold antiquities, as, I dare say, some of the committee may know; perhaps a book that is properly in the library, but certainly not a book for circulation. William Trollope, "A History of Christ's Hospital," 1834; first copy bought February 21, 1857, 7*s.* 6*d.*; second copy bought July 13, 1870, 5*s.*; third copy bought January 1, 1880, 3*l.* 12*s.* I think that that copy may have been bought for its binding, but I have not been able to lay my hands on it. Albert Dumont, "Inscriptions Céramiques de Grèce," 1872—a book really for reference for a museum officer cataloguing pottery; first copy bought September 23, 1871, for 13*s.* 6*d.*; second copy bought on May 6, 1872, for 13*s.* "Alciatus, Andreas—atum libellus Emblem," 1544; first copy bought of that edition May 31, 1870, for 12*s.* 6*d.*; the second copy, not such a good one, bought on August 3, 1882, for 2*l.* 2*s.*, the library containing one or more copies of nineteen other editions of that work, many practically with the same cuts. Then "Chesneau, Orpheus Eucharisticus," 1657; one copy bought on February 2, 1876, for 2*l.* 15*s.*; the second copy bought on June 2, 1884, 1*l.* 1*s.* "Valeriano Bolzani, Hieroglyphica, Lugduni," 1626; first copy bought December 11, 1869, for 10*s.*; the second copy bought on February 12, 1870, for 6*s.* 6*d.* I may mention also that there was another copy bound up with other books. These books were found by me when Sir John Donnelly sent down about the Bourguignon books, and I am always turning up these things every day, and these instances were merely got together off two shelves. I think, if a week was given to me, I could produce perhaps 200 or 300 instances of a similar character.

As I understand, you have a very large collection of photographs at South Kensington Museum?—I cannot say how many, but I should think there are 100,000, including duplicates.

Approximately 100,000?—I think so; that is what I am told.

When you say duplicates, is that duplicates that are in the circulation department, or duplicates which have been bought in the way some of these prints or books have been bought?—I think it includes those in circulation.

Have you got an adequate catalogue of this collection?—No proper catalogue of photographs; there is a sort of a rough catalogue made by an attendant, there is also a printed catalogue of photographs up to some years before my nomination. There is no general catalogue of the photographs; there is a printed catalogue up to a certain date, some years before my nomination; I think it was drawn up by Mr. Derby, but I am not sure.

Does it extend to the year 1880, this printed catalogue?—I do not think it comes down as late as that, but it is a very insufficient catalogue such as it is.

What we should like to know would be the relative size of this catalogue to the entire collection. You imagine that there are about 100,000 photographs in the collection, do you think this printed catalogue contains as many as 10,000?—Yes, I dare say it contains 20,000 perhaps, or more; but I cannot say, as I have not examined it. I consulted it before I came into the library, but I have never used it since.

Why, is it a bad catalogue?—A very bad catalogue.

And at the present time it is entirely out of date?—Yes, quite.

Your modern collection being possibly ten, and certainly five, times larger than it was when that catalogue was made?—That is so.

Are arrangements being made to catalogue those that you have now, to make a fresh, proper and complete catalogue?—I drew out a scheme for cataloguing the photographs of paintings; you see photographs of paintings require to be catalogued in different ways. Our library was founded for the use of students and craftsmen. Take a photograph of a picture; the photograph has to be catalogued under the name of the painter; secondly, if there is anything in it useful to a craftsman there ought to be an index to that; there may be a very valuable bit of goldsmiths' work represented in the picture, in which case there ought to be a reference to that; there may be an important bit of textile or lace. Not many years ago, when I catalogued some Flemish and Dutch lace, I did it only from pictures, dating the lace from the time when that pattern first appeared in a Flemish or Dutch picture. These photographs of paintings are extremely valuable in that way. When I came to the library all the photographs of pictures in the National Gallery were together, all those of the pictures in the Dresden Gallery were together, and all those of the pictures in the Louvre were together. That is of no use to the student. First

of all, for a student of painting you want to bring all the works of one school together, and all the works of each master of that school together, and these should be arranged chronologically, and then there should be a proper catalogue and proper indexes. These are entirely wanting in our library. It is very well if you wish to amuse yourself to look through a scrap-book, but you learn nothing by that; a student does not; he must have things arranged chronologically to show the sequence and the development of art.

Is it a just generalisation to say that with regard to prints you have got an enormous number of duplicate copies?—An enormous number, and as you will see in some cases of triplicates and quadruplicates, and I may say more, that of some we have as many as twenty or thirty copies.

Then is it a just generalisation to say that in a large number of cases these prints are not the originals, but are merely copies or adaptations of the originals?—That is quite so, and I may add that many of them are very worthless impressions that ought not to be in the Museum in my opinion nor in the opinion of many experts who have seen them; they ought never to have been bought.

There is one thing I wish to ask you about which you mentioned just now; you said there may be more duplicates, there may be more copies out on circulation. Have you not got a list of the things that are on circulation?—Yes, we have a list of the registered numbers, but I cannot tell you if the description against the registered number is correct, because in many instances the descriptions are wrong. I will not vouch for them at all. I may mention we have some things down in the register of entries kept by Mr. Reid; we have some prints down as being from the lighthouse of Aix-la-Chapelle. I was very curious to see what this lighthouse of Aix-la-Chapelle could be, because Aachen being an inland town in Germany, how could there be a lighthouse there? But when I had them got out to see what they were I found they were these niello plates from underneath the corona lucis that hangs in the dome of the Carolingian Chapel, but that is called in French *phare*, and I suppose by turning to the dictionary he found that *phare* was a lighthouse.

That is the great branch of candles in the church?—Yes.

This is simply a case of ignorance?—It is a case of having a person to register things who is not sufficiently educated.

You have given us an unlimited number of duplicates, triplicates and so forth with regard to prints, and the other day you mentioned some analogous cases with regard to books, are there any other additions you would like to make?—I think I mentioned that I had purchased myself books not in the catalogue. On April 3, 1893, I purchased a book called "Old Church Architecture of Scotland," 1861, quarto; I purchased it, as I said, after a search by my attendant in the catalogue, and it was stated not to be in the library. I may add that these are extracts from the daybook kept by the attendant in charge of the book in which the books that were purchased from the catalogues were entered each day, and these remarks which I am going to make are in the margin. This work was in the library, but wrongly catalogued. On referring to the catalogue I found that book was catalogued under "Architecture: Scottish Church."

And did you buy a duplicate?—I bought the duplicate under that impression, but having discovered that it was in the library I got the bookseller to take it back. It was purchased under approval; that is to say, supposing the book was incomplete I had the right to send it back, but if not incomplete, I had not the right legally to send it back, but the bookseller, as we are very good customers, took it back. It ought to have been entered under "Scotland" with a cross reference from the author's name, Muir, who is perfectly well known as being the author, but whose name does not appear in the book. He is known to be the author, because he has published other books with his name and calling himself the author of that book.

Are there any other cases?—On June 26, 1893, we bought a book by Claude Du Molinet. "Figures des différents Habits des Chanoines réguliers," 1666. That was in the library wrongly catalogued; it was catalogued in "The Universal Catalogue of Books on Art," which I may say is the work which has generally misled our cataloguers. It was catalogued there under "Molinet (Claude Du)," but instead of being called "Figures des différents Habits des Chanoines réguliers," it was catalogued as "Discours sur les Habits des Chanoines séculiers et réguliers," a different title, you see, the real title being "Du Molinet. Figures des différents Habits des Chanoines."

I do not think we need the full particulars; I merely wish to know if you are able to bear out the statement that you yourself had bought books several times (six times, I think) not knowing that they were already in the library?—That is so. The third instance is on July 10, 1893, a work called "Album des Boiseries sculptées du Chœur de Notre-Dame de Paris." This is printed in the "Universal," under its title, "Album des Boiseries;" but there is no press-mark against it and no "S. K."

against it in the reading-room catalogue, and no cross reference to the author's name under which it is catalogued.

You have since found another copy?—I have since found that it was in the library; and again in that case I got the bookseller to take it back. There are two more on July 13, which, although I have been hunting up, I have not been able to supply the information about. On July 13 there was a book called "Overbeck: Die Bildwerke zum Heldenkreis," ordered by the assistant librarian at that time, which is wrongly catalogued. When I say wrongly catalogued, as you probably are aware, many German books have two titles—a main title to the whole series on the left-hand side, and on the right-hand side another title; and these books, of which the different volumes are sold separately, ought to be catalogued not only under the title on the sinister side, but also under the title on the dexter side. I do not know if you quite follow what I mean.

The broad fact that I wished to understand was that, owing to deficiencies in the catalogue, duplicate books have been sent to the library?—That is an instance.

But you have been able in certain cases to persuade the bookseller to take them back without charging you?—That is so. Then on January 19, 1894, "Bordeaux et Bosquet. Normandie Illustrée." That is an expensive book that was bought, being in the library wrongly catalogued, and the bookseller rather declined to take that back, and so I kept it and sent it into circulation.

He would not let you send it back?—No, I do not think we could fairly ask him to take it back; I cannot recollect who the bookseller was now, but I could not fairly ask him to take it back. It was a heavy book and had been got from abroad, and as it was really a book that might be made use of for circulation I kept it, but I should not have bought it for circulation except under those circumstances. On March 5, 1894, "La Croix. Hypogée—Martyrium de Poitiers." That was also wrongly catalogued, but I got the bookseller to take that back. On June 8, "Kunstgewerbe-Museum zu Leipzig, Vereinsmitteilungen," 1886 to 1889, 30 parts. That was found to be wrongly catalogued, and that also I got taken back. There are some other books which I was not able to get taken back, and which have been kept in the library.

Mr. Bartley: I suppose you are aware that there was a regular scheme made many years ago for the catalogue?—Well, I asked repeatedly when I came there first whether there were any rules for cataloguing, and I was told no.

And although you have been appointed since the year 1890, you have not thought it your business to find out what has been done on the subject of cataloguing in the department to which you were appointed?—I have not gone into the history of it. I have not had time to do that; I have had quite enough to do with the current work and to do it well and properly. About the universal art catalogue, I may say that the reading-room catalogue, which has been called a document or a register, but which is nothing of the sort, because it is a catalogue of books in the library and books not in the library, is not a catalogue of books in the library, but of books in and not in the library.

Mr. Ernest Gray: It is a catalogue of standard works of art?—Of standard and not standard works of art.

Mr. Bartley: Is not that an advantage?—No.

You think it is not an advantage to know that such a book exists on the subject he is studying?—He should consult the universal art catalogue for that.

And you think it is no advantage?—No advantage in a reading-room catalogue; he should consult the universal art catalogue for that. When a reader comes to the library he finds, for instance, a book by "H. C. Reneuë" and when he reads it through he sees it is an edition (revised), the French for the word revised being put down as the author of the book. Or if he gets a Dutch book and there is put down as Deel (J. Tooneel) as the author of the book "The Theatre of the Remarkable Painters of Europe" (Tooneel der uitmuntende Schilders), Dutch for volume i. is made the author of the book. There are numbers of cases like that.

Sir Henry Howorth: Are there any others that you could give?—Yes, I could mention a great many others: Fasti (Mariani), where "Fasti" is made the family name and "Mariani" the Christian name, being the Marian annals; the Latin word "Fasti" is made the surname and "Mariani" is made the Christian name. Then we have Antonio Ferrari of Galata, in the kingdom of Naples, catalogued as Galateus (Antonius); Gerlach (Theobald) of Billican is catalogued as Billicanus (Theobaldus); such a well-known person as Hadrianus Iunius is catalogued as Hadrianus for the surname, and Iunius for the Christian name; Olaus Magnus, again, is catalogued under Olaus instead of under Magnus, Olaus being his Christian name. Magnus is a well-known Scandinavian family.

Chairman:—Would you say what catalogue you are referring to?—The Deel is taken from the universal and transferred into the reading-room catalogue; "Reneuë" also; Mariani Fasti is the South Kensington catalogue. Antonio Ferrari is the South Kensington catalogue of comparatively

recent date; I cannot say who it was catalogued by, without looking up the inventory slip, but it is printed in the supplement of books in the South Kensington Library. Gerlach (Theobald) is again in the supplement to the South Kensington Library. Hadrianus Iunius is originally in the universal, but has the word Cicognara crossed through at the end on the reading-room catalogue, and S.K. put against it. When the book came into the library the cataloguer ought to have seen the title and corrected it, and not kept up the mistake. Olaus Magnus is a South Kensington mistake. Then there is Jean Poldo de Albenas under Albenas, instead of Poldo D'Albenas, which is his family name. That is a South Kensington mistake, and not the universal. Here is another instance, Leovallac, which is the name in Latin of the village where the man was born, instead of Steier, which is the man's name. Such a well-known person as Caius Valerius Flaccus, instead of being catalogued under Valerius Flaccus is catalogued under Flaccus.

EDINBURGH ARCHITECTURAL SOCIETY.

A MEETING of this Society was held on the 1st inst., Mr. J. A. Williamson, president, in the chair. Professor Baldwin Brown delivered a lecture, entitled "Notes on some Edinburgh Buildings and Monuments." He began by explaining that his intention was to touch upon Edinburgh buildings, not from the historical point of view, but only as illustrating matters of general interest to those embracing the profession of architecture. The foremost question of the hour on the artistic side of architecture was that of the meaning and value of architectural styles in modern practice. Many of the younger members of the profession were repudiating the idea of being bound down in their work by the traditions of the past, and were claiming for the designer freedom to work out the solution of modern problems in a modern spirit. The past history of the art, however, showed that the "styles" had not fettered freedom, and that some of the best architects, as for example Wren and Playfair, cared comparatively little what forms they used so long as they obtained those effects of grouping at which they aimed. The truth was that architectural effect depended not so much on the forms themselves, but on the designer's sense of proportion in their combination. There was a distinct advantage in the use of well-understood established forms, because the eye was able to judge better of their relations without the attention being drawn off to the forms themselves. The present age had really its own architectural style, and a very good one, brought down from the Tuscan Renaissance and established here by Adam and Playfair. The fact that we had this tradition of style was, however, obscured by the numerous revivals of which the nineteenth century had been the scene. The lecturer discussed some of these revivals, "Gothic," "Classic," and "Scottish Baronial," in their effect on Edinburgh architecture, and urged architects, if they wished to found a new style, to take the new materials which they used now, iron and steel, and to try and evolve from these materials suitable forms for their treatment.

LISKEARD CHURCH TOWER.

THE Bishop of Truro has addressed the following letter to the Vicar of Liskeard concerning the restoration of the church tower:—

Trenyhton, Par Station: November 27, 1897.

My dear Mr. Norris,—Let me put my counsel in writing. You and Liskeard consider that you have received a decision of the Chancellor's Court which is unfair to you. The law has anticipated your discontent and provided you with a remedy—the higher Court of Appeal.

This has been my constant advice to you. It is supported further by the Chancellor himself, by both the Archdeacon of the Diocese and by the Archbishop of Canterbury. I appeal to you and your wardens, as men of authority in the church and responsible positions in the town—physician, member of the Corporation and schoolmaster—to uphold the public discipline, and lead the people in law-abiding character.

In order to make this easier for you and to prevent any possible risk of life, I said I thought you were justified in removing some of the top stones of the tower to relieve the lower parts of a weight that might be unsafe, and in speaking of this some words escaped from my lips that have to be understood in the sense of my last words—not that I considered you justified in removing the two upper storeys of your tower, but the least amount of its masonry that would temporarily guard the public safety, pending the decision of the higher Court. To do more than this would, I added, bring you within contempt of court by acting before its decree.

I beg you will kindly show this note to your wardens. I shall be glad to subscribe 5*l.* 5*s.* towards the expenses of appeal.—Yours sincerely,

JOHN TRURON.

The Vicar, in a letter to the *Cornish Times*, says:—"I regret my inability to follow the advice of my Diocesan in this particular letter. I am opposed to the spending of any more good money in such useless litigation. We have followed the advice of our Bishop and of our archdeacon in consenting to the terms of Mr. Chancellor Paul, with the result too painfully known to all of us. At the same time I am personally grateful to the Bishop for the permission to take down whatever may be considered dangerous to the church or the lives of the people, of which there is, to my mind, fresh evidence since the fearful storms of Sunday. I am also thankful to our Town Council for having taken up the case, and for their clerk's letter.

"We are advised to again approach Mr. Chancellor Paul to grant permission to take down a portion of the tower, *i.e.* to grant what the Bishop has already granted. To this I strongly object, reasons for which I have given to our churchwardens. I may be in the wrong, but I do not think so; and all with whom I have consulted in and out of the parish do not regard me as being in error. At present I am only concerned in the taking down of the dangerous portion of the tower, so that any and all fear on the part of our people may be removed, and in order that our ministerial work be not damaged. I confess that this last fear weighs heavily with me. Certainly, the spiritual Church ought to be the first and chief consideration.

"I pointed out to Dr. Gott, after our confirmation service, that the dead weight pushing against the first of the north arches of the nave should be immediately taken down, *i.e.* the north and east corner of the tower, or nearly the two upper storeys. I have also intimated my willingness to collect sufficient money to do this work, and if need be to undertake this work—of course, under the sanction of the Bishop.

"It is certain this stagnation cannot continue much longer without the most baneful results following. That we have been unfairly dealt with in this our united undertaking—no open opposition, no opponents in Court against us, no evidence against the evidence of Mr. Sedding, Mr. Lang, Mr. Hancock and Mr. R. A. Courtney, or to the very able and conciliatory address of Mr. Childs—goes without saying. I hope your readers will at once give us their views on this vexed question."

"OLD MORTALITY."

ON Saturday afternoon, under the auspices of the Hawick Archaeological Society, a tablet as a memorial of the religious itinerant was unveiled at Haggiesha', near Hawick. It was in a house, still to the fore, at Haggiesha' that Robert Paterson, the prototype of Sir Walter Scott's "Old Mortality," was born, in 1712, and the Archaeological Society have inserted a tablet in the wall to commemorate this fact, the unveiling ceremony being performed on Saturday afternoon by Mrs. Craig. The Rev. W. A. P. Johnman, president of the Archaeological Society, who presided, in opening the proceedings, said they were that day making an advance in the concrete commemoration of the local memorabilia. About a month ago a programme of these was laid before their Society. "Old Mortality's" birthplace claimed early attention, and the money was voted to accomplish its identification, and they were there now for the purpose of celebrating the completion of this work, of visibly stamping this cottage as the birthplace of "Old Mortality," and of informing all inland and beyond the seas that on this spot got origin that good, quaint and purpose-possessed man who a century ago, in large blue bonnet and hoddin-grey suit, assisted by his four-footed friendly colleague, his bony, wizened, greyhaired Sheltie, made the round of all the borderland and beyond for the purpose of keeping alive the memories of the men who lived and suffered and died for God and religion and native land. The work of "Old Mortality" was very much their work in this region to-day; his was limited and specifically directed toward Covenanting memories; theirs was of a broader and more comprehensive character, viz. perpetuating person and incident of historical importance and of all kinds in bygone days. This was a valuable work, not merely as an embellished page of permanent literature which all there might peruse, but as a kind of extra-mural museum, worthy of a visit from all that were beyond. Many probably imagined that Sir Walter Scott created "Old Mortality"—that he was, to take an illustration from about the same period, a simple analogue of Burns's "Tam o' Shanter." Burns, to all intents and purposes, created "Tam o' Shanter"; Scott, in "Old Mortality," had to handle a personality who would have lived though the novel under that name had never been written. How Robert Paterson, of Haggiesha', got his nickname, which had become his historical appellation, might easily be apprehended, though who first mouthed it might be for ever lost. Like many other designations begun opprobriously, "Old Mortality" was entirely apopros. Were the material forthcoming, in his judgment, no worthier memoir could be published than of this self-denying man, or of one more fit to take an honourable

place among "The Scots Worthies" of these days. Sir Walter met him only once, and far away from his familiar haunts. To that interview, he presumed, they were indebted for the novel of that name. It lay not within his present purpose to criticise that great and thrilling story; but these two facts might be averred—first, the late Poet Laureate regarded it as Scott's "chef-d'œuvre," and that not without valid reasons; and, further, whatever estimate might be put on it as a work of art, unprejudiced opinion must admit that the life and sufferings and services of the men to whom they were to a large extent indebted for their civil and religious liberties to-day were narrated with the pen and prejudice of a caricaturist. By that novel the Great Wizard had set "Old Mortality" upon a platform so elevated and world-commanding that he must be declared to be blind who could not see him and know him. If Sir Walter did not construct a fictitious personality out of a historical and hidden-away character, he practically discovered him to the world, and by uniting the person of "Old Mortality" with his celebrated work of that name secured for him an eternity of fame.

Mr. John W. Kennedy then gave some interesting notes on Haggiesha' and "Old Mortality." In his "History of Hawick" Robert Wilson stated that the place got its name from Michael Paterson, its occupier, providing a monster haggis at the two church festivals of Whitsunday and Martinmas, for the entertainment of the priests who ministered at the altar of Hawick Church. Burnflat, however, was the name that was invariably used in the title-deeds. They might be interested to know that "Old Mortality's" spectacles were in the Hawick Museum, and that a local sculptor had two of his chisels, now also handed over to the museum. In inserting this tablet they linked the district to one of Sir Walter's most famous novels, which owed its creation to the author meeting Robert Paterson in Dunottar Churchyard. Mrs. Craig then unveiled the stone in the front wall of the cottage. It bears the following inscription:—"Robert Paterson, the prototype of Sir Walter Scott's 'Old Mortality,' was born here in 1712. This stone erected by the Hawick Archaeological Society, 1897;" Miss Agnes Wilson unveiling another tablet in the rear wall of the cottage bearing the inscription:—"The birthplace of 'Old Mortality.'" Mr. R. Murray gave a description of "Old Mortality's" cottage, and moved a vote of thanks to Mr. Scott, Pilmuir, the proprietor of the cottage, for allowing the tablets to be inserted.

ST. NICHOLAS'S CHAPEL, LITTLE COGGESHALL.

ON Monday St. Nicholas's Chapel, Little Coggeshall, was reopened and dedicated after restoration. The chapel was built by the monks of the Cistercian Order, about 700 years ago. It is of a simple quadrilateral design, without aisles or transept, and measures from east to west 43 feet and from north to south 20 feet. It is constructed of rubble consisting principally of flints and fragments of early English brick, and it is one of the earliest instances, if not the earliest, of moulded brickwork in the kingdom. Many years ago this sacred building was converted into a barn, part of the south wall being removed and a wing attached. This unsightly addition was demolished shortly after the conveyance of the building was made in 1860 (for 100*l.*) to the vicar of Coggeshall, the late Rev. William James Dampier and his successors in the vicarage. A partial restoration was then effected, and eight or nine years ago about 200*l.* was raised by Mr. G. F. Beaumont and expended in preserving this interesting relic of past ages. After that, the English Abbey Restoration Fund having in January, 1896, promised 550*l.* for a complete restoration of the building upon condition that a similar sum was raised by subscriptions, the Rev. C. C. Mills, vicar of Coggeshall, appealed for help. By the following January Mr. Mills was able to announce promises for the amount required, with 4*s.* 8*d.* to spare. The work was therefore put in hand. The plans were prepared by Messrs. Bodley & Garner, ecclesiastical architects, and the restoration was carried out by Messrs. Rattee & Kett, of Cambridge. The style of the ancient architecture has been affected as little as possible. The old reed thatch has been taken off and where it was necessary to supplant the old timbers of the roof by new, the new ones have been made to correspond. The western portion of the roof has been raised to a level with the eastern half, and the whole is covered with old plain tiles. In the same manner the restoration has taken place within and without. The east window (the old moulded brick mullions of which still remain, as they do also in the west window) is of stained-glass. The central light contains a representation of the Crucifixion. The other windows are of cathedral glass with a framework of oak. The chapel is very nicely furnished, the oak altar having a rich frontal, tapestry panels and canopy with side curtains. The altar ornaments were presented by Mr. Sheldrake, of the Hamlet, and other recent gifts are from Miss Anson (harmonium), the Misses Farnell, Miss Surridge, the

vicar, &c. The vicar will kindly lend for present use his private set of altar vessels and a lectern from the oratory at the vicarage. The font, stained windows, reredos and frescoes for the walls will remain to be given in the future. The chapel will accommodate about 150 persons. The nave is seated with chairs.

CHRIST CHURCH, BIRMINGHAM.

THE sale of Christ Church, Birmingham, and the churchyard was lately completed, but as it is said that a higher price could be obtained, the following statement has been issued by Messrs. Milward & Co.:—

Some months ago Mr. Edge made an offer of 10,000*l.* in cash and 1,500*l.* per annum in perpetual rent-charges to be issuing out of the site, and secured thereon, for the purchase of the church. He valued the rent-charges at thirty years' purchase, making his offer 55,000*l.*, according to his own view. On November 16 last Messrs. Bloxham & Co. made an offer of 62,000*l.* for the site. On November 17 last Messrs. Milward & Co. wrote to Mr. Edge informing him that 62,000*l.* had been offered, and asking him whether he was prepared to make a higher offer. Mr. Edge called upon Messrs. Milward & Co. in reply to this letter, and said that he was not then prepared to say whether he would make a higher offer or not, but that he desired an opportunity of doing so. He was told that a meeting of the trustees would be held at 2.30 P.M. on December 1, and that he must send in his offer before that time if he wished to make one, as the trustees would certainly sell at that meeting. He said that he would wish to come at the time of meeting, and bring his offer if he should have one to make. He was told to come at 2.45 on December 1, and he came. He was then asked to make his offer, but he declined to do so, stating that he was prepared to make a substantial increase upon the offer of 62,000*l.*, provided the trustees would say they were prepared to sell to him, and he would make no offer except upon this condition. The trustees could not be advised to submit to these terms, and therefore passed a resolution that if Messrs. Bloxham, on behalf of the Colmore Trustees, would give 65,000*l.*, the property should be sold to them. Messrs. Bloxham, on being informed of this resolution, accepted the terms, and the sale was made to them at 65,000*l.* Mr. Edge was informed that the property had been sold to the Colmore Trustees, and he then protested, and for the first time said that he was prepared to give 70,000*l.*; but he was told that it was too late, as he had declined to make any offer, except on a condition the trustees could not accept. When the trustees sold the property to the Colmore Trustees they had no other offer before them than of 62,000*l.* from those same trustees, and they had no offer of any kind from Mr. Edge before them except his original one, which amounted to 55,000*l.* It was not until after Mr. Edge was told that the sale to the Colmore Trustees had been made and concluded that Mr. Edge said he was prepared to give 70,000*l.*

TESSERÆ.

Castle Howard.

THIS castle recalls Blenheim, and is by the same architect, Vanbrugh; but it is less broken, and, though not of equal extent, has a grander and more massy appearance. In the whole arrangement of the palace and the garden the architect, evidently had Versailles in his mind, as the *ne plus ultra* of this style. In the grounds are colossal stone basins, to which the flowers planted in them give the appearance of flower-baskets. The principal ornaments, however, are numerous copies of the most celebrated antiques; the dazzling whiteness of which is contrasted with the bright green of the turf. The northern and rude climate has unfortunately made it necessary to paint them with oil colour; only the ancient large Boar of Florence still stands unpainted in a very good copy of the finest Carrara marble. On two sides are pieces of water, over one of which is a large stone bridge. All this, as well as a square building, which has on every side a portico of four pillars of the Composite order and an elegant mosaic floor; a pyramid of considerable size; and, lastly, a very large circular building, surrounded with pillars and crowned with a cupola, which contains the family vaults, give to the whole a rich and truly princely appearance. The high cupola with a lantern, which strikes one immediately on entering the house, is in the same character. According to the tasteless fashion of that age, Antonio Pellegrini, one of the late mannerists of the Venetian school, has painted in the cupola the Fall of Phaeton; so that a person standing under it feels as if the four horses of the sun were going to fall upon his head. The corners are adorned with the four elements. More noble and important than all this show are the manifold works of art of various kinds which the spacious apartments of the palace contain, and which give it the appearance of a museum.

Holbein as a Costume-Painter.

Holbein is our earliest authority for the real everyday aspect of English society. In his time the principle of deference for age was in vogue. People started with the supposition that fifty years and upwards was the only sensible time of a woman's life, and those who had the misfortune to be younger had to make the best of it, being probably assisted by some suspicion that the greater the disparity between themselves and their costume the better they looked. The dress of the majority of Holbein's portraits is of all others best adapted to secure an honourable retreat for waning charms. Beneath the stern buckler of the deep stomacher it mattered not what kind of shape lay concealed, for all were reduced to the same level. Beneath the stiff diamond-shaped cap, closed carefully between the edge and the temples with gold tissue, it was all one whether the hair was thick or thin, black, red or white, for none at all was seen. The high make of the dress on back and shoulders covered what might be very beautiful in the bride, but prevented a deal of rheumatism in the matron. The modest and becoming partlet—a kind of habit-shirt made of good stout opaque materials—filled up the space the gown left bare, and buttoned high up the throat with embroidered collar or frill. The handkerchief, fastened upon the back of the cap in odd clumsy folds which puzzle costume-hunters to account for, could be let down, as it had been generally worn in the previous reign, snug and warm round the shoulders and kept out many a draught. The sleeves were full and close down to the wrists, with a ruffle half covering the hand, while all tell-tale outline was effectually stopped, as in Holbein's drawing of the buxom old Lady Butts, by a short mantle edged with fur. The cap more especially favoured those whom nowadays we consider the worst treated. The decided colours of its materials, the jewels along the border, and the gold tissue often interwoven with scarlet threads, enlivened the duskiest complexion, while the stiff angular forms relieved the hardest features. The mask of the face stood out sharply defined but well supported. The profile told nobly. The side of the cap descending along the cheek assisted to give the perfect oval in the young and to conceal that junction between the throat and jaw-bone on which time is most legible. Altogether it was a head-dress too old in itself for anyone to look very old in it. In this costume we see much to account for that peculiar truthfulness in Holbein which to our view so amply compensates for the absence of the laxer graces of a later period. With forms so settled and rigid no latitude was left to a painter. All ages looked stiff and decorous alike, or if they did not it was no fault of the dress.

Christian Art in the East and West of Europe.

There can be no doubt that the exportation of books adorned with Byzantine miniatures by the early missionaries, who carried Christianity and a degree of civilisation to the northern and western countries, supplied the original types from which, however barbaric the imitations, the first attempts were made to rival in the extreme west the arts and spiritual graces of the east. Some of the leading distinctions between the Byzantine and Latin (that is, between the eastern and western) modes of working out religious conceptions were that, in the western or Latin mode, symbolism was universal, the art of the catacombs was followed distinctly, though frequently remotely developing itself in mythical and sentimental forms and systems of parallelism between type and prototype. In the Greek Church the exposition of faith, through art, took a more tangible form. Symbolism was avoided on all possible occasions, and the direct representation of sacred themes led to a partial transfer, to the representation of the adoration due to the thing represented. Iconoclasm was the reaction of this abuse. In the advanced periods of Greek art this realistic tendency led to a painful view of the nature of religion, more particularly in connection with the martyrdom of saints and the physical sufferings of our Saviour and His followers, which are frequently represented in the most positive and often repellent forms.

Gainsborough and Cozens.

Gainsborough unwittingly set the fashionable world agog after style; but he did not enter the lists as a teacher, nor would he have allowed youth, who had advised with him upon art, to waste their time in attempting to learn what no one could teach. The copyists, or rather dabblers in his new style, were full-grown amateurs, polite idlers at Bath, who vainly fancied, forsooth, because this rare genius could, by a sort of graphic magic, dash out romantic scraps of landscape, rural hovels, wild heaths and picturesque groups of rustics, that they had but to procure his brown or blue paper, and his brushes and pigments to do the like. They had, however, in their egotism forgotten that Gainsborough had cultivated his natural taste for painting by an early and sedulous study of its principles, and that he commenced by drawing every object in nature compatible with his choice of composition, with the accuracy even of the Flemish and Dutch masters. Indeed his

early studies of trees, shrubs, weeds and even all the expletives of pastoral scenery were as faithful to their prototypes as those from the pencil of Wynants himself, whose works Gainsborough held in high estimation. The Gainsborough mania was long the rage; beaux and belles of *haut ton* were stricken with this sketching frenzy. Cozens was another who flourished at Bath. He, although an artist, was no Gainsborough, and only claims a notice for having too successfully practised upon the credulity of the amateurs of style, who frequented that fashionable resort of wealthy listlessness. Will it be believed hereafter that a professor of painting should undertake to splash the surface of a china plate with yellow, red, blue and black, and taking impressions from the promiscuous mass, on prepared paper, affect to teach his disciples—and those persons of education and elegant minds—to work them into landscape compositions? This, however, he attempted, and the charlatany succeeded, for he had a host of scholars for several seasons, who rewarded him most munificently for his wonderful discovery.

Proportion of Interiors.

Beauty and harmony of proportions depend very much upon the particular purpose for which an apartment is intended, and also upon the particular character aimed at. Even loftiness and lowness of proportion are not necessarily either a merit or defect, as their being so depends in very great measure not only on the nature of the apartment itself, but also on the architectural treatment of it. Whether in interior or exterior design, it is requisite that the individual features should be not only well proportioned in themselves, but so well balanced and adjusted that the *ensemble* shall at once produce a pleasing impression upon the spectator, which kind of *eurythmia*, or general harmony of proportions, admits of so many modifications, and depends so greatly upon the precise nature and character of the particular design, that direct precepts avail but little towards its attainment, on which account it must be acquired chiefly by taste guided by study and observation.

Landscape Art.

The principal art of landscape painting consists in conveying to the mind the most forcible effect which can be produced from the various classes of scenery, which possesses the power of exciting an interest superior to that resulting from any other effect, and which can only be obtained by a most judicious selection of particular tints and a skilful arrangement and application of them to difference in time, seasons and situation. This is the grand principle upon which pictorial excellence hinges, as many pleasing objects, the combination of which renders a piece perfect, are frequently passed over by an observer because the whole of the composition is not under the influence of a suitable effect. Thus a cottage or a village scene requires a soft and simple admixture of tones calculated to produce pleasure without astonishment, awakening all the delightful sensations of the bosom without trenching on the nobler provinces of feeling. On the contrary, the structures of greatness and antiquity should be marked by a character of awful sublimity suited to the dignity of the subject, indenting on the mind a reverential and permanent impression, and giving at once a corresponding and unequivocal grandeur to the picture. In the language of the pencil, as well as of the pen, sublime ideas are expressed by lofty and obscure images; such as in pictures, objects of fine majestic forms, lofty towers, mountains, lakes margined with stately trees, rugged rocks and clouds rolling their shadowy forms in broad masses over the scene, much depends upon the classification of the objects, which should wear a magnificent uniformity, and much on the colouring, the tones of which should be deep and impressive.

Murillo.

The characteristics of Murillo, about which there can be no mistake, are soon stated; he was not only a naturalist but biassed throughout by that spirit of localism and preference for his own particular province which forms the second nature of the true Spaniard. Andalusia, cheerful as its sun, and Seville, the city of Astarte and Figaro, are stamped on all his works; the hierarchy of heaven is anthropomorphised into a Bætican form; the type of his Virgin, lovely indeed, that Jews may buy and infidels adore, is the still existing maiden of Triana; his apostles and saints are her still existing parents, nor could any one glance at his masterpieces in the Seville convent of Capuchins without seeing in the Cicerone monk where the artist looked for a model, and how true the copy. The unchanged originals of his pauper groups, full of fierce, eager, southern life, still swarm in like manner about every church door on the Guadalquivir, and them we shun as much as we seek their portraits; his refining pencil has made them, as Cervantes did honest Sancho, company for duchesses. In a word, nature was his guide; all that the Creator made was good in his eyes, and he feasted on pulpy, throbbing, living realities, rather than the dry bones of the dead and gone; his mingling of ordinary humanity with the supernatural, the

haughty with the humble, wealth with poverty, health with sickness, beauty with ugliness, heightened effect by contrast and fixed faith in spectators; the truth of every accessory—all, to the utter contempt of geographical and chronological proprieties, being local in colour, form and substance—confirmed the belief of legends and dogmas to which they were associated, and the masses chimed in with transcripts wherein they and their nature and daily life were faithfully mirrored. But the tastes of the people are carried out by the genius of Spain whenever it is genuine; thus her ballads, owing nothing to art or "concetti," but all to truthful nationality, breathe the loves, the camps of real soldier life, and come home to every Castilian heart, and thus Murillo appealed to that of the Andalusian. The tastes and capacities of those immediately about him were what he consulted, and to which he lowered his loftiest aspirations. His holy families are not glorified forms which compel us to bend the knee, but pleasing scenes of domestic life where the gambols of charming children delight affectionate parents, and it is to the dear sympathies which they awaken in all that they owe their enduring vitality and increasing fame.

Magnitude in Art.

There is a certain maximum of magnitude to everything, either in its genus (if it is a work of nature) or (if it is a work of freedom) in its design and in the limits which ultimate causes prescribe to it. We apply this measure of magnitude with more or less consciousness in every apperception of objects; but our perceptions are very different, according as the measure which we consider ultimate is more or less contingent or necessary. If an object surpasses the conception of its generic magnitude it induces astonishment to a certain degree. We are surprised and our experience is enlarged, but so far as we take no interest in the object itself, the only result is this feeling of surpassed expectation. We deduced that measure only from a series of experiences, and there is no necessity that it should always be adequate. If, on the contrary, a production of freedom surpasses the conception which we formed from the limitations of its causes, we shall already experience a certain admiration. Here it is not only surpassed expectation which surprises us in such an experience; it is at the same time a divestiture of limits. In the former case our attention was only confined to the product which in itself was indifferent; in the latter we are attracted by the reproductive power which has a moral relation, or rather a relation to a moral being, and must then necessarily interest us. This interest will increase in the same degree as the power which constitutes the active principle is nobler and more important, and as the limit which we find surpassed is more difficult to overcome. A horse of unusual magnitude will agreeably surprise us, but still more so the strong and dexterous rider who manages him. Now if we see him leap with this horse over a wide and deep ditch we are astonished, and if there are hostile ranks into which we see him spring, respect is united with this astonishment, and it passes over into admiration. In the latter case we consider his action as a dynamical magnitude, and apply our conception of human bravery as an unit of measure where it depends upon our own feeling and upon what we regard as the extreme limit of valour.

Grecian Art.

"In beauty," says Lord Bacon, in his essay on that subject, "favour" (or "form," as we should now say) "is more than colour, and decent and gracious motion is more than favour. This is the best part of beauty, which a picture cannot express, nor the first sight of the life." Grace, then, being beauty in motion, and time being the "measure of motion," and time and space being, as to their metaphysical character, analogous, we shall be justified in using the word harmony in its original and more extended signification, in expressing by it, that is, not the mutual relations of objects in space only, or what in music is harmony properly so-called, but the relations of sequence or succession in time also, or what in music is called at the present day melody; and we think it reasonable to assert that, in this wider employment of it, the term harmony can be applied to the beautiful, not only as we perceive it in space and in a state of repose, but also as it comes before us under the conditions of time and motion, when we distinguish it as the graceful. Thus the carved or undulating line, to which the name of the "line of beauty and grace" has especially been given, is one which we follow with the eye from end to end. We might define it—and the same definition would suit the sequence of a musical air—as "unity in progression." And thus a flower and a tree, of which the outlines mainly consist of flowing or curved lines, as the harebell or the willow, are confessedly graceful. Thus the dance also is graceful; and the verse in Wordsworth, "She seemed as happy as a wave that dances on the sea," suggests the closeness of its analogy to the flowing or undulating line. So, when Virgil describes birds singing, and Lucretius the motion ("decent and gracious") of the clouds in heaven, they use language so similar that the one might almost have been

suspected of having copied the other. "Æthera mulcebant cantu" is the expression in Virgil applied to the birds' music. "Aëra mulcentes motu" is the singularly beautiful and poetical expression applied in Lucretius to the clouds' movement. He is speaking of the drifting of the clouds over the face of a clear sky.



Cutting off Gas Supply.

SIR,—It is a well-known fact that the escape of gas has a large effect in the spread of fires, and from a report appearing in a recent number of the *Daily Mail*, Manchester is the only city which appears to have undertaken to cut off the gas supply, and they do this by a stopcock in the pavement.

I have a method to accomplish this which is at once very effective and also quite simple, and it would be, if adopted by the various authorities, both insurance companies and municipal authorities, a very great preventative of the present danger and waste of gas.

Can any of your readers help me in this by bringing it under the notice of any gentleman who could influence its adoption, if he was satisfied with and approved the method?—Yours faithfully,

A. G. BELL, Builder and Contractor.

92 Sherwood Street, Nottingham:
December 5, 1897.

GENERAL.

A General Meeting of the Royal Institute of Painters in Water-Colours, Piccadilly, was held on Monday, when the following artists were elected members:—Mr. J. Gülich, Mr. Mortimer Menpes, Mr. Dudley Hardy, Mr. Charles Sainton, Mr. W. W. Collins and Mr. David Green.

The Secretary of the Institution of Civil Engineers has addressed a letter to the secretary of the "Senatus Academicus" of Edinburgh University, in which it is stated that, at the instance of Professor Armstrong, the council of the Institution have ordered that the degree of Bachelor of Science in Engineering of the University of Edinburgh shall be held to exempt candidates who apply for election into the Institution from passing the examination prescribed by the council for applicants for associate membership.

An Exhibition of about 400 photographs for the archaeological survey of the British Isles is now open at the Camera Club. Among the contributors are Messrs. Bolas & Co., J. Bulbeck & Co., Welsh, Scamell, &c.

The Memorial of R. L. Stevenson will probably be a monument inside St. Giles's Cathedral, and another in the open air, probably on the Calton Hill, Edinburgh.

A Meeting was held at Wakefield on Tuesday to receive the report of the committee appointed in October to promote a memorial to the late Bishop of Wakefield. A report was received from Mr. Pearson, R.A., in which he recommended that Wakefield Cathedral should be enlarged at an estimated cost of 20,700*l*. The report was adopted, and it was also decided that a memorial window should be provided by children.

A Statue of Henri Heine has been commissioned from M. Hasselrijs, of Rome, by the poet's sister, Mdme. Embden, and will be placed at Heine's grave in the cemetery of Montmartre.

The Château Achilleon, which was erected for the Empress of Austria in the island of Corfu, is about to be sold. The numerous works of art in the building have been sent to Vienna.

A Meeting of the Northern Architectural Association will be held on Wednesday next (15th inst.) at the Art Gallery, Newcastle-upon-Tyne, when Mr. Wm. S. Vaughan will read a paper, entitled "Some Notes on the Construction of Steel Girders and Columns." The lecture will be illustrated by means of models and blackboard sketches.

The Decoration of St. Paul's has cost already about 120,000*l*., and will require 100,000*l*. for completion. The collection at the bicentenary service on the 2nd inst. produced 809*l*., and some definite panel or portion will be assigned by Sir W. B. Richmond and the decoration committee to the Freemasons.

Mr. Octavius Hansard, architect, was killed at the Portland Road station a few days ago. He was seventy-one years of age.

The Architect.

THE WEEK.

THE need for more precise definitions in the Building Act of 1894 will not be diminished by the decisions which were given a few days since in the Queen's Bench Division. Two cases came up on appeal. One, London County Council v. Rowton Houses, raised the question, What is a public building? and although a decision was given, it was not precise or comprehensive. As an institution Rowton House is deserving of admiration; but we cannot see why it should be exempt from the conditions that are imposed upon ordinary lodging-houses all over the Metropolis. By the Act a house must not be less than 20 feet from the centre of a street. Rowton House being erected on the site of old dwelling-houses, every inch was utilised, and the frontage came closer than 20 feet to the roadway. When the owners were summoned the magistrate held that it was a public building and not a dwelling-house, and that the words of the Act, "No dwelling-house to be inhabited or adapted to be inhabited by persons of the working class shall, without the consent of the Council, be erected or re-erected within the prescribed distance," did not apply to buildings in such places as Churchyard Road, Newington Butts, but to buildings in narrow alleys and courts. The summons was accordingly dismissed. Mr. Justice HAWKINS considered that as there was no provision for wives or families, Rowton House could not be considered as a dwelling-house for the working classes. His Lordship held there was a probability of its being a public building, and dismissed the appeal of the County Council. Mr. Justice CHANNELL thought it might be a dwelling-house although it was a public building, but otherwise he agreed in the dismissal of the appeal. The definition in the Act says that among public buildings may be an hotel, lodging-house, home, refuge, or shelter which contains more than 250,000 cubic feet or has sleeping accommodation for more than 100 persons, but as there was no such building as Rowton House existing at the time, the hotels and shelters contemplated must have been of a different class.

THE second case also turned on the word "dwelling-house." A man named DAVIS was desirous to take down a row of old buildings in Brick Lane, consisting of shops with living-rooms, and to erect new shops with rooms over them. But he wished to occupy the whole of the site which he possessed. He erected one house, which he let, and his tenant sublet the rooms to families of the working classes. The County Council contended that it must be treated as a "dwelling-house" inhabited or adapted to be inhabited by persons of the working class, and summoned the owner in order to have the house set back. The magistrate held that houses for the working classes meant model dwellings which should be specially constructed. Mr. Justice HAWKINS adopted that view, and maintained there was nothing to show that anything more than a shop and dwelling-house was intended. Mr. Justice CHANNELL went into the subject at some length, and said that when a building was intended for the working classes there must be special construction and air space. The appeal in that case also was dismissed. From the judgments it would appear that special construction can constitute and cannot constitute a working-class dwelling under the Building Act.

WE mentioned last week that M. HASSELRIS, of Rome, was commissioned to prepare a statue of HENRI HEINE, which is to mark the poet's grave in the cemetery of Montmartre. It is the second time the sculptor has received such a commission. There is now a statue by him of HENRI HEINE in the villa in Corfu which belongs to the Empress of AUSTRIA, who is one of the most enthusiastic of the poet's admirers. Germany has no memorial of him except numerous editions of his books. Accordingly a statue was prepared for presentation to Düsseldorf, where HEINE was born on December 13, 1799, or, as he used to maintain, on January 1, 1800. When the statue was ready Düsseldorf was in anti-Semitic throes, and the gift was

rejected. Neither Mayence nor Frankfort would accept the memorial. It was then purchased by the Empress, and despatched to her "Achilleion." But as the villa has been abandoned, who can say what is to be the fate of the statue? It may eventually find a refuge in London, the city which HEINE abhorred.

At the ordinary meetings of the Society of Arts which will be held after Christmas, the following papers will be read:—"The Protection of Industrial Property," by J. F. ISELIN; "The Projection of Luminous Objects in Space," by ERIC BRUCE, M.A.; "Aeronautics," by Captain B. BADEN-POWELL; "Stage Mechanism," by EDWIN O. SACHS; "The Recent History of Papermaking," by CLAYTON BEADLE; "The Preparation of Meat Extracts," by C. R. VALENTINE; "Children's Sight," by R. BRUDENELL CARTER, F.R.C.S.; "Fireproof Construction of Domestic Buildings," by THOMAS POTTER; "Compensation to Workmen," by A. D. PROVAND, M.P.; "The Production of Low Temperatures," by Dr. CARL LINDE; "The Cinematograph," by JULES FUERST; "The Present Condition of the Sugar Industry," by T. R. TUFNELL; "English Art in Illuminated MSS," by Sir E. MAUNDE THOMPSON, K.C.B.; "Renaissance Woodwork in England," by J. HUNGERFORD POLLEN; "Recreations of an Indian Official," by the Right Hon. Sir MOUNTSTUART ELPHINSTONE GRANT-DUFF, G.C.S.I., C.I.E., F.R.S.; "The Plague in Bombay," by HERBERT MILLS BIRDWOOD, C.S.I.; "India and Sir Henry Maine," by CHARLES LEWIS TUPPER, C.S.I.; "Glass Painting," by LEWIS F. DAY.

THE forty-fourth annual general meeting of the Society of Engineers was held on December 13, at the rooms of the Society, 17 Victoria Street, Westminster, S.W. The chair was occupied by Mr. George Maxwell Lawford, President. The following gentlemen were duly elected by ballot, as the Council and officers for 1898, viz.:—as President, Mr. Wm. Worby Beaumont; as vice-presidents, Messrs. John Corry Fell, Henry O'Connor and Charles Mason; as ordinary members of Council, Messrs. James Patten Barber, Joseph Bernays, George Burt, David Butler, Percy Griffith, Richard St. George Moore, Nicholas James West and Maurice Wilson; as hon. sec. and treasurer, Mr. Perry Fairfax Nursey; as hon. auditors, Messrs. Alfred Lass, F.C.A., and Samuel Wood, F.C.A. The proceedings were terminated by a vote of thanks to the President, Council and officers for 1897, which was duly acknowledged by the President.

At the meeting of the Sheffield Society of Architects and Surveyors on Tuesday, Mr. F. R. FARROW lectured on "The Warming of Public Buildings." He described the various methods adopted in the warming of public buildings, first of all treating the hot-air systems, and the objections to them; then the general principles and methods of heating by low-pressure warm water and high-pressure hot water, together with their respective advantages and disadvantages, describing in detail the arrangements and materials of the pipes used in each case. The lecturer also dealt with the different methods employed in the use of steam for heating public buildings by means of low pressure, high pressure, and exhaust steam, with the merits and defects of each, pointing out the various classes of buildings to which these methods are especially applicable. Each system was shown to have its own particular merit and peculiar suitability to certain classes of buildings, and it was pointed out that there is no one system which is universally superior to all others, nor even successfully applicable in every case. Having dealt with general principles, the details of various fittings and apparatus were explained, the several types of radiators and their methods of employment, the different kinds of boilers with the particular purposes for which they are best suited, the forms and uses of stop-valves, steam traps and other minor but important features. Questions involved in the calculations necessary to determine the heating power and apparatus required for different buildings were then explained, and the criterion of efficiency determined. The lecture concluded with an exhibition and explanation of plans, showing the heating arrangements successfully adopted in some modern public buildings.

JOHN LOUGHBOROUGH PEARSON.

THE Bishop of CHICHESTER lately described Mr. PEARSON, who died on Friday last, as one of the most eminent architects in England. Dr. WILBERFORCE was, however, afraid to say that Mr. PEARSON was the architect who was to carry out the restoration of one of the towers of his cathedral. The circumstance is remarkable, but at the same time it recalls the architect. Mr. PEARSON had been in practice for over fifty years, and yet outside the circle of his clients and friends he was almost as unknown as if he were without a name or a history. An incident which was related on the occasion when Mr. PEARSON obtained the gold medal of the Institute will suggest the peculiarity of his position among his contemporaries. Mr. WHICHORD, the then president, said he overheard a conversation between two architects who were discussing the bestowal of the medal. One of them complained that the gold medal was to be given to a man of whom nobody had ever heard and whom nobody knew, while the other maintained that his only claim to the medal arose from being a member of the Council. It seems incredible that such ignorance about so able an architect should have prevailed in 1880; but if it were not for the controversies concerning some of Mr. PEARSON's restorations he was as likely to be as unknown to the profession in 1897 as in 1880. Comparatively few were acquainted with his skill as a designer, and consequently it was supposed he was one of those architects who kept a "ghost." That was a manifest absurdity, for gentlemen who possess secret auxiliaries can take a prominent part on the professional stage before the eyes of the world. It might even be said that the attacks which were made upon his schemes of restoration derived some of their force from the fact that to the majority of his countrymen he did not appear to be an architect who was much practised in construction. Every artist should at least be allowed the liberty to follow his own rule of life and to develop his powers without becoming the victim of adverse comments.

Although he was commonly supposed to be of Scottish extraction, he belonged to a family who lived long in Durham; but he could be claimed as a Belgian, for he was born in Brussels in 1817. He entered the office of IGNATIUS BONOMI, in Durham, when he was a boy of fourteen. Afterwards he served as an improver in SALVIN's office in London; then he became an assistant to PHILIP HARDWICK, R.A., by whom he was employed on the new hall at Lincoln's Inn. HARDWICK was more of a Classicist than a Mediævalist, and the former influence was exercised on Mr. PEARSON. He believed in rules and precedents, and the objection which has been made to his churches arose in a great measure because they were not free and independent examples of Gothic. He preferred measure to freakishness, and consequently his buildings were overlooked.

At the time he started there seemed to be a fair field open to him. PUGIN was then exercising his utmost power and he believed in the ability of Mr. PEARSON. The church of Holy Trinity, Westminster, which was Mr. PEARSON's first work in London, was constantly visited by PUGIN in his latter days, and was considered by him to be in advance of contemporary buildings. There are many critics who prefer St. Peter's, Vauxhall, which is an excellent example of a brick church for a district where economy must be supreme. Still more remarkable is St. Augustine's, Kilburn, which is familiar to most provincial architects who have visited London, for it is generally one of the first buildings sought. Mr. PEARSON's church of St. John, in Red Lion Square, reveals his skill in dealing with a difficult site. BERESFORD HOPE, who was one of the most absolute and kindest of judges, was not altogether satisfied when he found that for a time Mr. PEARSON was attracted by French Gothic of an early type, but the architect, he said, remembered he was an Englishman, and in the Kilburn church he added nerve and force to a French type, which made the style assume something of a nineteenth-century character.

Mr. PEARSON could not be always satisfied with his churches. He considered he was at his best when designing towers and spires, and it was rarely he was able to command the funds which were necessary for the realisation of those parts of a design. The tower of St. Peter's, Vauxhall

is a feature in the district, and stands out with remarkable force above the sordidness of its surroundings. The commission for Truro Cathedral gave him an opportunity such as is obtainable by few architects. SCOTT's only cathedral is in Edinburgh, and BURGESS's in Cork. Mr. PEARSON was hampered at Truro by the difficulty that the services in the parish church which stood on the site could not be suspended. He was able to obtain excellent stone, and the parts which are finished prove that the building, if it should ever be completed, will from its grace, religiousness and simplicity be worthy of its purpose. The total cost was estimated at the modest sum of 105,000*l.*, while the building is as large as Ripon, Rochester or Southwell. In 1870 Mr. PEARSON was appointed architect to Lincoln Cathedral, in which he carried out some important work. His skill and knowledge were also invoked by the authorities of Rochester, Chichester, Gloucester, Bristol and Exeter cathedrals. His restoration of a part of the west front of Peterborough Cathedral called forth the severest criticism, but what has been done is not so transforming as was anticipated. He was also entrusted with the restoration of Westminster Hall, and if the result is not altogether satisfactory, it should be remembered that he had to carry out the suggestions of a Parliamentary committee. At Westminster Abbey he took up the restoration works of Sir GILBERT SCOTT, and he rendered service to that noble building by opposing schemes which would deprive it of much of its interest. He erected churches in different parts of the country and restored others, and in all of them he was equally conscientious. He was indifferent if his work did not appear remarkable to critics, and he was not ambitious to gain a reputation for innovations. He was no less happy in designs for domestic buildings. Quar Wood shows French influence, but it is sufficiently characteristic to be introduced by Mr. EASTLAKE in his history of the Gothic revival. Lechlade Manor House is more English in treatment, while the Astor office on the Thames Embankment is French rather than English. He added a wing to King's College Library, Cambridge, where he had to connect a Classic with a Gothic building.

Mr. PEARSON was a notable instance of what can be done by perseverance and self-reliance. He was only twenty-four when he started in business, and all his mastery of Gothic detail was acquired by careful study of buildings. He owed nothing to the Oxford archaeologists or the Cambridge Camden Society, and it could not be claimed that he gained anything from membership of architectural societies. Yet he was a successful architect, although the number of his commissions might not equal those given to SCOTT and STREET.

In 1874 Mr. PEARSON was elected an associate of the Royal Academy, and in 1880 he attained full honours. He is succeeded by his son, who assisted his father in his later works.

STAINED-GLASS WINDOWS.*

WHILE it is easy enough for most people to obtain a notion of the history and the process of painting on walls, panels, canvas or paper, there are few who are able to do so much when the painting is on glass. It would appear as if the difference of material had changed what was a pleasure into a task which is almost beyond the powers of an amateur. But in glass painting more depends on the materials employed than in the other varieties of painting. Sculpture might also be included with painting. The kind of canvas does not much affect the nature of the painter's work, and in modern times a model is supposed to be equally well adapted for reproduction in marble or bronze. But in glass painting whatever is employed has its rights; there is as it were a sort of rivalry between the materials, and the character of the work depends upon the extent to which the conflicting rights are respected. It would not, for instance, be considered absurd for windows without any touch of painting to be produced in a manufactory of glass paintings. Very effective windows can be made by the use of coloured glass alone. Some of the most beautiful windows in Europe are

* *Windows.* A Book about Stained and Painted Glass. By Lewis F. Day. London: B. T. Batsford.

made up mainly of fragments of unaltered glass, the painter's work being found only in places where it was necessary to give definiteness. A modern student or amateur cannot help being puzzled when he sees or is told of this peculiarity. He asks himself, Why should perfection be a result of a primitive condition of manufactures? If the Mediaeval glass-makers were able to turn out as large sheets as are obtainable to-day, would they have been content with a system of design which is based on small fragments? He would find many artists to argue with him that superior work, and of a class more in keeping with the century, can be produced when larger pieces of glass are employed and when the painter's colouring is preferred to the glass-maker's. The questions of size and quality of glass necessarily involve one no less important, viz. that of leads. Just as there can be a window glowing with colour without any help from a brush, there can be another which depends for its patterns entirely on the leading. Is the glazier who lays down the leads to be considered an artist, or as no more than a necessary evil that should be only sparingly utilised? Problems like the foregoing have to be determined by every one who wishes to understand the history of stained-glass, but they are considered as almost beyond the capabilities of amateurs, and as a consequence few people who are not incited by necessity care to make a serious study of stained-glass in England. We may imagine the art to be a state in civil war, for varieties of glass, leads and paints appear to be in conflict to attain supremacy, and whoever claims to possess knowledge must take sides with and against some of the combatants. According as he is a painter, decorator, chemist, or mechanic, his position will be chosen.

Mr. DAY has not been classed among Gothicists, for in his ornament he endeavours to be as modern as possible, but the early glass workers would claim him as a brother craftsman. He is emphatic in his praise of their work; he endeavours to place himself in company with the glaziers and painters of successive generations and to explain the stages of that evolution in which they were unconsciously engaged. Mr. DAY is so absorbed by the work of ancient artists he has not a word to say about his own, and his book is on that account, as on others, unique in treatment. For him there is no detail in glass-painting which is trifling, and he explains processes with an amplitude which should be enough to reveal the mysteries of the art to the dulllest pupil. The author is so full of his subject as to exercise a sway over the reader, and thus his book when taken up through duty will be read for the pleasure it imparts.

Mr. DAY believes that "coloured glass was probably first made only in imitation of precious stones, and being made in small pieces, it had to be set somewhat in the manner of jewellery." This theory governs all his criticism. It is for its resplendence as a mass of illuminated precious stones, rather than for its story or for its worth as an archaeological record, he prizes a window. No one would wish to mix pastes with jewels, and in the same spirit in almost the last lines of the book Mr. DAY protests against the ordinary process of restoration, saying:—"Better than what is called restoration, the brutality of the mason who plasters up gaps in the clerestory windows of great churches with mortar, or the plumber's patch of zinc which temporarily at least keeps out the weather and the crude white light, leaving us in full enjoyment of the colour and effect of old glass." We cannot have jewels of colossal size, for the best attempts to rival paintings in foreign glass, although they possess excellent qualities, are not such "traps to catch sunbeams" as the oddly-shaped fragments in the old windows. They obscure the light rather than enclose it. In proportion to the number of pieces which it was considered desirable to introduce was, of course, the quantity of the metal strips which held them in position. The leads do not find universal approval, and as a rule nobody cares to see the mechanical aids to beauty in form. M. LASTEYRIC suggested, from his experience at St. Denis, that leading had a chromatic effect, and preserved the value of the tones employed by the painter, for he found that without leads as an intermediary, flowers which were painted yellow became red. He believed that leads increased the energy of sombre parts and "compromised the *clat* of the luminous parts." Mr. DAY's conclusions are similar:—

The leads, were they never so objectionable, are actually the price we pay for the glory of early glass. It is by their aid we get those mosaics of pot-metal, the depth and richness of which to this day, with all our science of chemistry, we cannot approach by any process of enamelling. Moreover, though merely constructional leads, taking a direction contrary to the design, may at times disturb the eye (they scarcely ever disturb the effect), they add to the richness of the glass in a way its unlearned admirers little dream. Not only is the depth and intensity of the colour very greatly enhanced by the deep black setting of lead, a veritable network of shade in which jewels of bright colour are caught, but it is by the use of a multiplicity of small pieces of glass (instead of a single sheet, out of which the drapery of a figure could be cut all in one piece—the ideal of the ignorant!) that the supreme beauty of colour is reached. Examine the bloom of a peach, or of a child's complexion, and see how it is made up of specks of blue and grey and purple and yellow amongst the pink and white of which it is supposed to consist. Every artist, of course, knows that a colour is beautiful according to the variety in it; and a "ruby" background (as it is usually called), which is made up of little bits of glass of various shades of red, not only crimson, scarlet and orange, but purple and wine colour of all shades from deepest claret to tawny port, is as far beyond what is possible in a sheet of even red glass as the colour of a lady's hand is beyond the possible competition of pearl powder or a pink kid glove. Not only, therefore, were the small pieces of glass in early windows, and the consequence, leads, inevitable, but they are actually at the very root of its beauty, and the artificer of the dark ages was wiser in his generation than the children of this era of enlightenment. He did not butt his head against immovable obstacles, but built upon them as a foundation. Hence his success, and in it a lesson to the glazier for all time, which was taken to heart by craftsmen even of a period too readily supposed to have been given over entirely to painting upon glass.

Mr. DAY admits that the mosaic windows, with their almost cumbrous bonds of metal, are rather barbaric, but he asks pertinently, "Might it not be said that in all absolutely ornamental decoration there is something barbaric?" EMERSON would have answered the question in the affirmative, for has he not said that the finest art of a race is attained soon after they emerge from the state of barbarism? The craftsmen could not remain content with cutting and trimming the glass which was provided for them. The glassmakers, by the discovery of the process of flashing, enabled the artists to produce new effects, and windows became allied to cameos and sgraffiti. By that means it was, among other advantages, no longer necessary for robes to appear as made out of unadorned textiles. The work of the embroiderer could be imitated, and the vestments of saints appeared to be of golden and silvern tissues. The process was simple, for lines which could not be formed with a pencil were attainable by the aid of a sharp-pointed instrument. The Swiss especially were enabled to produce most delicate results.

Then came the discovery of enamelling, which must have been considered as the means of endowing glass-painters with a new power. They were no longer confined to a few colours and a mechanical process of scraping or scratching. Depth and vigour were obtainable beyond the dreams of the illuminators. The artists could not have foreseen that so many of their finest effects were destined to succumb to the assaults of time, while the simple surfaces of their predecessors defied all its efforts. As Mr. DAY says, "Enamel was never of any great use in glass-painting, and it led to the degradation of the art to something very much like the painting of transparencies, as they are called, on linen blinds." But as the world seems to become more and more indifferent to the future, it is not likely that enamelling will ever be set aside through apprehension about its durability.

The glass-painters would have been more than human if they had resolved to keep to the old traditions. They were enabled to surpass the work of the wall-painters, and it would be too much to expect them to practise continual self-denial. If people in those days could have sought only for chromatic effects, there would be less temptation to painters, but always "stories" appear to be indispensable. There were vast numbers of pictures in churches, as well as carvings, which represented scenes in bible history or in the lives of saints, but the craving was for more of the same sort, and windows which could be made delightful without introducing the human figure became mere supplements to

frescoes and pictures which were visible elsewhere. On the walls or in an easel picture the painter could represent a scene as his imagination created it; in the window he was under restraints and was compelled to respect them. But his patrons were to be satisfied, and it is no wonder he endeavoured to emancipate himself from restraints. The glazier, who appeared to have him in thrall, could not be accepted as a friendly aid, and consequently metal-work was diminished, concealed and made to assume a form which was not suggestive of its importance. One of the consequences was the adoption of leads in straight lines, which expressed plainly that the glazier's co-operation with the painter was in a humble capacity and could not be considered as more than a mechanic, like that of the men who laid tiles or bricks without attempting to shape them in any way.

Subjects themselves, says Mr. Day, it has been explained, came to be glazed as much as possible in rectangular panes; but it marks, it may here be mentioned, a decline of design, as well as of technique, when these came in any way to interfere as they did with the drawing. Having made up his mind it is to be glazed in rigid square lines, the artist should logically have designed accordingly. He had only to mark off the glazing lines in his cartoon, and scheme his composition so that it was not hurt by them. Towards the seventeenth century the plain glass, the extra part beyond the canopy or beyond the picture, would often be glazed in some simple pattern. That, you might imagine, stood for the window behind the picture or the monument. At the church of St. Jacques, Antwerp, above a picture of the Circumcision is a canopy leaded in squares and painted to look like falsehood, beyond which clear glass is glazed in a pattern.

It is always an advantage for a student of stained-glass to begin with the glazing, and if he can form a diagram of the leading he will soon find that the qualities of the window are more easily manifested than appear at first sight. But a novice must not suppose that he is to accept any arrangement of lines as a model for imitation. To prize them for such a use would be as absurd as the imitation of a surveyor's triangulation under new circumstances. The designer cannot, however, ignore leads, and their treatment must be one of the first considerations when he prepares a cartoon. It is not advantageous to make more use of the metal than is absolutely necessary in order to emphasise the archaicism of his treatment.

It may be asked, If precedents are not to be exactly followed in leading, are they to be also modified before adoption in regard to other qualities? That is a question which is never likely to be answered in the same way by all who have interest in windows. As many of the windows in Glasgow Cathedral were produced under the direction of Mr. WINSTON, we suppose that in an archaeological sense they are correct. We have never discovered anyone who could stand long enough before them to examine the details, with the exception of one of the guardians of the buildings, and as he was employed on them in his youth his critical powers were defective. But while such works remain, it is evident there can be fidelity to ancient examples without the least power of expressing the spirit of ancient work. The Glasgow windows are object lessons to all who wish to realise what should be avoided in stained-glass, if it is to become a source of joy to beholders. The makers probably were compelled to think so much about archaeology they could not give any attention to colour. Yet to modern observers it is colour which fascinates, for few have the time to follow out the details of a "story" which could be far more clearly told in black and white on paper. If Mr. DAY's advice is followed, there will be fewer examples of the Glasgow species:—

The problem is how to produce the best glass we can in harmony with the architecture to which it belongs, but without special regard to what happens to have been done during the period to which the architecture of the building belongs. We may even inspire ourselves at the sources of sixteenth-century Italian art, and yet in no wise follow in the footsteps of the glass-painters of the period, who were more or less off the track. We may set ourselves to do what they did (glass was not their strong point), but what they might have done. There, if you like, is an ideal worthy of the best of us. If we pretend to be craftsmen we must do our work in the best way we know. If we are men let us at least be ourselves. Let us work in the manner natural to us. If we undertake to decorate a building with a style of its own, let us acknowledge

our obligation to it; let us be influenced by it so far as to make our work harmonious with it—harmonious, that is to say, in the eyes of an artist, not necessarily of a savant. Evidence of modernity is no sin, but a merit in modern work. To see how a man adapted his design to circumstances not those of his own day gives interest to work. We never wander so wide of the old Mediæval spirit as when we pretend to be Mediæval or play at Gothic. True style, as craftsmen know, consists in the character which comes of accepting quite frankly the conditions inherent in our work.

The last extract will suggest the frankness of the author. He is throughout a craftsman addressing those who aspire to be like himself, and is as communicative as they desire. Whatever is said has some relation to production. The book is therefore a complete course of instruction for incipient glass-painters, but it will be also a guide to all who have to decide upon the character of proposed windows. Amateurs who have been scared by the difficulties of the subject will discover that it is possible to obtain enough knowledge to enjoy windows by a simple perusal of the pages. The volume is larger than Mr. DAY's other books, but there is enough information in it to afford material for two or three works on stained-glass.

DISTRIBUTION OF ELECTRICAL ENERGY.

THIS subject was brought before the Northern Society of Electrical Engineers by Mr. C. H. WORDINGHAM, A.M.I.C.E. (city electrical engineer, Manchester), in a paper read on November 8. The paper is a very long one, but it is one of considerable interest.

At the commencement there is a general reference to the alternating *v.* continuous current controversy of a few years ago, and it is said that "it is impossible to force an unvarying system on varying conditions," but the paper is one which appears to us the opposite of this statement. The points which are given as having completely altered the comparison between the two systems are:—Improvements in consuming devices and the cheapening of the supply have caused the intensity of the demand; that is to say, the quantity of energy demanded per mile of main to become already very great, and in the near future there can be little doubt that it will be enormously increased, while at the same time the area to be supplied has been increasing to a great extent. We thus see that the problem has shifted from the grounds it originally stood on, viz. small compact areas and large scattered ones, to the ground of a large fairly dense area, with various kinds of demand in the different parts.

The paper lays down the suggestion that for practically all purposes continuous are superior to alternating currents, and further, that wherever there is likely to be any large demand, continuous currents should be used. Mr. WORDINGHAM, however, says with regard to this that he only refers to the distributing mains, and by so doing he disarms a great amount of criticism. The continuous current system is defended on the grounds that it is the most suitable for arc lamps, for motors, electroplating, charging of secondary batteries, and electro-chemistry from the consumer's point of view. From the central station point of view it admits of the use of accumulators direct on the mains, causing a better regulation of pressure; it also allows of the choice of any system of mains, while alternating currents do not, and there are troubles with terminals owing to vibration. Meters are more accurate with continuous current, especially when motors are used.

The paper also contains a further condemnation of single-phase alternating currents, and the opinion is expressed that they will disappear entirely. We think that this is going rather too far, but there is no doubt that multi-phase currents will do much of the work now carried out by the single-phase currents.

The next point touched on is that of the system of mains. The pressure of supply is discussed, but from the central station point of view entirely, and it is decided that the highest possible should be used consistent with safety and the Board of Trade regulations. It is also confidently stated that high-voltage lamps are perfectly reliable. We would here mention that if high-voltage lamps are efficient, then low-voltage lamps may be much more efficient, and if the high-voltage lamps are cheap, the low-voltage can be

much cheaper, and the same considerations apply to the life of the lamps.

The merits of two, three and five-wire systems are discussed. It may be of interest if the principles of these systems are given here. The original low-tension system introduced for electric lighting was the 100 volt two-wire. If the voltage is doubled, however, *i.e.* to 200 volts, only half the current is required to transmit the same amount of energy. Further, the cable need be only half as large allowing the same drop of pressure, while, if the same percentage drop is allowed, it need only be one-fourth as large, *i.e.* with the same loss of energy in the mains. We thus see that when the pressure is doubled only one-fourth of the copper need be allowed. The object of engineers is, therefore, to increase the voltage as much as is possible with safety, to reduce capital outlay. The Board of Trade specify the maximum pressure which may be used on the mains as 450 volts. Further, except by special consent, the pressure on any pair of consumer's terminals may not exceed 250 volts. A 440-volt two-wire system is thus, it would appear, the best for a medium-sized town; but this is not allowed at present, and if it were there is no commercial 8 candle-power 440-volt lamp made, and, further, if it were it would be expensive and probably inefficient. For these reasons three wires are used—the pressure between Nos. 1 and 2 being 220 volts; Nos. 2 and 3, 220 volts; and between Nos. 1 and 3, therefore, 440 volts. As the current flowing through Nos. 1 and 2 is in the opposite direction to that in Nos. 2 and 3, there is no current in No. 2 wire if the lamps on either side of the system are equal, as they neutralise each other; the middle wire may therefore be made quite small, in fact, only large enough to carry the current for any lamp on one side in excess of that on the other. By this means the cables are designed for 440 volts, while 220-volt lamps may be used.

To further increase the pressure Dr. HOPKINSON introduced the five-wire system, in which the two extreme conductors are at a difference of pressure of 440 volts, there being three intermediate wires, the pressure between each pair being 110 volts. Within the last two years 220-volt lamps have been greatly improved, and the five-wire system is converted into a three-wire system with 220 volts between each pair of wires. As before mentioned, the 220-volt lamps are still rather more expensive, less efficient and have a shorter life than the lower voltage lamps. However, the advantages to the supply authorities are so great that these disadvantages may be more than counterbalanced by the lower price of electricity rendered possible. The five-wire system, which is only used at Manchester, is advantageous, as it allows electricity to be supplied at 100, 200, 300, or 400 volts, whichever suits the purpose best; while the 200 volts is rather high where, say, only two arc lamps are required, there being over 100 volts absorbed in resistances. The five-wire system is, however, not likely to be adopted now that 200 volts may be used.

The difficulty of the balancing consumers is a great drawback to 3 and 5-wire systems, as it causes bad regulation of pressure on consumer's terminals. The details of the balancing question are not, however, of general interest.

A great point is made by the author on the question of standardising in these matters. There are at present in use on supply mains, 100, 105, 110, 150, 200, 210, 220 and 230 volts, and these entail special lamps, specially-wound motors and meters; and in alternating stations there are periodicities varying from 40 to 120 per second, each of which requires special motors, &c., as well as meters. The result of all this is that lamps and other apparatus are dearer than would be the case if, say, three pressures were used, 100, 200 and 400 volts.

For the lighting of a city the question of the distributing network is here gone into very fully, and the author is on the whole strongly of opinion that several separate networks, each connected direct to the central station with separate feeders, should be used, the networks being interconnected at a few convenient points, in which interconnectors there are automatic switches which open and isolate any network on which a fault appears. The fault can then be burnt out from the central station without affecting the rest of the networks. It is also an immediate indication of the district in which the fault has occurred. This system has, however, not been

adopted entirely as yet in Manchester, owing to the fact that the good automatic switch or cut-out has not yet appeared. The advantage of one large interconnected network over separate smaller ones is that in the event of the demand being underestimated in certain streets the drop in pressure on the main will be smaller than if isolated, as the neighbouring network will help to supply the current. The use of fuses in street boxes is strongly condemned, and we entirely concur in this condemnation, as there is no means of finding out which fuses have and have not blown except by examining each box. The author also recognises that the size of distributor put down must be guessed at, and cannot be calculated. The best method is to have standard sizes of main, say $\frac{1}{16}$, $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ square inch section, and when in doubt use the next larger size. It is stated that distributors when once laid should never need enlarging, and we again agree with the author.

The rest of the paper is taken up with questions concerning the various kinds of cable and systems of laying.

The author, in his choice of systems of mains, *viz.* the drawn-in system for feeders and the built-in for distributors, confirms the best practice on this subject. Feeders have no joints and T-connections, and can therefore be drawn out and in without interfering with any other wires; and for this reason the drawing-in system is recommended. With distributors, however, the number of service connections and joints makes it impossible to draw out the cable; so no good object is served by having a drawn-in system. The author also insists that every cable in a drawn-in system should be in a separate duct, and with this we agree, as any one defective cable cannot affect another.

When Mr. WORDINGHAM goes on to the built-in systems, we think he is hardly so sound in his reasons or results. In the first place, he shows a strong bias towards bare copper mains, and in the second place he strongly condemns the paper and jute insulated lead-covered cables. Now as far as experience has gone, the bare copper has been almost always a failure, and the paper and jute insulated lead-covered cable a success. The author also has a great leaning towards the Callender built-in system, where the cables are embedded in a mass of bitumen which excludes damp. There is no doubt that this system is a good one, but it is not the only good one, and lead-covered cables have proved just as successful as it. The bare copper mains are described in great detail, which will not be of interest to the general reader; but the part with reference to the drawbacks of the system is worth repeating:—"The supposed drawbacks to the system are danger of flooding and liability to explosion of gas. As regards the former, it is difficult to see how the water could get in, but even if it did, it is unlikely it would reach the copper, as the culverts have all a fall of at least 1 in 100, and are connected to boxes at each end, all of which are drained to the sewers. Further than this, even if the copper were immersed, supposing the water to be pure, it is quite likely that it would be found to be feasible to continue running on the main until the culvert could be emptied." Now with regard to this, although the culverts may not get filled in Manchester, they do elsewhere, and also it is an experience that in a manufacturing town no surface water is ever pure enough to prevent very severe electrolysis. Further, there is always a possibility of a water main bursting, and ordinary town's water will allow of electrolysis. Again, it is the experience that once the insulators become wet, a film of hydrated copper oxide is formed over them which is conducting, and will allow electrolysis to continue till the positive wires become eaten away. Mr. WORDINGHAM is very fortunate indeed in not having the troubles which have condemned the system elsewhere. The author is also distinctly fortunate in never having an explosion in these bare copper culverts. Where the bare copper cannot be used Callender's solid system should be, according to Mr. WORDINGHAM, and a part of the remainder of the paper is taken up with an eulogy of them. We entirely agree with the author when he condemns the drawn-in rubber system, as the cables will not stand the wet and dry action met with, due to condensation if not leakage of water in the iron or even stoneware conduits. Details are then mentioned as to the laying of cables, painting of ends to indicate polarity, and the question of ventilating of

junction boxes. There is no doubt that with a drawn-in system the boxes should be well ventilated and drained.

The question of service lines is the next matter dealt with, and for this purpose we agree with the author that a flexible service should be adopted, owing to the confusion of pipes usually found outside premises; but we think that an armoured lead-covered cable laid direct in the ground is better than an armoured rubber cable laid in wooden troughs and surrounded with bitumen, as it is more flexible. With a drawn-in system there is an open connection between the consumer's premises and the main culvert, which allows bad smells to enter premises sometimes.

The paper concludes with an appeal for standardisation of main switches, fuses, meters and boards, with which we sympathise.

In conclusion, we would say that, although we cannot entirely agree with Mr. WORDINGHAM, there are many points and details discussed which are seldom considered in connection with the supply of electricity, and we have no doubt that the paper will prove a great addition to the subject.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A MEETING of the Institute of Architects was held on Monday evening last, Professor Aitchison, A.R.A., president, in the chair.

On the motion of the President the following proposal agreed to at the special general meeting of November 29 was confirmed, viz.:—That in order that the Council of the Royal Institute may remain in office until the close of the last general meeting in June of the year following that in which they were elected, the following alteration be made in By-law 30, viz. that in the last line but one of the final clause the word "last" be substituted for "first."

The President said it was his painful duty to announce the death of Mr. Octavius Hansard, who met his death under painful circumstances. Mr. Hansard was elected an Associate in 1848 and Fellow in 1860. Another loss was sustained by the death of Mr. J. L. Pearson, who was a perfect specimen of the English gentleman. His work was spread all over the country. His church at Vauxhall was remarkable for its brick vaulting. His restoration at Lincoln Cathedral was admired for its judiciousness. He was gold medallist in 1880. Votes of condolence were passed.

Mr. Emerson announced the death of Mr. W. Stephens Cross, elected Fellow in 1882, and Mr. Joseph Battye and Mr. Arthur James Forge, Associates.

Tests of Brickwork.

Mr. W. C. Street read the report on the third series of experiments conducted by the Science Standing Committee to ascertain the average strength of various descriptions of brickwork. The experiments were completed last spring by the crushing at the West India Docks of twenty short lengths of brick walls, each about 6 feet high by 27 inches long and 18 inches thick. The committee did not propose at present to give any fixed rules based upon the results or information gained by these experiments, as it was hoped that the Council of the Institute would sanction the preparation of a careful analysis of the facts contained in the three reports, and issue it in a suitable shape. If this were done it might be possible to generalise and formulate rules to govern the use of different kinds of brickwork as the supporting features of the structures erected under their superintendence. Meanwhile a few impressions could be given. The resistance of brickwork in lime mortar to crushing seemed to vary from one-sixth to one-eighth of the resistance offered by the brick itself, while in cement mortar it varied from one-half to one-fifth of that strength. So while cement mortar materially aided the weaker bricks in their combined strength, it could not materially affect the ultimate power of resistance in brickwork made of a harder variety. The different specimens in lime mortar and those in cement mortar showed comparatively little difference in the respective rates at which the beds were crushed, the only question was how long the bricks would be able to resist the pressure if the load were increased at these rates. The average thickness of the bricks was $2\frac{1}{2}$ inches and the total thickness of the mortar beds 6 inches, while the compression of the lime mortar beds averaged 1 inch, and that of the cement mortar beds about $\frac{1}{2}$ inch. This proved that the mortar generally was well crushed and disintegrated long before the final collapse of the several examples of brickwork. In dealing with the working load that might be calculated upon, care must be taken not to impose such a load as would materially damage the structure of the brickwork. At one-fifth of the crushing load the compression in lime mortar averaged $\frac{1}{3}$ inch in 6 feet of brickwork, and in cement

mortar it averaged $\frac{1}{4}$ inch. The great difference between dead and live loads must not be lost sight of. Taking a safe load as one-fifth of the crushing load, it might be assumed from the results obtained that in lime mortar stock brickwork is equal to about $3\frac{1}{2}$ tons, gault 6 tons, Fletton 6 tons, Leicester red 9 tons and Staffordshire blue 23 tons per square foot. In Portland cement mortar, 1 to 4, stocks would be equal to about 8 tons, gault 10 tons, Flettons 11 tons, Leicester red 17 tons, and Staffordshire blue 24 tons per square foot. Under the ordinary or average conditions of practice, the form of brickwork did not greatly affect the strength, the 18-inch square piers having given approximately similar results per square foot to those obtained from specimens 27 inches by 18 inches. With regard to the effect of age upon the different varieties of brickwork, results showed that, except in the case of blue bricks in cement, those built three months gave very similar results to those built five months. The difference in the case of the blue bricks was partly due to the fact that the bricks of which the specimens 27 by 18 were built were from a stronger lot than those of which the 18-inch square were built, the samples from each delivery falling respectively at 779 and 701 tons per square foot.

Appended were tables of results, showing dimensions, age and materials composing the piers, the pressure on gauge in pounds per square inch, the total real pressure in tons, the pressure per square foot of wall in tons, compression in inches, with observations on the varying conditions of the brickwork under increasing strains. There were also supplementary tables and formulæ by Professor Unwin, F.R.S.

A general description of the crushing of each pier was given to the meeting by Mr. Max Clarke, with the aid of several photographs which were, thrown on the screen by means of the lantern.

Mr. P. Gordon Smith said it was to be regretted that more money was not available for the expenses in the tests. He moved that the thanks of the Institute be passed to Sir William Arrol, Mr. Donaldson (engineer to the Dock Company) and the members of the committee who had taken so much pains to obtain satisfactory results.

Professor Unwin said the arrangements for the tests had been carried out by a sub-committee of the Science Standing Committee. There was really no report which could be called a report of the committee, it was only the report of two members. He was obliged to say these things because he was going to criticise. As this was the last of their reports he thought it rather a pity that some matters to which attention had been drawn last year had received no notice. He pointed out a year ago that in heading the tables there were many errors, and the way the report was put forward had completely thrown out the teaching of the results. He was told at that time some architects wanted the piers to be built in the ordinary way for the tests; they acquiesced in that, and the results were far from satisfactory. The second series of piers was then built. He understood that this time better sand was used than in the first test, although Mr. Max Clarke had said the same sand was used. The mortar undoubtedly was better than in the first series. When the third series was built, a quite new quality of sand was used in making the mortar; it was much better than that in the other tests. In this third report there was no reference made to these facts. He attached very great importance indeed to the mortar used. The difference was due almost entirely to the better quality of the mortar. Had the report gone before him, he would have said the committee was abdicating their office in not discussing their own results. The writers of the report were not, however, consistent, because they had drawn some conclusions. There was one point which he was sorry he had to explain. If the results were tabulated in a simple way, they would find the apparent anomalies between the tests were not so great. The results as shown were not absolutely irregular. It was obvious on the face of it that the whole of the piers in the second series carried nearly double the load of those in the first, a fact due almost entirely to the better quality of the mortar. The third series agreed almost entirely with the second.

Mr. William White thought the report did not make enough allowance in the ordinary work as to the stability and quality of the mortar, the quantity and mode in which it was made. In such tests it was necessary that all circumstances should be as near as possible to one another.

Mr. Wm. Woodward said Professor Unwin's criticism had confirmed the remarks made by him a year ago as to the unreliability of the reports. He was sorry the funds of the Institute could not secure a complete test, but he thought that, if appealed to, the members would readily subscribe a sufficient sum for a fourth and final test.

Mr. J. Douglas Mathews asked why the safe load was taken as one-fifth instead of one-fourth of the crushing load, which was the usual calculation.

The President, in putting the vote of thanks and closing the discussion, said it was a remarkable fact that such poor quality of mortar was used in the experiments. No architect

would think of using mortar that had two of sand to one of lime. Mortar with three of sand to one of lime was about twice the strength. The varieties in results of experiments must always be very great. He held the committee were quite right in having piers built in the ordinary way. No satisfactory results could be obtained if the piers were specially built for the tests. Attention was drawn to the question raised by Mr. Mathews.

Mr. Max Clarke said it was a fact that the piers for the first and second series of tests were built with the same quality materials. In the third series, however, Messrs. Cliff, who supplied the sand, ran short of the quality used in the former tests, and thus the experiments were completed with another quality sand not quite so good.

Mr. Street said that when the compression of the mortar had reached one-fifth they took that as the point at which they should estimate a safe load, namely, one-fifth of the breaking strain.

The President said they usually took the test as soon as it showed first signs of cracking, and one-fourth of that strain was considered a safe load.

ROYAL ACADEMY PRIZES.

ON Friday last the prizes won by the students of the schools of the Royal Academy were distributed by Sir J. E. Poynter, P.R.A. The occasion was remarkable, for the gold medal and travelling studentship for painting were for the first time not awarded. The subject assigned was "Cleopatra Clandestinely Introduced into the Presence of Cæsar"; but no one of the works submitted was considered worthy of the prize. The following prizes were distributed:—

Landscape painting, "An Afterglow," Turner gold medal and scholarship (50*l.*), Alfred Priest; landscape painting, "A Lock," Creswick prize (30*l.*), C. M. Q. Orchardson; painting of a figure from the life (open to male students only), silver medals, 1st Allan Douglas Davidson, 2nd Arthur Thomas Holloway; painting of a head from the life, silver medals, 1st Alfred Guy Smith, 2nd Edmund L. Van Someren; painting of a draped figure (open to female students only), silver medals, 1st Hilda Koe, 2nd not awarded; cartoon of a draped figure, "Hermione as a Statue—"The Winter's Tale," silver medal and prize (25*l.*), Mary Twogood; design in monochrome for a figure picture, "Jephthah Meeting his Daughter" (Judges, chap. iii. v. 34, 35), Armitage prizes, 1st (30*l.*) and bronze medal not awarded, 2nd (10*l.*) Ernest George Ellis; design for the decoration of a portion of a public building, "Spring," prize (40*l.*), Mary E. F. Brickdale; set of six drawings of a figure from the life (open to male students only), 1st prize (50*l.*) and silver medal Owen Baxter Morgan, 2nd (25*l.*) Ernest George Ellis, 3rd (15*l.*) George Murray; drawing of a head from the life, silver medals, 1st Francis E. Colthurst, 2nd G. A. Mott; drawing of a statue or group, silver medals, 1st Mabel Catherine Robinson, 2nd not awarded; perspective drawing in outline (open to painters and sculptors only), "An Interior View of the Entrance-portico of the Royal Academy, looking east," silver medal, no competition; composition in sculpture, "Charity," gold medal and travelling studentship (200*l.*), Alfred Turner; model of a design, "Gladiators Fighting," 1st prize (30*l.*) Gilbert William Bayes, 2nd prize (10*l.*) not awarded; set of three models of a figure from the life (open to male students only), 1st prize (50*l.*) and silver medal Alfred Turner, 2nd prize (20*l.*) Alfred Bertie Pegram; design for a medal, "A Design for a Cast Medal, obverse and reverse, in commemoration of Her Majesty the Queen's Reign of Sixty Years," silver medal, not awarded; model of a bust from the life (open to female students only), silver medals, 1st and 2nd, no competition; model of a statue or group, silver medals, 1st not awarded, 2nd Mortimer John Brown; design in architecture, "A Nobleman's Country House," gold medal and travelling studentship (200*l.*), A. H. Christie; set of architectural drawings, "The Library at Lambeth Palace," silver medals, 1st Arthur Maryon Watson, 2nd not awarded; set of architectural designs (Upper School), prize (25*l.*), George John J. Lacy; set of drawings of an architectural design (Lower School), prize (10*l.*), John Stevens Lee; plan of a building, "An Art Gallery for a Large Town," prize (10*l.*), Horace Charles Hide; original composition in ornament, silver medal, no competition; perspective drawing in outline (open to architects only), "The Chapter-house of Westminster Abbey," silver medal, no competition. The Landseer scholarships in painting and sculpture of 40*l.* a year each, tenable for two years, were awarded (in painting) to Edward Lawrence Van Someren and (in sculpture) to Alfred Turner.

The President, in delivering his address to the students, regretted that it should not have been found possible to present the gold medal for painting on this the first time he had had the pleasure of presiding during a gold-medal year. Painting had been from the beginning of the Academy, and always

would be, its main feature. Without making any comparisons between the three branches of art that this academy embraced, he thought it fair to say that painting was the art which appealed most widely and with the greatest force and directness to all minds; it was the most popular art both as regarded the numbers of those who practised it and those who enjoyed it, and as such it would always hold the principal place in their exhibitions and their course of study. Amongst the paintings in the gold medal competition were more than one which just fell short of the combined qualities that went to make a great work. He hoped the competitors would not allow their disappointment to discourage them from further efforts, nor was there any need to feel discouragement, for, in spite of the failure to gain the gold medal, there was promise that more than one of the competitors would achieve success in the future and take high place in the development—perhaps even in the history of the art of our country. The President warned the student against that crude and spurious realism which now tainted youthful effort, especially in the present decade, which has seen "the apotheosis of mere cleverness." Be satisfied that you have cleverness, he exclaimed; but do not show it; restrain and conceal it if you would become really great, for cleverness and technical excellence, when displayed as the end instead of the means of art, necessitates the absence of the artistic sentiment and of the higher capacity. The more the painting of your model is like your model the less it is like the character he is supposed to represent, and the more it departs from art. The apostles of realism and the hierarchs of technique always meet this great truth, not with experiment, but with a name in lieu of it, viz. Velasquez, who, if the truth be told, reached the astounding height he attained not by reason of but in spite of his limitations; only the commanding force of his genius compels us to pardon the shortcoming we do not find in Titian, in Rembrandt, his two great companions in the trinity of art. On the part of the student, therefore, the appeal to Velasquez is reduced to an evasion of the higher efforts. With only technique Hals could be vulgar and Rubens tiresome; but the possession of the other greater qualities could raise a modern—Ingres, to wit—nearly to the side of the great masters of the decadence, so exquisite is his drawing and so fine and lofty his sentiment. Referring to this master, Sir Edward Poynter said that had it not been for the indiscretion, or patriotism, of a French agent Ingres's masterpiece of portraiture would now be hanging on the walls of the National Gallery, instead of in the Louvre. The President urged upon his hearers not, in Sir Joshua Reynolds's words, to begin where the great masters left off, and reminded them that the wonderful technique to be found in Millais's best work—notably in "The Yeoman of the Guard" now at the National Gallery—was a technique slowly developed out of the intensely painstaking handling of his early days. He was glad to think that they would shortly in those rooms have an opportunity of surveying the whole life-work of Millais. Without entering in detail into the work done by the students, he thought that the subject of the cartoon of a draped figure was the best executed work he had seen turned out for a number of years by Academy pupils. The painting of drapery itself was comparatively easy of attainment, but the proper arrangement of drapery belonged to one of the most difficult departments of art. The compositions for the gold medal in sculpture were also excellent in design, but it was matter for regret that there had not been better competition in medalling. A number of the architectural drawings, too, were lacking in originality, and there was too much of that picturesque irregularity of architecture which appeared to have become the fashion of the day. As a final word he could but say that in every department there was evidence of zeal and painstaking energy, and he could only encourage the students to persevere, with the consciousness that in after years the exertions they put forth would meet with their due reward.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.

A LECTURE was delivered by Mr. Sydney D. Kitson to the members of the above Society on Monday evening in the Leeds Institute of Science, Art and Literature, the subject being, "Some Byzantine Churches in Greece." Mr. George Corson (president) occupied the chair. Byzantine art, Mr. Kitson said, was connected with the youth of Christianity, and had maintained its traditions to the present day. Many lessons were to be learned from it—lessons of construction and design. He went on to describe some of the Mediæval churches of Greece, most of which, being small, had been almost entirely disregarded by travellers. The builders of the old Byzantine churches, Mr. Kitson remarked, did not strive after effect; they knew that by expressing themselves truthfully they would obtain a beautiful building.

NOTES AND COMMENTS.

M. REDON, the architect who is entrusted with the conservation of the Louvre, has prepared plans for the adaptation of the Pavillon Marson to a museum in which the collections of the Union des Arts Décoratifs can be exhibited. He proposes a large hall carried through two storeys, and which is to serve for temporary exhibitions. It will be surrounded by several small rooms, which will be assigned to different sections of the collection. The Pavillon itself will probably be devoted to the objects from the Garde-Meuble, which are sufficient to form one of the most interesting exhibitions of furniture. As the building will be lighted by electricity, the collections can be studied by designers and workmen in the evenings. The Union introduced the system of admission fees, which are not popular among visitors to French museums, and it is not unlikely the Government will insist on the collections being visible gratuitously on some days in every week.

ALL the treasures which were carried off by the armies of France from other countries a century ago were not returned after the downfall of NAPOLEON. The Monuments Commission have discovered one example which came from Coblenz, but not a word is said about its restitution to that city. It is a retable in gilded copper adorned with enamels, the subject being the Descent of the Holy Spirit on the Apostles. There is a Latin inscription in antique characters, being a verse from the Acts of the Apostles in the Vulgate, and from the style of the lettering it is evident that the work is Rhenish of the twelfth century. The retable was lately discovered in the sacristy of the Abbey of St. Denis, but it will not be allowed to remain there. It has been transferred to the Cluny Museum in Paris.

IT would be an advantage if the authorities in London and the principal provincial towns were to imitate the action of the Municipal Council of Paris. It is proposed that from January 1, 1898, a competition will be opened each year between the architects and the proprietors of the houses erected during the year in Paris. The proprietors of the six houses which are considered to be the best will be exempted from a payment of a part of the dues, or "droits de voirie," which are imposed on new buildings. A premium of 1,000 frs. will be awarded to the architect of each of the houses. The architects who wish to compete are to make application between December 1 and December 15 in each year. The jury that will make the selection will be composed of five members of the Municipal Council, the director of architecture of the city, the inspecting architect, and two architects nominated by the competitors. A nearly similar competition was arranged for the houses in the new thoroughfare, the Rue Réaumur. Only in that case four houses erected between January 1, 1896, and December 31, 1899, will bring premiums to owners and architects. The sums awarded are not very large, but it will be advantageous for an architect to succeed in the competition and profitable for the proprietors.

THE office of supervising architect for U.S. Government buildings is always held for no more than a brief period. About a month ago a Mr. TAYLOR obtained it, but already an attack is made on him on account of his politics. It is said that the candidate who stood first in the competitive examination was passed over because Mr. TAYLOR was considered a better Republican. That is one view, but there are others who say that Mr. TAYLOR is not a good Republican, but that he is a good Democrat, and his votes are referred to. In 1888 he voted, it appears, for Mr. HARRISON. In 1892 he did not vote, and at another time he preferred to give his support to Mr. CLEVELAND instead of to Mr. BLAINE. But if good Democrats are in favour among the Republican party, it is asked why Mr. AIKEN, who held the office, was asked to resign immediately the MCKINLEY administration came into power? A journal which supports Mr. TAYLOR says:—"As a matter of fact, the only recommendations which are known to have been sent to the secretary in his behalf while the three names were under consideration, and which could by any construction be placed in the category of political support, were a letter from Senator DAVIS, of Minnesota, who was an old personal

friend of the TAYLOR family, and another from Representative HARMER, of Pennsylvania, who represents the district of Mr. TAYLOR's present residence. Mr. HARMER, as the writer is informed, was not personally acquainted with the candidate, but knew him by reputation, and sent the letter at the suggestion of some of his acquaintances in Philadelphia, who thought that a line or two which would show how Mr. TAYLOR is regarded by his neighbours at home would be only proper. Senator DAVIS's letter was a statement of what he knew of Mr. TAYLOR as boy and man, his character and the stock he came from. If either the Senator or the Representative had been a Democrat, but had stood in the same relation to the candidate in other respects, he would doubtless have been asked to bear the same kind of testimony." Mr. TAYLOR served for two or three years under his predecessor, and apparently he is the right man for the office. But an American official cannot expect to enjoy a long tenure of any post, and it is evident that already a successor to Mr. TAYLOR is looming large before the wirepullers of Washington.

PHOTOGRAPHS of objects of architectural, archaeological, historical or ethnological interest, for the collection now being formed previous to being deposited in the British Museum, will be received by Mr. SCAMELL, architect, the curator *pro tem.* of the National Photographic Record Association. Only unmounted photographs printed in carbon, platinum, or other permanent process will be received, the standard size being whole plate. Contributions may be forwarded to Mr. SCAMELL, either at the Royal Photographic Society, 12 Hanover Square, or at 21 Avenue Road, Highgate.

THE restoration of the church of Llanbeblig, Carnarvon, has brought to light some interesting features. The interior was covered with mouldy plaster, and filled with pews and galleries of rotten deal, so that the existence of many relics was completely hidden. The church is dedicated to St. PEBLIG, and was the first in Wales to bear the name of a saint not admitted to the Roman Calendar. PEBLIG's date was about 450 A.D. It stands close by the old Roman Segontium, a heathen altar (probably from thence) having been found in the foundations of the nave. In the south transept is a tomb said to be that of CONSTANTIUS CHLORUS, father of CONSTANTINE THE GREAT, whose body was removed hither from York by EDWARD I. A fine altar-tomb in a side chapel commemorates Sir WILLIAM GRIFFITH, Kt. (1587), and a brass in the chancel (1500) one of the Ffoxwist family now extinct hereabouts. Amongst the coins found were a dupondius of HADRIAN (A.D. 117-138), and a denarius of MAGNENTIUS (A.D. 350-353). Two incised stone coffin lids, a quaint monumental effigy, a stoup, a piscina, a credence, and an aumbry have also come to light. The restoration has followed strictly the lines of the original work, and has cost 4,000*l.* The vicar has had to become personally responsible for the sum of 1,000*l.*

ILLUSTRATIONS.

CASTLE KEEP, REIGATE.—ENTRANCE FRONT. BILLIARD ENTRANCE HALL.

PRIOR to the alterations this house consisted of the ordinary inartistic type of dwelling, with a central entrance and narrow staircase hall, about 5 feet in width, with the reception-rooms to left and right, and in dealing with the property no little difficulty was experienced in turning a house of this type into an artistic home.

The alterations comprised the removal of the old front and rebuilding the new front about 6 feet in advance of the old line, and the removal of one of the side walls of the staircase hall to form a large entrance hall, which is used also as a billiard-room; also the rearrangement of the staircase and the addition of bay windows. The pitch of the roof was governed by the old slopes. The lower portion of the work is carried out in a warm-coloured red brick, the upper part being rough-cast and distempered, and the shutters and entrance door painted green.

CATHEDRAL SERIES.—CANTERBURY: PART OF SCREEN TO DEAN'S CHAPEL. ARCADE IN CHAPTER-HOUSE. EFFIGIES.

THE OLD BREAKFAST-ROOM, ALTHORP PARK, NOTTINGHAM.



PHOTOGRAPHED BY S. B. BOLAS & CO.

17th 1897.



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ELIARD ENTRANCE HALL.

, Architect.



PHOTOGRAPHED BY G. B. BOLAS & CO.

1897.



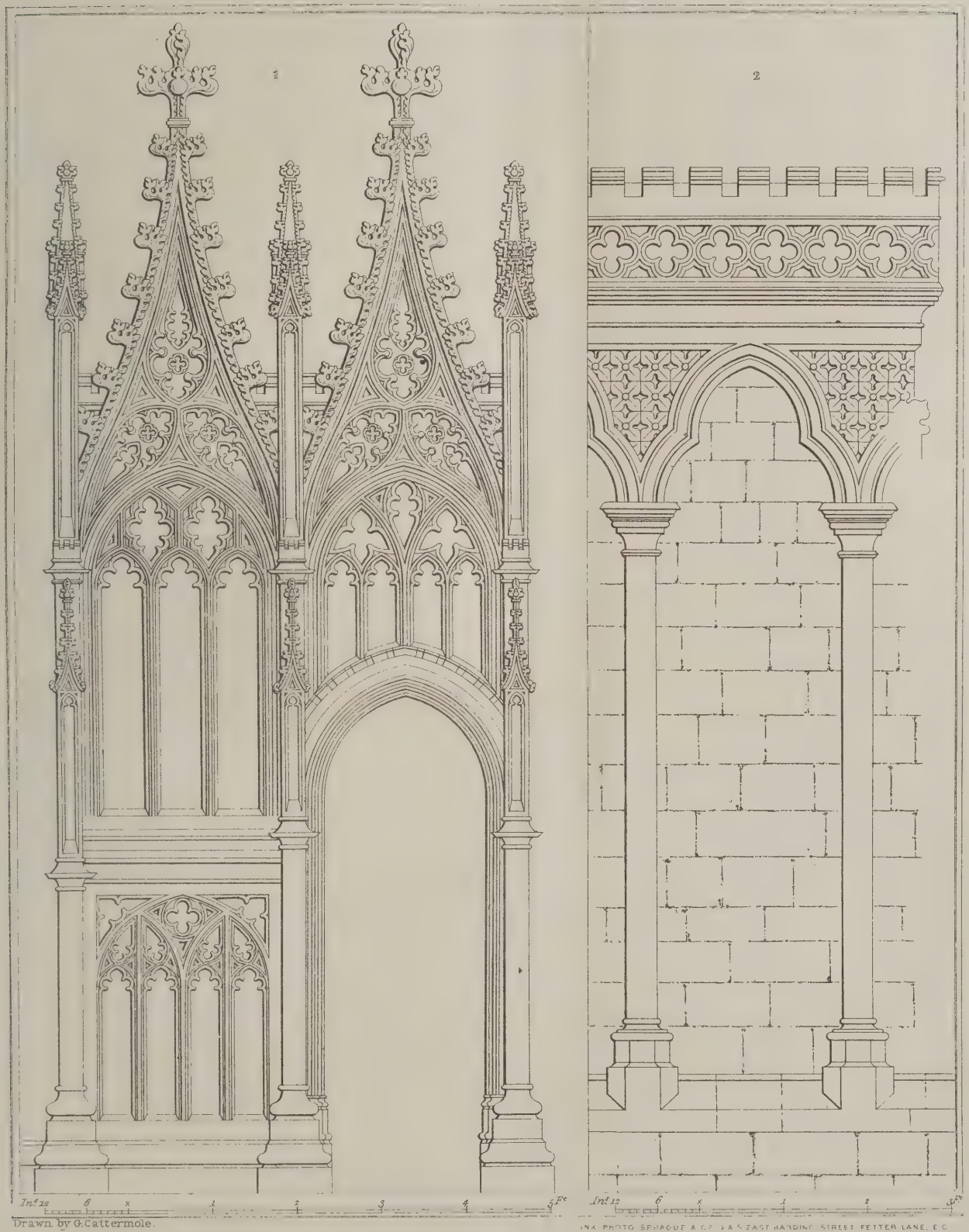
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1.—ARCHBISHOP CHICHELEY.

2.—ARCHBISHOP WARHAM.

3.—ARCHBISHOP WARHAM.



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CATHEDRAL SERIES, No. 93a.—CANTERBURY:

1.—PART OF SCREEN TO DEAN'S CHAPEL.

2.—ARCADE IN CHAPTER-HOUSE.



PHOTOGRAPHED BY BEDFORD LEMERE & CO

17th 1897.



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ORP PARK, NORTHAMPTON.

THE PURCHASE SYSTEM AT SOUTH KENSINGTON.

IN the course of the exhaustive evidence given by Major-General Sir J. Donnelly, secretary of the Science and Art Department, before the select committee on museums, the following information was obtained about the procedure adopted when objects are purchased for the South Kensington Museum:—

Sir John Gorst: What amount of public money is spent in adding to each part of the museums under the Science and Art Department?—To begin with 1885-86, it was 1,200*l.*; then the next year, 1886-87, 1,500*l.*; 1887-88, 2,000*l.*; 1888-89, 2,000*l.*; 1889-90, 2,000*l.*; 1890-91, 2,000*l.* Then, 1892-93, it was 1,800*l.*; 1893-94, 2,000*l.*; 1894-95, 2,000*l.*; 1895-96, 2,000*l.*, and it was then reduced last year to 1,800*l.* Take the works of art in the same way, beginning with 1885-86, 10,000*l.*; 1886-87, 10,000*l.*; 1887-88, it went down to 7,000*l.*; 1888-89, 7,000*l.*; 1889-90, 10,000*l.*; 1890-91, 10,000*l.*; 1891-92, 10,000*l.*; 1892-93, 7,300*l.*; 1893-94, 10,000*l.*; 1894-95, 10,000*l.*; 1895-96, 10,000*l.*; and then last year reduced to 7,000*l.* Then there are certain other subordinate votes, such as reproduction of works of art, for the hire of specimens, photographing art objects, historical collection of paintings, exchange of works and the art library, preparation of catalogues, carriage of materials. The total cost of that for 1895-96 was 19,100*l.*, and for 1896-97 was 14,360*l.*, being a reduction of 4,740*l.* Then in the Geological Museum there is a small purchase vote which used to be 400*l.*; that had been so for many years; that was reduced to 240*l.*, being a reduction of 160*l.* last year. Then in the Edinburgh Museum, the purchases which had been, I think, for some time at about 2,600*l.* were reduced to 1,600*l.*; a reduction of 1,000*l.* In the same way Dublin Museum was reduced from 2,300*l.* to 1,400*l.*; that is a reduction of 900*l.* That made altogether a reduction last year in the science and art branches of 6,100*l.*; and in the new estimates for 1897-98 the 1,000*l.* for Edinburgh and 900*l.* for Dublin have been reinstated.

How are the art purchases made?—The Museum director and his staff when they have things offered to them make proposals for purchases.

In the case of art it is the director of art and his staff?—Yes; the director for art of the Department makes his comments. That is the rule, but it is not invariably followed. He has the right to make his comments on the proposal, and then, if the purchase is a considerable amount, or there is any reason for thinking that the lord-president or vice-president may require some further advice, some experts on the committee of advice of the Department are consulted, and they give their opinions. Then it comes before the vice-president or the lord-president for his sanction, except for purchases under 20*l.*, which the Museum director can purchase on his own authority.

The original recommendation for the purchase comes from the director of the Art Museum, Mr. Purdon Clarke, does it not?—Yes.

And that is referred in the first instance to the art director, to Mr. Armstrong?—Yes, as a rule; I think they generally talk it over.

The art director is an official of the Science and Art Department, who advises you upon matters of art, but has no special connection with the Museum?—Yes, his functions with regard to it are laid down very clearly in the paper which I circulated, as I understood all these orders were to be circulated. It is called Form No. 1,286. It says:—"All proposals as to the purchase or rental, whether of pictures or art objects generally, are to be brought before the Board by the secretary, and should be accompanied by a statement:—1. The vote under which they are proposed. 2. The amount voted for the year. 3. The amount remaining at the disposal of the Board for purchases; or, in the case of rentals, still free from liability for the year. 4. The name of the vendor. 5. The price at which similar purchases have been made. The Museum staff will report."

As a matter of fact, those are not brought before the Board, but are brought before the vice-president, are not they now?—Yes; at one time we often had boards at South Kensington; the lord-president, or the president, either singly or together, used to come and hold boards at South Kensington.

That has fallen into desuetude at present?—Yes.

Were the purchases always brought before the Board?—No; very often the papers, especially if there was any pressure about it, were sent to Whitehall. Of course the question of a Board is a matter of internal arrangement.

As a matter of fact, the purchase is originally recommended by the Museum art director, and is then commented upon by the art director of the Department?—Yes.

And is then submitted, with your observations, to the vice-president for sanction?—Yes.

He consults the lord-president if he pleases. It is left to him to consult the lord-president or not?—Yes.

Under what sum are purchases made without sanction?—20*l.*

The Museum director has power to purchase up to 20*l.* without sanction?—Up to 20*l.* without sanction; but he ought to consult the director for art about it. I do not know that he always does. Of course these are the general rules, but on many occasions they are not rigidly adhered to.

Then the Museum director and the art director, if they were agreed, could purchase without further sanction any object under 20*l.*?—Yes.

Now, will you tell the committee what you mean by the committee of experts that you said were taken into consultation sometimes? Who do that committee of experts consist of?—The original minute appointing these committees was May 9, 1882:—"My lords decide that for the undermentioned collections in the South Kensington and Bethnal Green Museums, there shall be a body of referees or advisers who can be consulted as to purchases, elimination of objects, cataloguing, general arrangements, &c., either singly or in committee, as the occasion may require; provided that there is always a meeting of each committee for general inspection of the collection with regard to which it advises once every year. This will not preclude the employment and payment of a specialist from time to time to carry on a definite piece of work." Then came a list:—"Art Museum.—Mr. G. F. Bodley, A.R.A., Mr. C. Butler, the Earl of Carlisle, Mr. Walter Crane, Mr. F. Du Cane Godman, F.R.S., Mr. J. P. Heseltine, Mr. W. de Morgan, Mr. A. Morrison, F.R.G.S., Mr. J. H. Pollen, Sir E. J. Poynter, P.R.A., Mr. George Salting, F.S.A., Mr. L. Alma-Tadema, R.A." Those are the present advisers. Then there are also committees for the Indian Museum and various other sections.

As a matter of fact, are those experts consulted?—I think at one time they were a good deal consulted; much depends upon who the Museum director may be. If the Museum director has been appointed from the point of view of administrative capacity, as, for instance, the late Sir Philip Owen was, these committees have to be more largely consulted than has been thought necessary when the Museum director was a man well known in the world as an art expert, as, for instance, the late Dr. Middleton. Therefore the art museum committee, which was very often consulted before Dr. Middleton's time, was very little consulted while he was the director. Since then I think we have had one or two meetings of the full committee; and, of course, at all times, even during Dr. Middleton's life, we consulted separate people on separate portions of the collection when purchases were to be made. For instance, in the case of purchase of tapestries, I remember that Dr. Middleton almost always got the late Mr. William Morris's opinion and put it with his own when he recommended a purchase. But, quite recently, when you, sir [Sir J. Gorst], had some doubts about purchases, you directed that the committee should be called together; and those purchases, and a number of others which were remaining with the Museum for consideration, were brought before the committee, and they reported to you what they recommended for purchase and what they did not.

Sir Henry Howarth: In the case of the purchase of pictures, have not living artists been consulted whose names are not in that list at all?—Yes; the President of the Royal Academy is almost always consulted when there is an important—

When there is a purchase of an important or expensive picture?—Yes; these purchases of pictures are a small thing, it is only 800*l.*, and it is left in the hands of the art director very largely. But when there is at all an important picture, he always brings it up with the advice or recommendation of somebody of that kind.

When you say that there is only 800*l.* for the purchase of pictures, is the estimate confined to 800*l.*?—Yes; 1,000*l.* it was, and it is now 800*l.*

Is that a separate item of the estimates?—Yes; historical collection and paintings.

In addition to the 7,000*l.*?—Yes.

It is now 800*l.*?—It is 800*l.*

But do you not sometimes buy pictures out of the 7,000*l.*; is not the 7,000*l.* applicable to the purchase of pictures also?—No, unless it is a purely decorative thing; some pictures have been purchased out of that in this way; some pictures have been purchased for their frames, which were very fine frames; the pictures went for nothing, and no doubt in that way some pictures have been purchased out of the 7,000*l.*

Mr. Acland: Of course you would not include copies of frescoes which are part of the Art Museum?—No, that comes under the head of reproductions; but when a thing is purchased as a picture it ought to be purchased out of the sub-head for pictures.

Chairman: Anything that remains unspent on March 31 is returned, is it not, to the Treasury?—Yes, this March 31; after that it will not be returned.

There is to be a new system?—It will in future be a grant in aid.

Do you think the existing practice, which is now to be altered, the practice of repaying into the Treasury, has ever led

to any recklessness of purchase towards the close of the financial year?—No; the fact is, we have always had more things to purchase than we had money to purchase with. What has happened, possibly, has been this, that we have found that there is perhaps 30*l.* or 40*l.* left, or something of that kind, and the objects that are down in the reception-room very likely are things for which they require 300*l.* or 400*l.* It is quite possible, then, that the Museum director may go off and see at the various dealers in London whether there does not happen to be a thing of about the price of the money he has which it would be desirable to purchase. Of course he would not buy it if it was not desirable to purchase it. But it would be a very strange thing if you could not find a desirable object for a museum or for circulation among the whole of the dealers in London for 40*l.* or 50*l.* Of course it has never been necessary to waste any money. I have never known any case, at all events.

Mr. Acland: But you have occasionally anticipated the money of the next year, have you not? I do not mean in a technical sense. I suppose some arrangement has been made by which part is paid in one year and part in another, in accordance with the regulation. I suppose that has been done?—That is so; and this alteration is an advantage in that way, because, as Mr. Acland will remember, we had considerable difficulty in purchasing a very valuable collection only a year or two ago, called the Peyre Collection.

From Paris?—From Paris; the gentleman did not understand the English financial arrangements. He would only sell the whole collection at once, *en bloc*, and we could not pay for it at all *en bloc*, and therefore we waited till the end of the year. We explained how it stood, and we had to make a definite separation of his collection for a certain sum and get a receipt for that. We could only say we would do our best to purchase the rest next year, but we could not promise. He took it in that way and the thing was left over till the next year. It unquestionably caused some negotiation.

Chairman: Now, is there any separation between the objects which you purchase for circulation and those which you purchase for permanent exhibition in London?—No. The theory is that any object that is purchased for the South Kensington Museum is, and shall be, available for circulation. Of course, some things that have to be stuck on to the wall cannot be circulated, but otherwise everything is supposed to be in theory available. As a matter of fact very valuable objects are not often sent away from London, though one or two of the most valuable things have on occasion been sent when there was some special exhibition. For instance, I remember the Soltikoff reliquary was sent to Birmingham a number of years ago, when they had a special exhibition there of enamels. But the very fine things are, of course, as a rule, not sent away from South Kensington. With regard to the other things, there is no doubt it often happens that when recommending the purchase, the art museum director, or Mr. Armstrong, has specially noted that the things would be useful in circulation, and those objects are no doubt very largely kept in circulation.

Are the objects for the Science Museum and for the other museums purchased generally upon the same principle?—Yes; the directors in Dublin and Edinburgh have a right of purchasing up to 20*l.*; but when an object is of a higher price they have to refer it to South Kensington.

Mr. Bartley: Then the general conclusion we come to, I suppose, is that taking the collections as a whole they have been extremely well bought, very economically bought, but there have been cases where mistakes have been made?—Yes, I believe they have been very well and very economically, many of them extraordinarily extremely economically, bought, and I believe, from all I have heard with regard to other museums, that there have been a few mistakes made at South Kensington as in any other public museum of the same size in Europe. I have talked to many of the directors of other museums, and they have all admitted that they are taken in at times.

Would you agree that it is a very important matter in the organisation of a museum that the purchases should be most carefully arranged for?—Yes, and I think the arrangements that now obtain are as good as we could well make them; nobody has suggested any better arrangement.

I should like to ask a word or two about the Art Library. Do you consider the Art Library a very important educational adjunct to the Museum?—Yes.

Did it commence its career about the same time as the Museum?—Yes, I think they began and carried on together; in fact, it is part of the Museum, because it is not only a library, but there are many drawings and bookbindings and things of that kind in the library. It is just one section of the Museum really.

And an important section. Are there the same rules for the purchase of books as for the purchase of museum objects?—Yes, it is not often that the purchase of a book comes up for decision by my lords; I mean there are not many books over 20*l.* in value.

Who recommends them?—That is done by the keeper in

charge of the Art Library consulting with the director; the director is responsible for all purchases.

Are all purchases made from South Kensington?—If they are more than 20*l.* they have to refer for sanction, but over and above that the directors of both museums in Dublin and Edinburgh very largely use the services or take advantage of the assistance and services of the staff of the Museum at South Kensington in telling them of objects for purchase and advising them. Whenever they see objects for sale in London that they think would be desirable for Dublin and Edinburgh they advise the directors of it.

For all practical purposes their superintendence is with you, but the detail carrying out is left very largely, I suppose, to the keeper or superintendent?—Yes, the director.

Lord Balcarras: Have you ever bought things for the Museum yourself?—I have sanctioned purchases.

Have you bought things?—No; well, wait a bit; no, I do not think I ever have.

You are not sure?—I remember now once, when I was abroad, buying a brass object at Venice for myself, and I thought I was bound to offer it to the Museum, and I am sorry to say they took it; but that is the only thing I ever bought for the Museum.

Is it possible for the secretary of the Department to buy for the Museum?—Oh, yes, it is possible; but, of course, he would naturally report anything of that kind he had done to the heads of the Department.

He is the head of the Department?—No.

Mr. Acland: He would not be likely to buy without the knowledge of the director, or talking it over?—No, I do not know of any case; the case I have mentioned was the only time I have ever bought a thing. I have sanctioned purchases that another recommended, and for instance, during the vacation and recess I have sanctioned many purchases, and at other times the director of the Museum and the director of art have come and said there was a sale going on at Christie's and it was advisable to buy so-and-so, and I have sanctioned their making the purchases up to a certain price, and then reported what I had done to the heads of the Department for their information.

Lord Balcarras: Supposing the director brings in some object, the secretary of the Department is practically entitled to say, "This shall be bought," or "This shall not be bought"?—The secretary, I take it, is chief of the staff, and it is his business to do on his own authority anything that he knows his chiefs would consider ought to be done. Sometimes he has to take the responsibility of acting on his own judgment before he can refer to those chiefs. He would be neglecting his duty if he did not take the responsibility on those occasions, when if he hesitated some things might be lost. As to refusing, I suppose I have an authority, I do not know that I have ever exercised it, that if the director of the Museum came to me and proposed certain purchases, and I thought them undesirable, I should tell him so. If eventually he still thought they ought to be purchased, I should pass the papers on to the heads of the Department, with my remarks on it, saying that I did not recommend it; but I do not remember anything of the kind having occurred.

You say it would be submitted to you, and you would state if you thought it desirable or not?—Yes.

Supposing the director of the Museum brings, we will say, a chalice to you, the cost is immaterial; he says, "I want to buy this;" I understand from your evidence five minutes ago that it would be in your province to say whether the object should be bought or not; the sole criterion would be the knowledge of art on the part of the secretary of the Department?—If I said that I did not explain myself thoroughly; what I said was that if I thought he was wrong I should tell him so, and we should discuss the matter. If he still thought it was a desirable purchase, I should submit it to the heads of the Department, and I should say, "I differ from the director for the Museum, and I think this is a case in which you had better call in some of the referees;" that is the course I should pursue. If, on the other hand, there was a pressure of time, and it was necessary to make the purchase straight off, and the director brought me a proposal to purchase sufficiently supported, and I, looking at it from the common-sense point of view, thought there could be no question on the matter, I should authorise him so as to prevent the object being lost, and I should report to the heads of the Department what I had done. I have done so on many occasions, taken the responsibility of acting for them.

For the heads of the Department?—Yes, when there was not time to refer to them.

In fact, without your official power it would have been impossible on certain busy occasions for the Department to have acquired certain art objects?—Yes, I acted for the heads of the Department, as they always authorise me to do.

In the beginning of your last answer but one you said, "If I thought the director of the Museum was wrong, we should discuss the matter." Assuming you have money to make the purchase, that means you would discuss the matter from an art

point of view; as to whether the object was genuine and would fill a particular gap, and so forth?—I would discuss it from the common-sense point of view.

I do not understand. When a chalice, the case I named, is brought to the Museum for purchase, good common sense, I have no doubt, is valuable in every walk of life, but is not something beyond common sense required to settle whether that particular object should be bought or not?—What I mean by a common-sense point of view is this, that if Dr. Middleton had said to me, "Here is a chalice of the thirteenth century, and I think it is a very valuable thing and perfectly genuine," I should never have dreamed of saying it was not a chalice of the thirteenth century, or arguing the matter on that head; I might, from the common-sense point of view, have said, "Well, you have spent a good deal of your vote this year on chalices" (if it happened to be so), "do you think it is really desirable?" And we should have gone further into the matter; but this is really a purely hypothetical business. As long as I have been secretary I have never had to give a direct opposition to the Museum director on the subject of any purchase, and I have never had to go to the heads of the Department and say, "The director of the Museum thinks one thing and I think another." It is really not a practical question.

During all these years you and the director of the Art Museum or the director of the Science Museum have always agreed upon the desirability of purchases?—Not at first, before we began talking about it; sometimes he has come and discussed the matter with me, but we have never come to direct opposition.

I ask this question because I see in one of the reports you gave us in manuscript, which has not been printed yet, it says that an object bought by Mr. Cole was removed as undesirable; I presume, therefore, it was within the province of the secretary of the Department to buy?—Mr. Cole was director of the Museum as well as secretary.

Then at that time the two offices were combined?—Yes.

I understand from your evidence that your sanction only is required for the purchase of art objects and not your direct initiative?—My direct initiative is certainly not required, but strictly speaking, where it is an expensive object, the sanction of the heads of the Department is required.

With regard to that point, you say when it is an expensive object?—I mean above 20*l.*; the director of the Museum on his own responsibility can purchase up to 20*l.*

"The Museum staff," I see in paragraph 23, on Form 1,286, "are authorised to make purchases of objects not exceeding 20*l.* in value"?—Yes.

That is what you said just now?—Yes.

Is not that entirely ruled by the following sentence—"But the science or the art director should in all cases be consulted before any purchase is made"?—As a matter of fact that has not been enforced; they have made lots of purchases without consulting the science and art director, but as a rule he should consult the art director.

In that case the Museum director has no authority to buy, not up to 20*l.* but for a guinea, without permission of the art director?—In practice that is not so.

These rules are not regarded then?—In practice they have not been carried out so strictly as they have been laid down.

As they are laid down I have read the rules very carefully. —I say they have not been carried out as strictly as they might verbally be construed.

In rule 23 I see:—"All purchases, whether they require Board sanction or not, are subject to the control of the secretary"?—Yes, absolutely as accounting officer.

Control means, you must sanction the purchase?—Whoever is accounting officer must have that power eventually; I am accountable for the money, and if they were to exceed their vote I should be personally responsible for it, and therefore I must have control.

Not on the expenditure of the money, but on the subject on which that money is expended?—I thought I had explained that.

ART IN CHURCHES.

A CONFERENCE, convened by the Clergy and Artists' Association, was held at Bishop's House, Kennington Park, on Friday last. The Association has for its object the raising of the standard of church decoration, and with that end in view it seeks to enable the clergy and others to approach the artist more directly, in the belief that the best work can come only from men whose cultivated talents give them the independent position of artists, and not from those who turn the supply of church decoration into a commercial pursuit. Sir W. B. Richmond, R.A., said that the movement which the Association was carrying on was, in his opinion, a very interesting one, and it was one which he had wished to see initiated for a good many years. He would warn its promoters that it was desirable to begin on a small scale and not to increase

their numbers too rapidly. They should, he thought, only admit into the Association people who were very much in earnest and be on their guard against commercialism, into which everything in England had a tendency to drop down with a rapidity which was simply appalling. In his view art in our churches ought to be an expression of our national as well as our religious life. It should express the thoughts that were moving in our own time, and some latitude in the choice of subjects might be allowed to the artists. He could not see why bad drawing was necessarily devotional. There were a large number of people who supposed that the pious picture or window or reredos must have a sort of mawkish sentimentality about it. He trusted that the Association would keep clear of this tendency, and would encourage that which was manly, and that which in the best sense was modern. There never was a time when people knew more of the heroism of Englishmen than now, when all interesting occurrences were reported in the newspaper press. Many of the heroic doings of our fellow-countrymen might well be pictured on the walls of our churches. The disaster to the Margate lifeboat was fresh in people's memory. The crew entered that boat with the knowledge that they were carrying their lives in their hands. Their occupation needed the display of just as much courage as, and perhaps more than, the courage shown by the early Christians in allowing themselves to be thrown into the arena at Rome. He thought that by taking such subjects as the Margate lifeboat disaster—he did not say that subject particularly—and picturing them in our churches we should make our art a national art. There were, again, many subjects in the Old Testament which had never been touched by the artist. For instance, almost the entire Book of Psalms and the Proverbs were rarely illustrated, though they would supply wonderful subjects which could be so treated that the roughest ploughman could understand them. With regard to technique, he would lay it down as an axiom that nothing painted on canvas should be applied to a wall. The greatest French artists had used canvas for the decoration of the Panthéon in Paris, but it must be recognised even by the artists themselves that the result was an entire absence of unity. The fact was that a picture painted on a canvas in a studio and stuck on a wall invariably looked like a picture, and this a wall decoration ought not to do. As to stained-glass windows, our present system was almost always wrong. In the thirteenth and fourteenth centuries stained-glass windows were made by a sort of travelling guild of men, who moved about from town to town, carrying their furnaces with them. Their glass was made close by the church for which it was designed, and it was put up and altered again and again until it was regarded as right. What happened now? A man in Yorkshire who wanted a window wrote to a firm in London, who sent it down without knowing a bit about the church for which it was intended, except, perhaps, that it was of brick or of stone. The stained-glass art was one of the most difficult arts in the world, and yet it was relegated to people who were not artists. For the Clergy and Artists' Association to succeed it must move with the broader thoughts of the time, it must be exclusive and not inclusive, and it must produce better workmanship than the firms were able to supply. It would do a great deal of good, however, if it put the firms on their mettle and made them employ serious artists instead of people whose business was to design for six days a week and seven hours a day, which no living man could do with satisfactory results. The Bishop of Rochester, after commending the work of the Association, remarked that, like Sir W. B. Richmond, he had been struck by the comparatively narrow selection which Christian art made from the great riches at its disposal. There was a great deal in the Bible that art could lay hold of to make its own.

ARCHÆOLOGY IN WALES.

AT the annual dinner of the Honourable Society of Cymmrodorion on Monday, Lord Justice Vaughan Williams, who presided, said that the first foundation of the Society was in 1751, and no one could doubt the great usefulness of such a Society, not only to members of the Welsh brotherhood and the larger Celtic family of nations, but also to every intelligent man, and especially to every scholar, archaeologist and philologist. The original Society in its progress acquired a high reputation and flourished for years, but broke down in an effort to accomplish a zoological work, somewhat outside its constitution; but, phoenix-like, a Society rose in its place in 1820, only to come to an end in 1843, when its books and papers were with thoughtful wisdom placed with the British Museum. If the Welsh library which he had heard talked of of late was established in London, as he hoped it might be, he should not be surprised if these Welsh archives found a more characteristic resting-place than the British Museum. They would always, however, be grateful to the authorities of that great institution for the scholarly care bestowed on the Welsh

archives while in their custody. In the year 1873 the Cymmrodorion rose again in the form of the present Society, and every member of the Society ought to rejoice at its present prosperity, and to expect for the Society a long and prosperous life. The last quarter of this century had seen a remarkable development, social and political, of Welsh nationality. The marvellous progress of Welsh education and the establishment of the Welsh University were some among the many instances of this national development. Then, again, there had been in the subjects with which the Society was more particularly concerned what would be called in the City "a boom," which, happily, had not been ephemeral, but had gone on for many years, increasing year by year in intensity. He spoke of the progress made in philology, ethnology and archaeology generally throughout the world—a progress not only in the quantity of work done and the number of researches made in new fields, but also a progress made in the character of the work. Scholarly, accurate collations of scientific facts and data worthy to form the basis of really scientific conclusions had been substituted in all these fields for the hasty selection of a few ill-verified premisses as the basis of conclusions, to which students of these subjects used often to be impelled by warm poetic imagination rather than the cold dictates of reason. Among the work done by Welsh scholars recently he might mention the "Record Series," published under the auspices of this Society, and to which members of the Society had so liberally contributed in purse and good work, as strong evidence of the excellent work which was being done. The necessity of this series, suggested by Sir John Williams, had been emphasised by the announcement that the Government declined to undertake the publication of any more purely Welsh records. There had already been published in this series Parts I. and II. of the "History of Pembrokeshire," edited by Mr. Henry Owen, and Part III. would shortly follow. Mr. Henry Owen had munificently presented to the Society not only his labour, but had placed at the disposal of the council a sufficient number of Part II. as he did of Part I. to enable them to give a free copy of the work to any member who might apply for it. There had also been published in this series the "Court Rolls of the Lordship of Ruthin," by Mr. Arthur Roberts, of the Record Office; and he was told that they might shortly expect in this series the following among other works:—"The Black Book of St. David's," by Mr. Willis Bund, and "The Catalogue of Welsh Manuscripts" in the British Museum by Mr. Edward Owen. Dealing with the materials at the command of the Welsh archaeological student, he showed that as to the period of Roman occupation the Rev. Hugh Williams, professor of Church History at the Theological College, Bala, had thrown some light on the history of the early British Church, and how far and how long the Christian Church in Wales down to the sixth century was the Church of the Romans themselves. The sixth century seemed to have been a period of vigorous national life, of religious and mental activity. It was the period of St. David, St. Sampson and St. Teilo, of the poets Taliesin, Aneurin and Llywarch Hên, and of the marvellous Celtic Christian mission which went so far towards Christianising the Northumbrian Cymri. But, curiously enough, from that time forward down to the end of the eleventh century, there seemed to have been a dearth of any manifestation of this national activity, mental or otherwise, and even with regard to the sixth century itself there seemed to be no contemporaneous evidences, and what evidences there were took the shape of later manuscripts purporting to embody the works of the great men of the sixth century, and could only be received subject to the severest literary criticism, especially when they came to manuscripts belonging to the end of the sixteenth or to the seventeenth century. On looking at the materials at the disposal of archaeological students it seemed to him that further materials might come to hand later, because he did not understand that the records at the Record Office had been examined except to a very slight extent. Again, the monastic records seemed to have disappeared in such a wholesale fashion that one could not help hoping that they might turn up hereafter in some place where they were sent for safety, possibly in the library of the Vatican or in the library of some Cistercian convent abroad.

GLASGOW ARCHITECTURAL ASSOCIATION.

A MEETING of the above Association was held in the rooms on Tuesday, the 7th inst., the president (Mr. W. T. Conner) in the chair, when Mr. Alex. Wingate read a paper entitled "The Architectural Treatment of Gables." The lecturer confined himself to treating the subject in a general historical manner, tracing the development of the gable through its different phases from the Greek tympanum to the variable quantity of the present day. After a discussion, in which several members took part, a hearty vote of thanks was passed.

COLOUR PHOTOGRAPHY.

AT a meeting of the Royal Photographic Society, held in the rooms of the Society of Arts on the 14th inst., Professor Gabriel Lippmann described his system of colour photography, whereby a photograph showing the colours of nature is obtained by a direct process and with one exposure of the plate. The film, which might be of any sensitive substance, he explained, was exposed, developed and fixed in the usual way. Two conditions, however, must be observed. The film must, in the first place, be transparent and grainless, and, in the second, it must be in contact with a metallic mirror during exposure. The effect of the mirror, which was formed by running a layer of mercury in behind the plate, was to reflect back the incident coloured rays and thus make the incident light waves stationary. These stationary vibrations, falling in the interior of the sensitive film, impressed their own structure upon it, and by virtue of the structure thus imparted to it the brown deposit of silver, when viewed by reflected white light, appeared clothed with the same colours as were possessed by the image in the camera. The colours were produced by "interference" in the same way as those of the soap bubble or mother-of-pearl. That this was their cause M. Lippmann said was proved by the fact that the tints of a negative changed if it were damped in consequence of the gelatine swelling slightly and thus altering the structure of the silver deposit. The colours produced by this process were true and bright, provided that exposure and development had been properly conducted; they were, moreover, completely fixed, and resisted the action of light and time. He had not yet succeeded in taking prints from his negatives, but was convinced that to do so would be found possible. In the course of the lecture a number of the results achieved by M. Lippmann were exhibited in the lantern, including coloured photographs of the spectrum, stained-glass, landscapes, fruit and flowers, and the portrait of a little girl. A reproduction of the spectrum of argon showed the characteristic lines of that gas in the most beautiful and distinct manner.

SOCIETY OF ANTIQUARIES OF SCOTLAND.

THE first monthly meeting of this Society for the current session was held in the library at the Museum, Queen Street, Edinburgh, on Monday, Mr. J. Balfour Paul, vice-president, in the chair. The first paper, by Sir Arthur Mitchell, K.C.B., M.D., LL.D., consisted of a series of notices of facts or objects interesting on account of their bearing on the methods and conclusions of scientific archaeology. In the next paper Mr. F. R. Coles, assistant-keeper of the Museum, described a cyst with a double unburnt burial which had been recently discovered at Ratho Quarry. Mr. James W. Cursiter, F.S.A.Scot., contributed a notice of a stone with an incised cross, showing square, corded arms with circles at the intersections, and the two sides of the foot of the shaft ending in scrolls, which had been found on the site of the old chapel dedicated to St. Columba in Walls, Hoy, Orkney. Mr. T. N. Annandale contributed a note on the hammer-stone used in the Faroe Isles in the preparation of dye from tormentilla, two specimens of which were exhibited with melcather coloured by the dye. He also exhibited a Faroe bismar or wooden weighing beam, used like a steelyard, similar to those in the museum from Orkney and Shetland.

GLASGOW PHILOSOPHICAL SOCIETY.

A MEETING of the Architectural Section of Glasgow Philosophical Society was held on Monday in the rooms, 207 Bath Street. Mr. Macgregor Chalmers presided. Mr. Thomas Bonnar, F.S.A. (Scot.), decorator, Edinburgh, read a paper on "Notes on the Decorative Treatment of Interiors." At the outset Mr. Bonnar pointed out how backward we had been in this country in the use of colour both for external and internal decoration, and briefly referred to the probable causes. Amongst these he placed our climatic conditions, which he regarded as having had an undoubted influence on the national character. But now, while retaining the national individuality, we were in all the arts adding more of the warmth and brightness which come from contact with the larger world. The lecturer then referred to the picturesque in decoration, which he defined as akin to what architects call the accidental, and as the avoidance of mechanical uniformity of treatment; the seeking for originality, something unexpected and uncommon. He warned his audience, however, against the production of anything bizarre or fantastic. The decorator should only seek results which would arouse feelings of agreeable surprise and pleasure. Mr. Bonnar next dealt with the principles of decoration as applied to the adornment of our houses and public buildings, indicating some of the difficulties a decorator had to contend with, and the necessity for his seeking the highest development of his artistic sense, so that he might be saved from many mistakes in treatment.

After describing various styles of decoration as applied to the different parts of a room, the lecturer spoke briefly of ceiling decoration, arguing in favour of a return to the practice of painting these surfaces with form and colour, and thus an outlet would be obtained for the technical abilities of the rising school of decorative artists.

BYZANTINE ARCHITECTURE.*

WHEN Constantine the Great determined to make the ancient city of Byzantium the capital it was practically in ruins, and the style in which the city was rebuilt has been termed Byzantine. The Byzantine, the Venetian, the Florentine, the Lombardic and even the Norman may all be regarded as belonging to Romanesque architecture.

Byzantine architecture, as one of the subdivisions of Romanesque architecture, has peculiarities of its own. The style was developed from the Classical under the Byzantine Empire, or rather Roman Empire of the East, during the fourth and fifth centuries of the Christian era, and under variable modifications was used until the final conquest of the empire by the Turks in 1453. The style exerted considerable influence even in Italy as late as the fifteenth century, and it may be regarded as surviving still in Russian architecture and to a less degree in other Eastern lands.

An almost universal feature of the style in buildings of any pretensions is the incrustation of brick or rough stone-work with more precious material. Large spaces are left void of bold architectural features, to be rendered interesting merely by surface ornament of polished marble presenting natural beauty of hue, or of sculpture in very low relief, and confined in the main to vegetable or geometrical designs of clearly cut outline.

The style depends much upon colour for its effect and mosaics wrought on grounds of gold or of positive colour are profusely introduced. The leading forms which characterise the Byzantine style are the round arch, the circle, the cross and the dome supported upon pendentives.

The capitals of the pillars are of endless variety and full of invention; while some are plainly founded on the Greek Corinthian, many resemble those of the early round-arched Western architecture; and so varied is their decoration that frequently no two sides of the same capital are alike. The ancient basilicas of Sta Sophia in Constantinople and the church of St. Mark in Venice are classical examples of Byzantine architecture.

About the time of Constantine a number of general laws were imposed upon all architects throughout the Roman world. But after the capital had been transferred to Byzantium the bonds of tradition relaxed, and the Oriental taste which had introduced at Rome the employment of mosaics and coloured marbles again rose into the ascendancy and proportions were sacrificed to masses and beauty of lines to conspicuousness of ornaments. Somewhat later a new style of architecture came into vogue, which, without inventing anything, changed everything. Taking up what was exceptional at Rome, namely, the cupola, architects forthwith made it the chief feature and best known character of their art. Persian influence, it is supposed, had something to do with the development of this particular style which for the want of a more appropriate name was called Byzantine, and of which the church of Sta Sophia at Constantinople remains the greatest model.

At the present day there remains no trace of the first Sta Sophia, built in the fourth century by Constantine. After having been frequently burned, it was totally reduced to ashes in the year 532. Justinian caused it to be rebuilt by Anthemius de Tralles and Isidorus de Miletus. Ephesus, Palmyra, Pergamos and a multitude of other cities and temples were despoiled to enrich it, and furnished to the architects columns of porphyry and granite which were prodigally lavished upon its interior. Ten thousand workmen were employed in the construction of its brick ramparts, vaults and mosaics. Its peculiar beauties were such that notwithstanding the mutilations to which the Turks subjected it in 1453, we can still appreciate the proud exclamation of Justinian, referring to the temple of Jerusalem, "Solomon, I have surpassed thee."

The proportions of Sta Sophia are by no means gigantic. It measures only 266 by 248 feet. Its exterior is somewhat naked and is disfigured by a number of buildings which hide the general outlines. Between the buttresses—raised by Amurath III. to sustain the walls shaken by successive earthquakes—tombs, schools, baths, stalls, &c., are crowded.

But putting out of consideration this confusion and forgetting the four hybrid minarets with which conquerors have flanked the great mass itself, the spectator cannot but admire the beautiful curves of the apse and the central cupola, whose elliptical shape exaggerates its size. Two long covered porticoes lead up to the church, the second of which communicates by

nine gates with the interior. So soon as he enters the building the visitor takes in at a glance the entire conception of the architect, and is forced to render homage to his genius, which, casting aside the restriction of the Classic school, combined in such perfect accord the circle and the straight line.

Around the basilica, up to the height where the vault springs, are vast rows of seats supported by richly decorated circular galleries. Nothing can equal the majesty of these porticoes, in the Corinthian capitals of which animals, allegorical figures and crosses are interlaced among the foliage.

Sta Sophia has lost all its ornaments. The iconoclastic zeal of the Moslem has left it nothing but its precious pavement which was always concealed under carpets. The statues have been removed. The altar, made of an unknown metal which was a mixture of gold, silver, bronze, iron and precious stones welded together, is now replaced by a slab of red marble.

Of the mosaics on a gold ground with which the building was at one time enriched only the four gigantic cherubim have been preserved, but the heads of these figures are concealed under a rose of gold, the reproduction of the human face being a horror to the Mussulman. At the end of the sanctuary may be perceived the lines of a colossal figure which time has not yet obliterated. This represents Sophia, the goddess of wisdom and patroness of the church, who, under her semi-transparent veil, looks down upon the ceremonies of a foreign worship.

In the church of Sta Sophia the long naves which characterised the basilican churches of the Western Empire are metamorphosed into a series of square chambers surmounted by cupolas. Here the proportions of the antique basilica are altered and lost, but great beauties make up for the loss. The boldness of the cornices, the powerful relief of the supports, the pendants and corbels which connect the square nave with the circular cupola, the unity of the whole edifice, all parts of which bear upon the central mass, supporting and sustaining it, are the chief features of Byzantine art and make it both original and captivating.

The barbarity of the capitals in which the Corinthian acanthus degenerates into a meagre fillet, the strange mixture of figures in mosaic on a ground of gold which replace the breathing sculptures and the delicate ornaments of the ancient temples, are faults that are forgotten in the harmonious impression of the whole—a harmony which has caused many travellers and artists to prefer Sta Sophia at Constantinople to St. Peter's at Rome.

In the West, Byzantine art took root first in the possessions of the Greek emperors of Italy. The church of San Vitale, at Ravenna, was constructed in the sixth century, at the same time as Sta Sophia. This religious edifice is small and octagonal. Its cupola is supported on eight large pillars resting upon eight apses, and between the pillars and the apses runs an aisle, from which each apse is separated by three arcades. A gallery runs around the church, above which springs the cupola pierced by eight windows.

San Vitale is removed still further than Sta Sophia from the Classic architectural traditions, none of its ornaments having been borrowed from the ancient monuments. Certain capitals distinctly recall the Corinthian, but the volutes and the foliage are far from being pure. Most of them are square at the top and assume by insensible gradations the circular form. Sculptured trellis-work helps to redeem the poverty of the outline.

Like all Byzantine constructions, San Vitale has in spite of its limited dimensions an aspect of decided grandeur and character. Very beautiful mosaics and marbles formerly lent to it a splendour of which it is now deprived, the choir alone having preserved its primitive decorations.

The church which Charlemagne constructed at Aix-la-Chapelle, and which he considered superior to all the churches in the world, is but a barbarous copy of San Vitale. It is a curious specimen of the poor talent and the depraved taste of the western architects of that period. Astonishment need not be felt that Charlemagne, one of the most intelligent men of his time, knew much less about architecture than a modern schoolboy. At that time it was difficult to find a workman who could carve a capital or square even a monolith. Such was the poverty of skilled labour that the common expedient was to rob an old edifice in order to furnish material for a new one. Proceeding on this principle, Charlemagne caused certain columns to be transposed from Ravenna to Aix-la-Chapelle for the adornment of this church, which is interesting only for the memorials it contains, being a kind of historical sanctuary.

"St. Mark's at Venice," says Théophile Gautier, "is a Sta Sophia in miniature, a reduction on a scale of an inch to a foot of the immense structure of Justinian. Nor is this to be wondered at. Venice, which a narrow strip of sea only separates from Greece, was always in familiarity with the East, and its architects sought out and reproduced the type of church which was then considered the most beautiful and rich in the Christian world. St. Mark was commenced in 979 under the

* A paper by Cyrus K. Porter, published in *Stone*.

doge, Peter Orseolo. Its architects had the advantage of seeing Sta Sophia in all its integrity and splendour before it had been profaned by Mohammed II. in the year 1453."

Under the five small domes at the sides of the structure open up the seven porches of the façade, of which five lead into the central atrium and two into the exterior side of galleries. The depth of these portals is garnished with columns in cipolino and pentelic marbles, in jasper and in other precious materials. "The central door, whose outline cuts the balustrade of marble that runs above the other arcade is, as it should be, richer and more ornamental than the others. Besides the mass of columns in antique marble which support it and give it importance, three tiers of sculptured ornaments exquisitely carved bring out into bold relief its outline by their projection. Above this porch are placed the celebrated horses of Lysippus, which for a time ornamented the Arc du Carrousel in Paris. Mosaics upon a gold ground shine on all the porches in the midst of enamels and numberless figures of every kind."

The atrium, whose round vault presents in mosaics the history of the Old Testament, leads to the nave by three bronze gates ornamented with silver, which it is said belonged originally to Sta Sophia. "Let us enter," says an observer, "into the interior."

"Nothing can compare with St. Mark's, neither Cologne nor Strasburg nor Seville—nor even Cordova with its mosque. Its effect is surprising and even magical. The first impression conveyed is that of a cavern of gold encrusted with precious stones which are at once splendid and sombre, sparkling and mysterious. Cupolas, vaults, architraves and walls are carved with little cubes of gilt crystals of unique form, among which the rays of light sparkle like the scales of a fish. Where the gold ground terminates at the height of the columns commences a clothing of the most precious and varied marbles. From the vault descends a great lamp in the shape of a cross of four branches whose points are decorated with lilies and which hangs from a ball of gold filigree. The effect is marvellous when the lamp is illuminated. Six pillars of alabaster with capitals in bronze gilt of Corinthian pattern support elegant arcades, around which runs a gallery the whole length of the church."

"In the area is the choir with its altar upon a dais between four columns of Greek marble carved like a piece of Chinese ivory-work by the most patient industry. The altar-screen, which is called the *pala d'oro*, is quite a confusion of wonders. It blazes with enamels, cameos, pearls, sapphires, silver and gold, while pictures in precious stones represent scenes in the life of St. Mark. It was made in Constantinople in 976. Finally, in the circle behind the great altar is a colossal figure of the Redeemer."

St. Front of Périgueux is a reproduction of St. Mark's, as St. Mark's is of Sta Sophia. It is erected on the same plan minus the vestibule, and the dimensions of both are almost the same. But in this instance one looks in vain for the wealth and splendour of the model. St. Front is poor and naked. Under the sad stone colour of its walls there are no mosaics, and yet the edifice is grand in character, so much power is there in a simple arrangement conceived in a great spirit.

After the erection of St. Front cupola churches were multiplied throughout France, but their architects abandoned in their construction the arrangement and style of the Byzantine works. Even at this early period a new character began to be manifest in the architecture of the West. In St. Front itself we find that Byzantine traditions are departed from, and in its arches instead of the round circle of the East we begin to notice a tendency to point the arch. The pointed arch is the exclusive feature of the Gothic style, and from its introduction dates the art of French architecture.

French architects in modifying their works and adapting them to the colder climate of the West changed the plan, aspect and ornaments of their churches. Sculpture reassumed its place upon the capitals and the walls instead of the many-coloured image-work of the mosaicists. Churches, in short, became at the same time more severe and more ornate.

The cathedral of Angoulême (1017-1120) is one of the most celebrated types of this transition between the Eastern or Byzantine and Romanesque or Western style. To the former belong the three cupolas that cover the nave; to the latter the general form of the building—its Latin cross, its transepts and apses, its historic frieze, its crown of double arcades and its corbelled cornice. As in St. Front the arches that sustain the cupola are narrowed at the top. Moreover, there is no trace of the Byzantine school in the pillarettes flanked with columns, or in the carving of the capitals, which consists of leaves and grotesque figures of animals.

The cupola placed at the intersection of the nave and transept is the same in diameter as the cupolas of the other churches we have mentioned, but raised as it is on a drum which towers high above the roof it looks larger than it is in reality. It is pierced with rich arcades of double columns in four of which are openings for windows. The façade is a great square wall covered with basso-relievo, and divided horizontally by three

rows of false arcades. Although it is no more than 60 feet high its great proportions give it a majestic and powerful appearance. Of all the square towers which the traveller sees between Poitiers and Bordeaux this is one of the most beautiful and the best situated. From a distance it looks heavy, but this effect vanishes when close at hand.

In concluding this interesting subject it may only be necessary for me to add that the Byzantine style was a combination of Oriental and Occidental elements, which had been united on the shores of the Bosphorus. When once its chief characteristics had been determined it was transferred unchanged to the most remote provinces. Five hundred years after Roman culture had embraced the civilised globe, and affected even semi-barbarous tracts, the influence of Byzantium was extended over the greater part of the world then known, and to lands previously quite uncivilised. The centre of culture had been removed somewhat farther eastward, but the extent of its influence was scarcely diminished.

At the east, in distant Asia, the Sassanidæ borrowed more from Byzantine stock than they contributed to it. In the south-east newly arisen Mohammedan art received its first and most important impetus even more directly from the same source. The north-east of Europe and the Asiatic shores of the Pontus retained the Byzantine civilisation longer than did the capital itself. Indeed in these countries its traces are evident even to-day. In Italy such maritime emporiums as Ravenna and its successor, Venice, were chiefly Byzantine in character, while even in political respects certain towns of Magna Græcia and Sicily long continued in intimate connection with Constantinople. Even the Germanic provinces felt its influence in architecture at least through the mediation of Italy, and in painting, with its branches, mosaic-work and illumination, directly from the Bosphorus.

Because of its enormous extent and the peculiar and tenacious character of its artistic work, Russia is by far the most important of the countries influenced by Byzantine civilisation. In it alone Byzantine art has continued to be practised up to the present day. Unfortunately it came under its influence in an age when the style of the Eastern empire had declined into mechanical mannerism. Christianity with its higher civilisation was not generally introduced into the Muscovite empire before the end of the tenth century, until Vladimir the Great had been baptized at Kherson on the occasion of his marriage with the Byzantine Princess Anna in 988. It was therefore not strange that the Byzantine style when it first appeared on the steppes of the Don and the Dneiper was quite without connection with the Greek colonies on the northern shore of the Black Sea. Kiev, the Russian capital at that time, consisted entirely of wooden huts, and the 400 chapels which it was known to have contained shortly after the death of Vladimir can have been only small timber constructions. The more important ecclesiastical edifices of the country, often built by Greek architects, were at that time few in number. But the churches of Sta Sophia at Kiev, Novgorod and Tchernigof, which must have resembled the great Sta Sophia at Constantinople in general arrangement as well as in name, soon exercised a decisive influence upon the rude and untrained inhabitants of southern Russia.

TESSERÆ.

Unity and Variety.

THERE are those who maintain that the true, the good and the beautiful are not really reducible to simpler terms when they are considered in their most generalised form, though, of course, in their more particular determinations the elements can be analysed. At any rate, some form of the doctrine that the beautiful is based on the unity amid variety has found extensive acceptance, and a few samples of how authors work this theory will be instructive. On this point Barry says that the disputes about definition do not represent corresponding divergencies in the idea itself of the beautiful; and he allows the theory of unity in variety on condition that this combination be such as to show "fitness of conformity to the design of each species." Cousin, dispensing with this limitation, says:—"The most probable theory of the beautiful is still that which makes it consist of two elements mutually opposed and equally necessary—these are unity and variety. Take a beautiful flower: undoubtedly it has got unity, order, proportion, symmetry, for without these it would lack that intelligible significance which is so marvellously present in all things. But at the same time what diversity there is. What delicate shades in the colour, what richness in the smallest details. In mathematics themselves, what is beautiful is not the abstract principle, but the principle bearing with it all its long train of consequences. Unity and variety are the notions applicable to all orders of beauty." In support of Cousin stands his compatriot Lacordaire:—"Isolation is the denial of order, of harmony, of beauty, since

none of these things can be conceived without the double idea of plurality and unity. Plurality without unity is positive disorder, unity without plurality is negative disorder. In the former case the bond is wanting to the things; in the second case the things are wanting to the bond." Mr. Ruskin also says:—"Composition means literally and simply putting together several things so as to make one thing out of them, the nature and goodness of which they will all have a share in producing. Thus a musician composes an air by putting notes together in certain relations, and a painter a picture by putting forms and colours in pleasant order. In all these cases, observe an intended unity must be the result of the composition. Everything should have a determined place, perform an intended part, act in that part advantageously for everything that is connected with it." The practical lesson is that we should improve many of our unpleasing productions by more attention to the variety which saves from wearisome monotony and to unity, which saves from distraction and pointlessness, and these results are often desirable for higher ends than mere artistic effects.

The Inspired Workman.

We are apt to forget that in the great epochs of art in ancient Greece, when Phidias was decorating the pediment of the Parthenon in Italy in the sixteenth century, when Leonardo da Vinci, Michel Angelo and Raphael executed the great works which have been the admiration of the world, those were only the ultimate and highest outcome of a taste for art which permeated the community. Then the humblest workmen vied with each other, and every pot and pan, spoon and fork, were beautified by the most exquisite and refined taste. Many great artists began their career in a workshop like Francia, Ghirlandajo and Benvenuto Cellini, and rose step by step to become great painters and sculptors. It is idle to imitate one characteristic of an age and expect that it will bring all the rest with it; the age was all of a piece, and all the phenomena dovetailed into each other. It has been argued, apparently seriously, that because in the Middle Ages workmen were entrusted with the decoration of buildings, if we did the same we should have a great school of architecture. Nothing can be more futile; workmen being entrusted with decoration is a detail which has no importance or significance except in connection with others. It is related that when the cathedral of Orvieto was built in the thirteenth century, the citizens watched its progress with passionate interest. Such was the delight which they experienced at the sight of every embellishment added to their church and such the fervour of their sympathy, that they devoted their spare time to dragging the stones from the quarries, and brought food and drink for the workmen that nothing might be lost. The zeal for the beauty of the building animated the whole community, and was shared by the workmen who may have been entrusted with the decoration. How can we compare such times with our own? Where is the zeal which animates our communities? How can we entrust men with the decoration of a building who care only for Saturday's wages, for short hours, full pay and easy work? The idea is an anachronism. We must take our times as we find them, our institutions as they exist; we cannot change or revolutionise a state of things rooted in prevailing ideas and the habits of daily life; all we can do is to work in them and by means of them. We cannot expect to produce a great school of art upon a substratum of indifference; we must begin from the foundation and educate the masses upwards from the humblest forms of art rising gradually to the highest. When we have done that we may expect a display of great art, which shall not be a graft but a natural and spontaneous product of existing conditions, as great art always has been.

Idealism and Art.

Idealism in a picture is that part of it which distinguishes it from a photograph. It is what the artist brings to nature, the causes for which he uses nature, and that voice which he tries to make articulate by her help. It represents in a picture the creative power, the master passion, the individuality or *ego* of the painter, which must impress itself upon his transcript of nature, and is always striving to do so. If this individuality be strong, it will compel nature to obey it, and if it be weak it will itself be compelled to obey nature and follow whithersoever she leads; if this be the case to such an extent that the artist's work bears no impress of the individuality of the artist, it cannot properly be called a work of art. Now if this idealism can do so much towards holding the balance between the mere material part and the purely mental part of art, even in a purely scientific age, what must have been its power when the strongest force and master spirit of the time was fighting on its side? And this has been the case in the most splendid periods of art history. The idealistic side of art is strong indeed in an age when every object and aspect of nature is seen through the atmosphere of poetic imagination; when the heroic overlaps and hides the commonplace, and when every mountain, river, or stream is not a scientific fact, weighed and gauged by scientific observation, and subject to natural laws registered by

science, but the centre of some poetic legend with a beautiful anthropomorphic basis, and its laws the incidents of a dramatic poem. Under such an influence Greek art grew and flourished. Steeped in that rich mythology, the artistic spirit of the age could spontaneously throw itself in a beautiful concrete form. The heroic could be embodied in the Theseus, the divine in the Venus of Milo; visible embodiments of a powerful impulse, but an impulse favourable to and in accordance with the highest aims of imaginative art.

Ancient Ink.

The ink which the ancients generally used was composed of lamp-black mixed with gum, as we are informed by Dioscorides and others who give the recipe for making it. Ink of this kind may be called carbonic; it possesses the advantages of extreme blackness and great durability, the writing remaining fresh so long as the substance on which it is written exists, but as it does not sink into the paper, it is liable to the great inconvenience of being easily and entirely removed, for if a wet sponge be applied to it, the writing may be washed away and no traces whatever of the characters will remain. The facility with which documents might thus be obliterated gave occasion to fraud, as an artful forger was able to remove such portions of the original writing as he might desire to get rid of, and thus profit by the absence of material words, or insert in the blanks which he had made such interpolations as might serve his turn. Many common accidents, whereby books and writings were exposed to wet, or even to damp, were also fatal, or at least highly injurious, to compositions and muniments of great value. Various expedients were therefore attempted to remedy an imperfection from which many must have suffered severely. Pliny informs us that it was usual in his time to mix vinegar with the ink to make it strike into the paper or parchment, and that it in some degree answered the purpose. It should be seen that vitriolic ink was also adopted soon afterwards, which possesses in perfection the quality that was desired of sinking instantly into the paper, so as to make it far more difficult to discharge it without destroying the texture on which it is written and of being perfectly secure against water, by which Indian and other carbonic inks are so easily effaced. It is not, however, equally secure against the effects of time, for vitriolic ink gradually fades away, becomes paler by degrees, turns brown and yellow and is scarcely legible, and sometimes, as the parchment grows yellow and brown with age, disappears altogether. A compound kind of ink came next into use, which united the advantages and avoided the defects of the two simple sorts; such a mixed ink was generally used for several centuries, and with this the manuscripts that are now most fresh and legible appear to have been written.

Innate Ideas of Beauty in Building.

As men unacquainted with the theories of philosophers have been appealed to in support of the theory of association, let us take a person of that description to a proper point, within view of a building presenting all the elegance of Grecian architecture, but of the existence of which he had no previous knowledge, nor of the rules and proportion followed. Will this person admire the structure or will he not? Will he instantly feel an emotion, or will he take time before he utters a word, or allows himself to be moved, to find out for what purpose it was erected; and whether, according to his own ideas, it be adapted for that purpose? Does he suspend his feelings till he has examined the kind of stone and learned its qualities; till he has probed the thickness of the walls, and dug down to the foundation to ascertain whether it be rock or sand? Will he pause to consider whether much skill and much power were exerted in the erection? Will he hesitate till he calculates the expense? Will he approach the portal till he searches for the date? Will he sit down to meditate quietly on the greatness of Rome and of Greece? If he did all this no one would be astonished at his being called little better than insane. So far from such an operose process being consequent, we should find the effect instantaneous; and although it should be discovered after a painful search that, in its interior arrangement, this fine building was ill adapted to its purpose; that it was constructed of a stone far from durable and on an unstable foundation, that it cost but little money and was but a month old—the only feeling which such circumstances are likely to excite is regret that so imposing an exterior had not been formed of more durable materials, and that the accommodations were ill contrived; it would never be said that the elevation was ugly. To prove that association has little connection with the admiration which architecture excites—that there is something in our minds which directs us to prefer certain forms and certain proportions in one form relatively to another—we have only to go back to the individual who invented any of the orders, belonging to Greece, or to him who invented the Gothic style, or to any one who has improved on the first idea of them, and to ask what could have led an individual to construct what he had never seen or heard of? What could have induced him to fix

on certain proportions for one part of a building to bear to another? Nothing, surely, but his own innate power. He must have felt certain forms to be more pleasing than others; certain arrangements to these forms to be more satisfactory than others. To him certain proportions in columns were irresistible, and he reduced them to practice. Subsequent ages have felt that they cannot be altered without giving offence.

The Walls of Babylon.

In his description of Babylon Herodotus says:—"A deep and wide trench full of water encircles it, next to which is a wall 50 royal cubits in breadth and 200 cubits in height (the royal cubit exceeds the ordinary cubit by three fingers). It must be observed that the earth out of the trench was employed for this purpose, and the wall was constructed in this manner. When they dug the ditch, they removed the earth and made it into bricks, and having made a sufficient number of them, they baked them in furnaces; then making use of heated bitumen by way of mortar, and interposing layers of reeds throughout thirty courses of bricks, they first built the side of the ditch and then the wall itself in the same manner." Some commentators instead "throughout thirty courses" read in "every thirtieth row." Now, it is certain that the interposition of reeds with bitumen was intended not only to strengthen the building, and therefore most naturally used nearest the foundation, but more particularly to protect the lower part of the wall which lined the ditch from the action of the water, and also the lower part of the city wall, or any other of the buildings, from the damp of the ground. This was the chief use of the bitumen, which was inferior as a cement to the fine lime mortar which was employed in the higher parts of the buildings. Hence it is difficult to see why the obvious translation is to be departed from, and this passage rendered by "every thirtieth row." Accordingly, Wesseling, in his commentary, says the thirty lowest courses. In which also Schweighauser agrees, on the ground that in this way the superstructure would be better supported. There is, indeed, no warrant for introducing the word "imis" into a literal translation; but there can be no doubt Herodotus means the thirty lowest courses, if he means the thirty courses to be consecutive, and it appears reasonable that the passage should bear this interpretation.

Wenceslaus Hollar.

The English school of engraving is indebted to foreigners for the early foundation of the bright and lasting fame which it possesses. The efforts of the Early English masters, who solely employed the burin, were inferior, although Evelyn, in his "Sculptura," contends that William Lightfoot, who was employed as an architect in the building of the Royal Exchange, but whose name as an engraver is not recognised, was nearly equal to Wierinx. The earliest artist that claims attention is Wenceslaus Hollar, born at Prague in 1607. He was originally brought up for the profession of the law. Disturbances in his own country compelled him to take refuge in Frankfurt. The Earl of Arundel, during an embassy to Ferdinand II., happened to meet Hollar at Cologne, and became his patron, and on his return to England introduced him to Charles I. He had a great attachment for his royal master, and interested himself so much in his cause that he was taken prisoner at Basing House, in Hampshire. On his release he took up his residence at Antwerp, where he employed his time in engraving chiefly from the collection of his former patron, the Earl of Arundel, who had also removed to that city. In 1652 he returned to London, and met with greater encouragement, but the plague and the great fire of London again threw him back, and caused still further disappointments. He was employed by Government in 1658 to make some drawings of the town of Tangiers, together with the forts, which he afterwards engraved. During his voyage to England the vessel was engaged by seven Algerine corsairs off Cadiz, and after a gallant struggle, in which the pirates were beaten off, she continued her voyage. Hollar escaped unwounded, and on his return commemorated the action by a very clever engraving. For his labour of two years he received only a hundred pounds, and that with much delay and after many humble petitions from the poor engraver. The life of this industrious man ended in penury, and on his death-bed the bailiffs who came to seize upon the little remnant of furniture he possessed were requested by him to leave his bed an hour or two longer, "and then to remove him to the prison of the grave." He executed about 2,400 prints with boldness and freedom, embracing every department of the art.

Gothic Cathedrals and Subsidiary Buildings.

It is a great mistake to think, as has too often been maintained, that Gothic cathedrals need to be completely isolated to produce all the effect which their architecture is capable of; the constructors of those cathedrals did not share in that notion, and nowhere have they been seen to put it in practice. There does not exist in Europe a cathedral which has not been

originally flanked at the north or at the south, not only by its sacristies, but also by the palace of the Bishop, the cloister of the canons, their chapter-house and the vast buildings which were necessary to lodge the chapters, almost always very numerous and very rich. In England many of the cathedrals have preserved these dependencies built in the same style as the body of the church, and they often strike more at first sight precisely owing to this encircling, whose inferior proportions make those of the central monument tell more. As a general rule, the grandeur of the admirable edifices of the Middle Ages, like all terrene grandeur, has need of points of comparison which make them to be appreciated and stand out. Absolute isolation is fatal to them. It is certainly not right to heap up neighbouring edifices so as to hide notable portions of the whole from the eye which contemplates them; it is not right to permit that houses should stick like a crust between the buttresses. But neither is it right to make a void around cathedrals so as to drown in that void the magnificent dimensions which they have received from their authors. They were not at all made for the desert like the Pyramids of Egypt, but otherwise to soar above the crowded dwellings and the narrow streets of ancient cities, to domineer and raise our imaginations by their vast extent and their immense height, immovable but changeless symbols of the truth and of the authority of that Church of which each cathedral was the image in stone.

GENERAL.

The Competition for the municipal buildings and law courts, to be erected in Cardiff at the cost of 200,000*l.*, has been decided. Acting on the advice of Mr. A. Waterhouse, R.A., the committee awarded the first prize of 500*l.* to the plans sent by H. V. Lanchester, J. S. Stuart and E. A. Richards, Bedford Row, London; the second prize of 300*l.* to J. S. Gibson and S. B. Russell, Gray's Inn Road; and the third prize of 200*l.* to Alfred Cox and A. H. Cooksley, Adam Street, Adelphi. Fifty-six sets were submitted. The site will cost 160,000*l.*

Gainsborough's Portrait of General Honywood, which was among the works of art in Marks Hall, has been sold for 4,000 guineas.

Mr. J. J. Shannon, A.R.A., has obtained the first prize of the International Exhibition of Painting now open at Pittsburg, U.S.A. This prize consists of a gold medal with a purse of 1,500 dols. added thereto. The picture which obtained this honour is a portrait of the artist's daughter "Kitty" in her riding habit.

Mr. M. B. Teulon, of the firm of Messrs. Teulon & Wood, architects, Crowborough, died at Worthing on the 8th inst. For many years he was the only architect at Crowborough and was connected with the building of most of the houses that have been erected in the place during the last seventeen years.

Mr. A. Macalister, an architect who practised for over half a century in Belfast, died on the 7th inst. in his seventy-sixth year.

Mr. Thomas Bush Hardy, the painter, died on Sunday last. The work on which he was last engaged was a large panel representing the Destruction of the Armada for the Army and Navy Club.

The Fire which broke out at Dover Castle on Tuesday was fortunately confined to the officers' quarters, a range of buildings erected in 1858.

Mr. Leslie Ower, president of the Dundee Institute of Architecture, read a paper on "The Evolution of Style in Architecture" before the Edinburgh Architectural Association on Wednesday last.

Mr. G. Herbert Bayley, A.M.Inst.C.E., civil engineer, architect and surveyor, of Manchester and Lymm, Cheshire, has been elected a member of the Sanitary Institute.

The Dean and Chapter of Canterbury have approved the revised design prepared by Mr. Jackson, R.A., for the tomb of the late Archbishop Benson. It will be Early English in character, and has a general resemblance to the tomb of Archbishop Peckham in the Martyrs' Chapel. The construction of the memorial will be at once proceeded with, and when completed it will be erected over the resting-place of the late Primate in the north-west angle of the cathedral nave.

An Ancient Portrait of King Henry VI., the founder of Eton College, has been hung upon the panelled wainscot on the north side of the hall a short distance from the west end of the building. The picture represents the monarch attired in regal robes with scarlet ermine-trimmed cloak. A velvet cap covers the head, and around the shoulders is a richly-jewelled "S.S." chain with pendant cross. There are several rings upon the fingers of the clasped hands, and the waist is encircled by a gold tasselled girdle.

The Architect.

THE WEEK.

THERE is not much chance of Irish architects gaining wealth if they devote their time to public commissions. In the last report of the Council of the Irish Institute some cases are brought forward which suggest that authorities believe in the squeezability of architects. One relates to the schedule of fees adopted by the Board of Control for architects engaged on lunatic asylums, which is much below the usual scale. On the remonstrance of the Irish Institute, the Board decided to adopt the schedule formerly in use. The Board of Control have also proposed to withdraw specialist's work from the architect's control. The Council of the Institute is of opinion that, in order to carry a building to a successful conclusion, it is absolutely necessary that at all stages of the work, from its original inception to its completion, the architect should exercise a general control over all the various contractors employed, and that he should be held responsible for bringing the entire undertaking to a successful issue. If the specialist's works were withdrawn from his control, divided responsibility would result, and in many cases dissatisfaction and possibly litigation would ensue. In connection with the employment by the Board of Control of architects for lunatic asylums, the Council also desires to place on record its emphatic condemnation of the practice of appointing as a nominal architect any person with whom it is proved necessary to associate a qualified architect in order to insure the preparation of proper plans and the necessary skilled supervision of the work, as when such appointments are made professional fees are paid to persons by whom no equivalent service is rendered to the public. It is also mentioned in the report that the Black-rock Commissioners have passed a resolution stipulating that the architect to be employed for an extension of the town hall should pay the clerk of works out of his commission. The Council consider it is of the greatest importance that the public and the members of the various boards should be made to understand that no member of the Institute should accept less remuneration for his services than that which is provided by these rules.

THE competition for the lunatic asylum in Londonderry was remarkable in other ways besides the proposed reduction of fees and the withdrawal of specialists' works. Eight architects were invited to take part, and a professional assessor was brought over from London. A plan by Mr. CHARLES OWEN was awarded the first place, and one by Mr. W. H. BYRNE the second. The suggestion was made by the governors that Mr. BYRNE should be afforded an opportunity of amending his plans, in order that the question should be reopened as to who should be entrusted with the work. Mr. BYRNE refused to amend his plan and declined to take part in any proceeding which would upset the award of the assessor. His conduct was so much approved, the following resolution was passed unanimously at the annual meeting of the Institute:—"We, the members of the Royal Institute of the Architects of Ireland, desire to convey to Mr. W. H. BYRNE our appreciation of his honourable and disinterested action in the matter of the Londonderry lunatic asylum competition. We welcome this additional evidence of the willingness of architects taking part in competitions to abide loyally by the award of a qualified professional assessor, and we deprecate any attempt to set aside or interfere with such an award." The report, in referring to the subject, says:—"The Council has had before it a report of proceedings at a conference of the Board of Governors with the officials of the Board of Control at Londonderry in November last. The Council notices with regret, from observations appearing in such report, that there appeared to be amongst those present at the meeting a very imperfect appreciation of the fair play to which architects invited to submit designs for a public building in limited competition, under an assessor, are entitled. The result of this competition must be to greatly discourage well qualified architects in the future from accepting invitations to take part in such competitions, as it would appear from the report that the selection of the best plan by the professional

assessor affords no security that the architect whose plans are placed first shall hold the position he has justly won. It is the unanimous opinion of the profession that when the design of an invited competitor is placed first by the assessor, the author should be rewarded by being entrusted with the whole of the work for which he was invited to compete and all emoluments attaching to it. The following members of Council were elected:—Messrs. W. M. MITCHELL, C. J. MC CARTHY, J. C. ASHLIN, J. R. CARROLL, CHAS. GEOGHEGAN, J. J. O'CALLAGHAN, J. H. PENTLAND, R. C. MILLER, W. K. PARRY and BYRNE; auditors, FRED. BACHELOR and C. H. ASHWORTH; Mr. T. DREW, R.H.A., president, and Mr. A. E. MURRAY, secretary.

THE late J. H. PULLAN, brother-in law of WILLIAM BURGESS, gained much reputation by his discoveries at the Temple of Minerva Polias, at Priene. But he was not permitted to follow out his excavations. According to Professor WHEELER, the American archæologist, the local lime-burners and masons have, since the English expedition, made away with what was left of the temple, and nothing now marks its site but a heap of stones. Two years ago the German archæologists resolved to begin new investigations, and the excavations so far made have been surprisingly fruitful. Although Priene did not reach the height of its prosperity until the time of ALEXANDER, it seems to have possessed a certain superiority of artistic cultivation, possibly in consequence of the relations which it maintained with Athens, of which it is said to have been a colony. It is most fortunate, therefore, that the sub-structure of the ancient city has been found in a remarkably perfect state of preservation, so that the streets, with the various buildings in them, the agora with its porticoes, the council-house, the seats in which are still in place, and a small theatre, are plainly to be distinguished. In the private houses, not only is the style and general distribution quite distinguishable, but the remains of the decoration are still visible. Professor WHEELER likens the ruins to those of Pompeii, and the study of them, in comparison with those of the Græco-Roman town of nearly five hundred years later date, will be most instructive.

A FEW glimpses of AUGUSTUS WELBY PUGIN are to be obtained with the aid of Mr. WARD's "Life and Times of Cardinal WISEMAN." The architect was rather nervous about the influence of a divine who was familiar with pagan basilicas, and was not prepared "to go to the death," like MONKEBARNES, to uphold the superiority of the pointed over the round arch. He cried when he saw the bishop go beyond the rood-screen with a couple of ladies. PUGIN was also an amateur theologian, and as such was of importance among the English Catholics who were compelled to seek advice from Maynooth professors when they were in doubt. PUGIN used to talk five or six hours on a stretch about church ceremonies, liturgies and antiquities of all kinds. He was, as J. B. MOZLEY wrote, "infinitely amusing." It was easy for a rival architect to move his wrath. One of them "ought to be hanged," he said, for building an obnoxious steeple. When told that the Dean of YORK deserved to be suspended, PUGIN asked, "In what way, sir?" He saw a fiddler ascending the organ-loft of one of his churches, and could hardly forbear knocking the man down with the fiddle, and he would not attend the opening ceremony. When PUGIN heard a Jew was converted by praying in one of the Roman churches, he replied it was demonstrably false, for a man could not pray in so hideous a church. But when it was said the convert was thinking of the uncouthness of the building, then PUGIN said, "I honour him; the story is demonstrably true." He saw a man fishing, and he remarked, "Life is not meant for that sort of thing. At six o'clock this morning I was at the top of St. Chad's steeple." According to Mr. WARD, the effects of PUGIN's influence are still visible, for "in many of the theological seminaries there is a special chair of architecture and art." It would be interesting to discover a few cases where the lessons from the chairs have enabled the clergy to discriminate between works of art which continue the traditions of their church and those which are opposed to them. PUGIN would now be more grieved on entering a church than he used to be half a century ago.

DICKENS AND BUILDING.

THERE was a time when Christmas and DICKENS appeared to be for ever united, and to think of one was to recall the other. It is now, however, assumed there was never any true relation between them, for the novelist's Christmas was, it is said, a fictitious season devised for his own advantage by a man who was without any respect for realism. Whatever truth may be in such criticism, it would be a gain to most of us if we could look at the world around us in the winter season with the imagination and kindness with which CHARLES DICKENS temporarily endowed his readers. He did not believe that Fancy was so great an evil as it was represented to be by pseudo-scientists like Mr. McCHOAKUMCHILD, H.M. Inspector of Schools, who, under the inspiration of the Department of Art, told the classes, "You must discard the word Fancy altogether. You have nothing to do with it. You are not to have, in any object of use or ornament, what would be a contradiction in fact. You don't walk upon flowers in fact; you cannot be allowed to walk upon flowers in carpets. You don't find that foreign birds and butterflies come and perch upon your crockery; you cannot be permitted to paint foreign birds and butterflies upon your crockery. You never meet with quadrupeds going up and down walls; you must not have quadrupeds represented upon walls. You must use for all these purposes combinations and modifications (in primary colours) of mathematical figures which are susceptible of proof and demonstration. This is the new discovery. This is fact. This is taste." The advice is a compendium of the doctrine of decoration which once emanated from South Kensington, and which was for a time accepted as infallible.

DICKENS could not approve of restrictions of the kind, for they would be as fatal to his own art as to the ornamentist's. His writings, and especially the parts which are most delightful, are not susceptible of proof and demonstration which would satisfy a mathematician or a lawyer. Every one who is familiar with his books must be aware of the fact, and this is not the place to discuss the subject at any length. But fancy never exercised stronger power over him than when he was describing buildings, and his Christmas stories would afford evidence enough of his peculiarity without referring to his longer novels.

DICKENS not only observed, but created. Whenever he liked, inanimate matter could appear to him as having many of the properties of living, organic beings. There was not even a necessity for him to see a thing; the wind is as invisible as it is impalpable, and yet in "The Chimes," without the least exaggeration, it is depicted as if it were some perturbed spirit which could not find repose within the walls of a church. Familiar as the passage must be to our readers it will bear repetition:—

The night wind has a dismal trick of wandering round and round a building of that sort, and moaning as it goes; and of trying, with its unseen hand, the windows and the doors, and seeking out some crevices by which to enter. And when it has got in, as one not finding what it seeks, whatever that may be, it wails and howls to issue forth again; and not content with stalking through the aisles and gliding round and round the pillars, and tempting the deep organ, soars up to the roof and strives to rend the rafters; then flings itself despairingly upon the stones below, and passes, muttering, into the vaults. anon, it comes up stealthily and creeps along the walls, seeming to read in whispers the Inscriptions sacred to the Dead. At some of these it breaks out shrilly, as with laughter; and at others, moans and cries as if it were lamenting. It has a ghostly sound, too, lingering within the altar; where it seems to chaunt, in its wild way, of Wrong and Murder done, and false gods worshipped in defiance of the Tables of the Law, which look so fair and smooth, but are so flawed and broken. Ugh! Heaven preserve us, sitting snugly round the fire! It has an awful voice, that wind at midnight, singing in a church!

M. TAINE interprets passages like the foregoing as proving that DICKENS was a poet, a man of northern race and a passionate Protestant. But French taste could not approve of a mode of treatment which was so *bizarre*, and M. TAINE compared the imagination of DICKENS to a string which was too tightly strained and which on the least disturbance produced sounds that were not to be heard elsewhere. It resembled a sort of monomania, and its effect on the reader was like grotesque dreams. If M. TAINE were an architect instead of a professor of æsthetics he would

condone many of DICKENS's apparent exaggerations. It is only in his novels we have descriptions of buildings which are not easily skipped by the reader." M. TAINE and all who derive their canons of taste from French sources must believe with BOILEAU that, although there is no serpent or odious monster which cannot by a delicate pen or pencil be made "an objet aimable," yet when a building is to be presented there cannot be too few details. A writer without taste—

*S'il rencontre un palais, il m'en dépeint la face,
Il me promène après de terrasse en terrasse;
Ici s'offre un perron; là règne un corridor;
Là ce balcon s'enferme en un balustre d'or,
Il compte des plafonds les rondes et les ovales;
"Ce ne sont que festons, ce ne sont qu'astragales."*

HOMER himself would not be found to comply with BOILEAU's rules, and it is common sense that if a building or part of one can serve any purpose in a description, the reader should not be expected to go through an effort in order to supplement the writer's words. In the description of the old institution where REDLAW, "The Haunted Man," teaches, there is nothing that can be called technical, and yet enough is said to give an impression of what the buildings were like, and the effect they were likely to produce on a nervous scholar:—

His dwelling was so solitary and vaultlike—an old, retired part of an ancient endowment for students, once a brave edifice planted in an open place, but now the obsolete whim of forgotten architects—smoke-age-and-weather darkened, squeezed on every side by the overgrowing of the great city and choked like an old well with stones and bricks; its small quadrangles, lying down in very pits formed by the streets and buildings, which, in course of time, had been constructed above its heavy chimney-stacks; its old trees, insulted by the neighbouring smoke, which deigned to droop so low when it was very feeble and the weather very moody; its grass plots struggling with the mildewed earth to be grass, or to win any show of compromise; its silent pavements, unaccustomed to the tread of feet and even to the observation of eyes, except when a stray face looked down from the upper world, wondering what nook it was; its sundial in a little bricked-up corner, where no sun had straggled for a hundred years, but where, in compensation for the sun's neglect, the snow would lie for weeks when it lay nowhere else, and the bleak east wind would spin like a huge humming-top when in all other places it was silent and still.

His dwelling, at its heart and core—within doors, at his fireside—was so lowering and old, so crazy, yet so strong, with its worm-eaten beams of wood in the ceiling, and its sturdy floor shelving downward to the great oak chimney-piece; so environed and hemmed in by the pressure of the town, yet so remote in fashion, age and custom; so quiet, yet so thundering with echoes when a distant voice was raised or a door was shut—echoes not confined to the many low passages and empty rooms, but rumbling and grumbling till they were stifled in the heavy air of the forgotten crypt where the Norman arches were half buried in the earth.

It will be observed how much of the effect depends on making lifeless things become sentient, and if a few more matter-of-fact terms were introduced the vigour of the description would vanish. DICKENS's peculiar genius is no less manifest when he has to describe individual objects of no great size instead of a group of buildings. In "A Christmas Carol" he undertook the very difficult task of convincing a reader that it was possible for one of the hardest of men and the most unimaginative to see a ghost. With that object it was necessary to suggest that the miser SCROOGE was in a peculiar psychological condition or state of disease. Accordingly, DICKENS begins by describing how he took a door-knocker for a portrait, or rather the face of his deceased partner MARLEY, who was a man like himself.

He (Scrooge) lived in chambers which had once belonged to his deceased partner. They were a gloomy suite of rooms, in a lowering pile of building up a yard, where it had so little business to be that one could scarcely help fancying it must have run there when it was a young house, playing at hide-and-seek with other houses and forgotten the way out again. It was old enough now and dreary enough, for nobody lived in it but Scrooge, the other rooms being all let out as offices. The yard was so dark that even Scrooge, who knew its every stone, was fain to grope with his hands. The fog and mist so hung about the black old gateway that it seemed as if the Genius of the Weather sat in mournful meditation on the threshold.

Now, it is a fact that there was nothing at all particular about the knocker on the door, except that it was very large. It is also a fact that Scrooge had seen it, night and morning, during his whole residence in that place; also that Scrooge had as little of what is called fancy about him as any man in the City of London, even including—which is a bold word—the Corporation, aldermen and livery. Let it also be borne in mind that Scrooge had not bestowed one thought on Marley since his last mention of his seven-years' dead partner that afternoon; and then let any man explain to me, if he can, how it happened that Scrooge, having his key in the lock of the door, saw, on the knocker, without its undergoing any intermediate process of change—not a knocker, but Marley's face.

Marley's face. It was not an impenetrable shadow, as the other objects in the yard were, but had a dismal light about it, like a bad lobster in a dark cellar. It was not angry or ferocious, but looked at Scrooge as Marley used to look: with ghostly spectacles turned up on its ghostly forehead. The hair was curiously stirred, as if by breath or hot air, and though the eyes were wide open, they were perfectly motionless. That and its livid colour made it horrible, but its horror seemed to be in spite of the face and beyond its control, rather than a part of its own expression. As Scrooge looked fixedly at this phenomenon it was a knocker again.

A man who can be deceived by a knocker on a foggy night would not be proof against visions of spirits. SCROOGE was not altogether a trustworthy witness about spiritual manifestations, but as he was converted and became a friend of BOB CRATCHIT and his family, besides discovering how Christmas should be kept, we can afford to overcome his optical and mental delusions.

All that we claim for DICKENS is the skill to impart interest to buildings, but it would be unjustifiable to suppose he was competent to produce accurate descriptions of them. He rendered his own impressions, but nothing more. It is also remarkable that he is far more successful with imaginary than with real buildings. DICKENS repeatedly acknowledged that he did not possess the knowledge which would enable him to notice pictures and statues as they deserved; and he was, like the majority of his countrymen, still less competent to treat of buildings. What he says of High Street, Rochester, reveals his strength and weakness. He was familiar with the place from his childhood, but all he could say of it was the following:—

The silent High Street of Rochester is full of gables, with old beams and timbers carved into strange faces. It is oddly garnished with a queer old clock that projects over the pavement out of a red brick building, as if Time carried on business there, and hung out his sign. Sooth to say he did an active stroke of work in Rochester, in the old days of the Romans and the Saxons and the Normans; and down to the times of King John, when the rugged castle—I will not undertake to say how many hundreds of years old then—was abandoned to the centuries of weather which have so defaced the dark apertures in its walls that the ruin looks as if the rooks and daws had pecked its eyes out.

The extract suggests his method, viz. a few words about the character of the buildings as they appear, and then imagination is drawn on to enhance their interest. For that reason his references to buildings in his "Pictures from Italy" are insufficient to enable us to form a notion of the interiors or exteriors. But his words often help us to obtain a vision of some scene in a building. Thus in speaking of the Coliseum he says:—"In passing in, they who will may have the whole great pile before them as it used to be, with thousands of eager faces staring down into the arena, and such a whirl of strife and blood and dust going on there as no language can describe." It is not every visitor who is competent to create such a vision, but those who can are not likely to forget the building which was the scene of so much excitement and which is now a desert. The man who could say of the ruin, "Its solitude, its awful beauty and its utter desolation strike upon the stranger like a softened sorrow, and never in his life perhaps will he be so moved and overcome by any sight not immediately connected with his own affections and afflictions," must have been a genuine admirer of architecture, although he could not understand the elements of its greatness.

Mr. Charles Herbert Shoppee, F.R.I.B.A., F.S.I., has been elected architect and surveyor to the Auction Mart Company, Limited, in succession to his late father, Mr. Charles John Shoppee.

THE FIRE RISK OF ELECTRICAL-POWER INSTALLATIONS.

THE prevention of fire is at the present time attracting the attention of many, due to the recent conflagration in the City and the one in Paris, and numerous papers and contributions have appeared on the subject from various points of view.

Mr. LESTER TAYLOR's paper before the Manchester Insurance Institute from the point of view of electrical-power installations will no doubt serve a useful purpose.

Numerous rules have been issued by insurance offices, and we not long since commented on the new rules of the Institution of Electrical Engineers, but all these are chiefly concerned with electric lighting, as it is comparatively recently that the adoption of electric power has made any strides—that is, self-contained power plants in factories and the like, although, of course, small motors connected to public electric-supply mains have been numerous. As Mr. TAYLOR mentions, electric lighting and electric-power installations have some points in common, so really the only extra risk is the motor and its accessories. Now, is there a risk with a motor properly fitted and attended to? In an ordinary factory we should say No; but of course in positions where they are sometimes placed, and no doubt will continue to be unless strict rules are adopted, there is no doubt a risk. A motor, for instance, placed out of the way in some corner where dust and combustible particles can accumulate, and rarely receiving attention, may become a source of danger owing to the brushes becoming ragged and the commutator worn, excessive sparking being the result; or the resistance may become red-hot. Now, if the motor is always under notice there is little chance of these occurring, or, if they do occur, little chance of fire. There is a certain amount of danger due to switching on too suddenly, thus causing a rush of current; but if the proper apparatus is used to prevent this it is avoided. If a properly constructed and proportioned starting resistance is used the starting current will be very little in excess of the normal working current.

Mr. TAYLOR refers to the risk of the motors themselves taking fire, and also to the scattering of molten copper globules over considerable distances. We think this risk is very slight, except under very adverse conditions. We must, however, bear in mind that the development of electric power is without doubt destined to take an important part in our manufacturing industries, owing to the flexibility of a system of transmitting power by cables instead of cumbersome shafting, and the capability of attachment of the motor directly to the machine.

We see that these motors are scattered about the factory in various positions. Now if these positions are damp or dusty, some precautions should be adopted to prevent injury to the motor and danger of fire. There are several ways of protecting a motor. One is to enclose an open type motor in a case of iron or wood. The use of wood is not desirable, but it is surprising to see the great number of cases in which this is done, oily waste even being stored in the boxes sometimes, as stated by Mr. TAYLOR.

In other examples the case is part of the field magnets, and encloses all but the commutator and pulley. This type of motor, often called the ventilated enclosed type, is greatly used, and we think it fulfils all reasonable requirements. There is another type which is completely enclosed, including the brushes, and, in fact, everything except the pulley. These air-tight motors are heavy and expensive, owing to the want of ventilation, and are rarely used except in cases where the air is charged with explosive gases or other matter likely to cause explosion. These motors are chiefly used in mines. In this connection it may be mentioned that alternating-current motors are very suitable for dangerous situations, as there are no commutators and no possibility of sparks.

We have now concluded with the motor itself, and have agreed that there is, perhaps, a slightly greater risk with it than with shafting and belts, although there is a possibility of there being danger from fire even with these, owing to bearings firing. We now turn to switches, fuses and regulating resistances. There are many points in common between the switches and fuses for use with motors and lighting. In the former case there is a necessity for having the fuses protected rather better, and it is advisable to use

an iron box under lock and key for fuses, and an open box of the same material for switches. This precaution will remove all danger from damp, and in the case of fuses, of fire due to molten fuses falling on to wood or other inflammable material.

There are several precautions which should be, but very rarely are, taken with resistance boxes. These should be entirely ironclad, the case being perforated to allow ventilation. It is necessary that the resistance wires should be amply large for the work, otherwise severe overheating will occur and the resistance coils will get out of shape and fall. A very good precaution to take is to wind the wires on a rod of insulating fireproof material such as slate or asbestos. This will prevent distortion of the coils, however hot they may become.

It may be of interest here to give some extracts from the Phoenix rules, although we should hardly recommend these now that the Institution of Electrical Engineers' new rules are issued, but they will serve to indicate the view that insurance inspectors take of the matter.

"No dynamo, motor, transformer, battery . . . to be placed in any working room of any cotton, woollen, flax, jute, corn, saw-mill, &c. . . or where hazardous processes are carried on, or in which any hazardous goods are stored; they must never be hidden away in cupboards, lofts or roofs, &c.

"Electrical motors, when in rooms such as above described, should be placed in an approved fireproof compartment, so that if the motor was on fire, the fire could not spread, and provision should be made that fine dust or 'fly,' &c., could not get to the motor. The resistances should be inside the above compartment.

"An electrical-power installation requires the same safeguards that apply to an electric-light installation in which the conditions of supply and the electromotive force of the current are similar."

When we come to consider the dynamo or generator, we can hardly see that the risk is increased, as this is, or should be, always placed in a separate part, as, in the case of mechanical power, in the engine-room.

There are special precautions which should be taken in certain factories with reference to both the wiring and motors. In breweries, distilleries and paper-mills the dangers are from damp, and also in the last from chlorine and other bleaching agents; and for these reasons all motors should be self-enclosed and air-tight, or they will be damaged. In saw-mills fine dust is the objectionable matter, and this should be kept from the motors, switches, fuses and resistances. When naphtha and other chemicals which are solvents of rubber are used, the cables should be lead covered. In sugar-mills the high temperature is harmful to rubber, and in this case lead-covered paper or jute insulated cables must be used. Ironclad motors are also very advisable in these cases.

Mr. TAYLOR mentions that it is the practice in America to take power from the tramway overhead conductor. It does not seem to us to be a very hazardous thing to do if the negative terminal is connected mechanically and electrically to a rail bond in the road, and precautions are taken with regard to shock.

INDIAN ART SOCIETY.

THE annual meeting of the Society for the Encouragement and Preservation of Indian Art was held at the Imperial Institute. The president of the Society, Sir M. E. Grant Duff, was in the chair. The report which was submitted stated that since the incorporation of the Society under the license of the Board of Trade it had devoted itself to the same objects which it was originally established to promote. The Society had contributed to an exhibition held at the Crystal Palace and brought over native silk weavers to work at their trade, and also promoted sales of native work which had resulted in considerable sums being sent to the sufferers in the famine-stricken districts at Sholapur, Delhi and elsewhere. The working of the Society, it was further stated, was extending in India, branches having been established at Lucknow and Sholapur. In moving the adoption of the report, the chairman expressed his cordial interest in the operations of the Society, which was contributing in a quiet way to make the products of Indian art better known in this country, and doing some good to the better class of Indian artisans. Mr. T. H. Thornton seconded the motion,

and insisted on the importance of the Society taking care that none but good specimens of Indian art should be introduced to the British public, and that at a moderate price. The Society must differentiate their exhibitions from those of certain shopkeepers in London, and while he noted a marked improvement in this respect in the latest exhibition, he suggested that a display of palmistry was a little derogatory to the aims and objects of the Society. The report was adopted. Mr. Goldstein moved, and Sir Raymond West seconded, a vote of thanks to the office-bearers, and selected for special mention, as did indeed nearly all the speakers, the energetic efforts of Mrs. David Carmichael and Mrs. Pheroze Thomas, the secretaries. This was agreed to, and the retiring members of the council were re-elected. A vote of thanks was also accorded to the chairman on the motion of Sir Owen Tudor Burne, who appealed to lovers of art in England and India to assist the Society by becoming members or patrons. Sir M. M. Bhownaggee, M.P., took occasion to make a few remarks at the close, in which he dwelt upon the moral aspects of the work of the Society in relation to our fellow subjects in India. The efforts of English men and women who had passed more or less of active life in that country, and who now devoted themselves to promoting the interests of the poorer classes of natives in a philanthropic and practical manner, could not but constitute a bond of sympathy between the two countries.

THE BOGEY OF THE STUDIO.

AN address was given at Corbin Hall, Crouch End, by Sir Wyke Bayliss, president of the Royal Society of British Artists, to the students of the Hornsey School of Art. He said that the "bogy of the studio" appeared in three different shapes, and in each of them he must be peremptorily banished. His first shape was in the idea that art, after all, was nowadays a common thing, that there were thousands of people all trying to earn a living by art, and that what one could do hundreds of others could do equally. In ignorant minds that which was common was indistinguishable from the commonplace. But nature was full of common things; our daily lives were made up of them, and we should no more wish to be without them than we should wish the hedgerows to be without the wild rose. The commonness of beauty was the very crown and glory of nature. Art in reproducing nature began with paint but ended with passion, which was a term common to both; and when art had reached that term it had fulfilled its mission. It might be imperfect, but it could not then be commonplace. The second appearance of the bogy was in the suggestion that art was merely a commercial affair, because the artist painted for a living. He had seen people so frightened by the word "pot-boiler" that they had changed the whole purpose of their lives; and timid purchasers had been deterred by the sinister use of that little word from acquiring pictures which they wished to have and knew to be good. What was a pot-boiler? It was a picture painted by an artist, not in an idle moment, or for an experiment, but in the ordinary course of business for money. The finest art work which the world had ever seen had been done under those conditions. The friezes sculptured by Phidias on the Parthenon were pot-boilers, and no doubt "Mrs. Phidias and the kids" had their share of the payment made for them. The great painters of the Renaissance worked for money. Rubens did not paint his acres of canvas gratuitously. The finest portraits of Reynolds were painted not from the faces he chose, but from those chosen by country gentlemen who had the purses to pay for the portraits. Morland painted to get out of the sponging-house or to settle his score for beer. The most precious of Turner's works were painted for publishers, and the masterpieces of David Cox were done as copies for the young ladies whom he instructed in the art of painting in water-colours. Let the artist never be ashamed of working for a reward, if only his work were sincere. Let him do his duty by those dependent on him, and not only boil the pot, but see that there was something in it. Sincerity was the only weapon by which the bogy in this shape could be slain. As for the commercial details, art would sanctify those. The third appearance of the bogy was in the declaration that there were no more great artists, that the days of Phidias and Raphael would never come again and that the English race was not artistic. He would but mention three such names as Turner, David Cox and Constable, and point to the fact that the art of painting landscape and the practice of water-colours had come from the English school. And the belief that the golden age of art was past arose from one of two causes—despondency or conceit—a conceit which would not acknowledge the value of contemporary work. Let it be remembered that art was a living and growing force, strong enough to shape the destiny of a nation. Were women beautiful only in the time of Helen? Were men exalted only in the days of the Renaissance? The source of the inspiration of those great days was not exhausted, and that inspiration could still be drawn from the common life of men and women for those painters who, having a passionate love of art, submitted themselves to the training of the school.

ECCLESIOLOGIA GERMANICA.

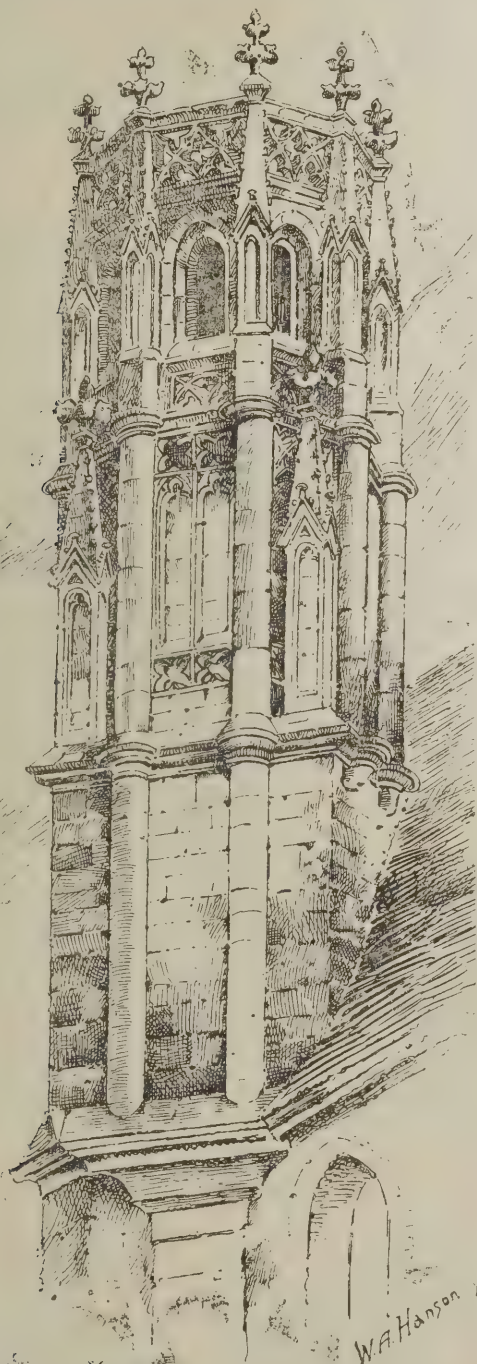
By T. FRANCIS BUMPUS.

*(Continued from page 347.)**Notes on some Steeples in Saxony.*

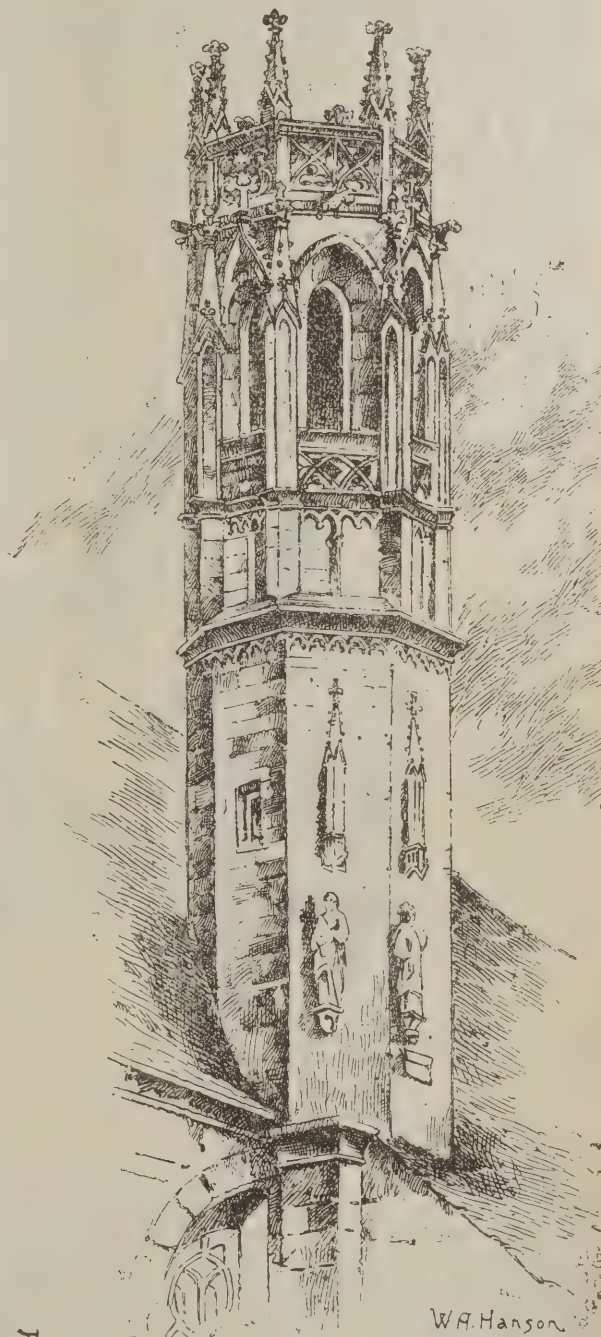
THE Erfurt churches are extremely numerous—there being a dozen or so equally divided between Catholics and Protestants—but hardly one can be said to possess a steeple which comes up to English ideas of dignified outline. The steeples of the Dom and the contiguous Severus Kirche owe something of their more than ordinary imposing appearance to the elevated situation enjoyed by the churches which they

well as the flanking towers, was surmounted about the time of the re-edification of the choir with crocketed spirelets, the centre one rising above that on either side of it. The present triplet of spirelets is, however, a "restoration," the original group, of which the present one claims to be a copy, having been removed in 1717 after damage by lightning, and only replaced within the last half century.

The steeple of the Severus Kirche is an oblong mass rising at the east end of a nave whose five aisles are included beneath one vast roof. This steeple, much greater in breadth from north to south than from east to west, like that of the Dom, forms the choir on the ground plan, a low apsidal sanctuary projecting beyond. This oblong mass of wall rises in the centre, mounting up into three distinct turrets, each of which is



The Franciscan Church



The Augustinian Church

TWO BELFRIES IN ERFURT.

surmount, but when they come to be examined they are practically nil. The Dom, formerly a Romanesque building (in all probability somewhat resembling Naumburg), was gradually removed, the choir in the fourteenth and the nave in the fifteenth century, and rebuilt on a scale of much greater magnificence, the old Romanesque octagonal steeples flanking the commencement of the choir being, however, left. These had been connected together by a wall after the fashion of the screen façades in the Harz lately alluded to, which wall, as

crowned by one of those very *éclat* slate spires so frequently met with in this part of Germany. A similar example of a triplet of spires in such close contiguity would have been offered by St. Pierre at Louvain, had the façade of that church ever been carried out on the imposing scale in which it was conceived.

Three of the prettiest belfries in Erfurt are those which the pencil of Mr. Hanson has so delicately limned in this instalment of the "Ecclesiologia." They are attached to the three great

churches formerly in the possession of the Augustinians, the Dominicans and the Franciscans, but which are all now Protestantised.

The broad characteristics of these three imposing buildings having been sketched in former numbers of these papers,* any very detailed reference being again made to them is unnecessary. I cannot, however, resist making a few remarks on these extraordinary buildings, the most striking feature in all of which is the absence of any grandiosely dimensioned steeple, their promoters apparently having been content with a graceful octagonal turret affixed to the clerestory, or standing a short distance from it.

In the Dominican church—styled by its Lutheran possessors *Die Prediger Kirche*—the lean-to aisles extend along the whole of its fifteen bays of tall, narrow arcades, being lighted by windows of three divisions, each traceried in the head, with a large trefoil, not included, as generally, within a circle. A door, occurring in the fourth bay from the west on the north side, has the superimposed space between its two square-headed entrances and its arch filled by a large perpendicularising window of four lights. The aisle wall being very tall, there is room for another window above this doorway. This is a Middle Pointed one of four lights, and, like the other windows with which it ranges, presents some of that fine bold tracery which it was so pleasant to meet with in Erfurt after the poorer work seen in Westphalia. The small clerestory windows of two lights correspond with those in the aisles.

Inside, the separation between nave and choir is effected by a coeval stone rood-loft extending the whole width of the church. The choir, with its fine double row of stalls, has a bay intervening between it and the rood-screen, to admit of a free passage to its side aisles—an arrangement which, to the best of my knowledge, is unique. The belfry of this church stands against the aisle wall at the last bay on the south side, a wooden bridge connecting it with the roof of the nave. It is, although unpretending, quite a little gem of its kind.



Turret of the
Dominican Church
of Erfurt

The Franciscan church (*Barfüsser Kirche*), although of exactly the same dimensions as the one just briefly reverted to, differs from it in several small points of arrangement. Here the nave arches are much wider, comprising two windows of both aisle and clerestory. The vaulting, however, follows the divisions of the clerestory, the groining ribs starting from a corbelled shaft between each window, by which arrangement an air of greater length is imparted to the internal ensemble. Here the aisles, to which an appearance of narrowness is given by the greater breadth of the arcades, extend only as far as the sixth nave bay, or, looking at the church externally, as far as the twelfth window, an aisleless choir of four bays, ending like that of the Dominican church in a five-sided apse, shooting out beyond. Externally, no visible separation between nave and choir is afforded, except by the discontinuance of the lean-to aisles, but internally a rather low-pitched arch is introduced to mark the division. The vaulting of the choir is not reduced, but kept at the same height as that of the nave, an arrangement which may be seen in Butterfield's churches of St. Alban, Holborn, and All Saints, Margaret Street, where the chancel arch, with its superimposed space of brickwork, forms one of the most striking features of these historical edifices.

At St. Matthias, Stoke Newington—considered by many to be Mr. Butterfield's most strikingly original London church, and one which on its completion in 1853 caused quite a revolution in ecclesiastical design—the tower, a finely-proportioned "saddleback," forms the chancel on the ground plan. This steeple at Stoke Newington is carried on two arches which, springing from corbelled shafts, span the church transversely. Owing to the great height of the nave, a considerable wall space is left above the western of these two arches. There are no transepts, the aisles being carried alongside of the steeple in lieu of them. The arch opening into either chancel aisle being of the same pitch as those in the nave, supports a clerestory in continuation of the nave one. Thus, a species of lantern is formed over the *chorus cantorum*, which is of the greatest value from an acoustical point of view. Beyond it extends a short, aisleless sanctuary much lower than the nave, its barrel-shaped brick vault rising but little above the apex of the eastern tower arch. But to return to Erfurt after this digression. The aisleless choir of the Franciscan church, with its five-sided apse, is most graceful, and is closed by one of those gigantic tryptichs upon which the Mediæval Germans bestowed so much of their art.

In this church the elegant lantern turret is attached to the clerestory wall at the point where the lean-to aisle ceases. Standing as these two enormously long churches do, parallel with each other, at the distance of but two minutes' walk, they recall by their situation St. James's and St. Mary's churches at Bury, between which, as my readers will recollect, rises the great Norman gateway tower of that once most magnificent and powerful of English religious houses, the abbey of St. Edmund.

Two very notable churches have been raised in the North of London within the last twenty years which will convey some idea of the arrangement of these great Erfurt churches—St. Michael, Camden Town, in the English Middle-Pointed style—Early, with just a *souffçon* of the reticulated as regards its fenestration—and the Roman Catholic church of St. Dominic at Haverstock Hill, edited in that soft, Early Northern French Middle Pointed of which Sir G. G. Scott was so fond, and due to Mr. Buckler. Both churches have their great length of roof unbroken by a turret or *flèche*; the Camden Town example is square-ended in conformity with English usage, the Haverstock Hill church terminating in a lofty Belgian-looking apse.

The Augustinian church at Erfurt is the smallest of these three great structures raised by the Preaching Orders, but it abounds in beautiful Middle Pointed work—especially window tracery—and its belfry, attached to the northern side of the nave clerestory, or rather to the narrow strip of unfenestrated wall which does duty for one, is quite a gem of fifteenth-century German Gothic art, as will be seen by the illustration.

I will now endeavour to describe as graphically and as concisely as possible the leading features of such other Saxon church steeples as succeeded in leaving an impression upon the memory during this tour.

Mr. Hanson's drawing of the western façade of the abbey at Gernrode, which accompanies this instalment of "Ecclesiastical Notes from North Germany," will convey a very fair idea of the type of steeple prevalent in the Harz district. Another very interesting example of the same kind of half steeple, half façade is presented by the Romanesque church of Drübeck, on the line of railway from Harzburg through Ilsenburg to Wernigerode, a locality replete with interest to the student of Saxon Romanesque. This church at Drübeck is a long Romanesque one, with a western apse like Gernrode. Its aisles and northern transept have never been completed. The simple clerestory of small round-headed windows is borne on three round arches with short, thick, cylindrical piers. These nave arcades, as well as the arch destined to open into the northern transept, are walled up, after the fashion of a modern church where funds have not been forthcoming to raise the building *d'un seul jet*. A couple of octagonal turrets with spirelets like those at Gernrode flank the west front which rises far above the apex of the nave roof. This western screen-mass is coextensive with the flanking turrets, and is gabled transversely, as at the Liebfrau Kirche in Halberstadt.

Equally singular outlines are presented by the western aspects of the churches at Luckau and Geithayn, the steeples of the first two being almost completely extinguished when viewed from the east, owing to the enormous mass of roofing that has been thrown over the "hall" churches in their rear. Luckau shows two very dignified Late Pointed brick towers crowned by spires flattened at the top, and of four sides, of which those east and west are of greater breadth than those north and south, terminating in a metal cresting, from the centre of which rises the weathercock. These steeples at Luckau rise two stages clear of the façade between them. This façade is rectangular, and from it a roof slopes off to the breadth of the towers and rests against the front of the nave, whose large stone gable cross is, within a few feet, on a level with the tops of the spires. It is certainly one of the most extraordinary western façades of my acquaintance, this of the

* See *The Architect* October 8 and 15.

Nikolai Kirche at Luckau, and, singular as it may appear to English eyes, has a certain dignity peculiarly its own.

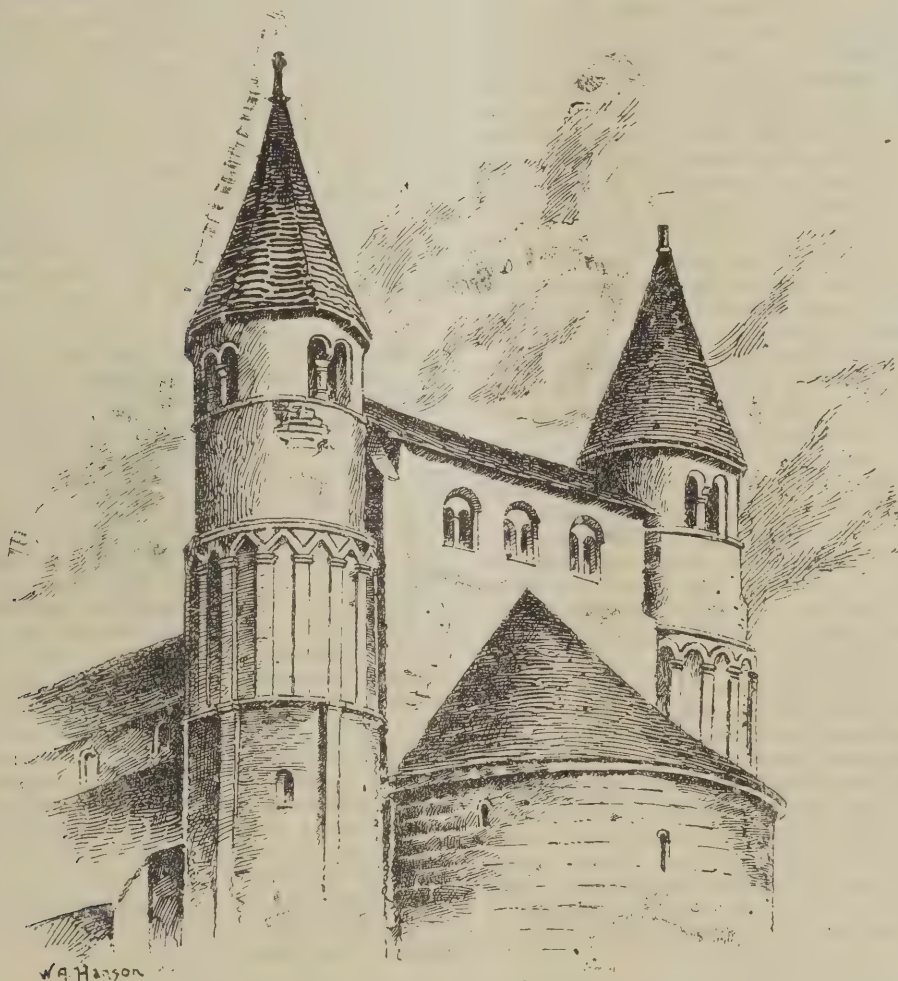
Another of these heavy-roofed Late naves has been built on to the Early façade of the church at Geithayn, a town lying between Chemnitz and Leipsic. Such a ponderous mass has quite dwarfed this church's picturesque pair of western steeples, consisting of towers surmounted by low octagonal spires, not broached, but like that of All Saints, Margaret Street, and St. John's Roman Catholic Church at Islington, spreading themselves out at the base.

The summit of the façade between the towers has, like the Luckau example, a roof sloping off at an angle coextensive with their breadth, to meet the gable of the lofty Late Gothic nave, the apex of whose roof reaches to about half-way up the spires.

Occasionally we find the tall western screen façade in Saxony without the flanking turrets. An instance of this treatment, causing the front to assume the air of a saddleback tower, gabling from north to south, can be seen in one of the

type of church seems to have been pretty generally adopted during the thirteenth, fourteenth and fifteenth centuries. Next to it, in point of purity, we may place portions of the church at Nienburg. The five-aisled Marien Kirche at Muhlhausen is likewise satisfactory, and later on we have such distractingly elegant interiors as the Marien Kirche at Zwickau and the Petri Kirche at Görlitz, both of which have double aisles to their naves. Some of the details of these great fifteenth-century churches, such as their porches, deserve study, though in point of refinement it cannot be classed with our contemporaneous work.

The rich Late Gothic Marien Kirche at Zwickau (a picturesque old walled-town on the line of railway from Dresden to Hof) has a square western tower surmounted by an eight-sided lantern, a species of small broach being introduced to minimise the harshness caused by the abrupt transition from the square to the octagon. This last is finished off with a richly quatrefoiled parapet, from which rise small crocketed pinnacles. From the south side of the tower projects what we should call in England a parvise porch. It is of very rich Late Pointed detail,



West end of the
Church of Gernsode

churches of the quondam cathedral city of Merseburg, between Halle and Naumburg.

That most picturesquely outlined of mid-German cathedrals, Meissen, near Dresden, and so remarkable for its two rood-screens (the one placed beneath the eastern arch of the crossing and the other cutting the long aisleless choir in two), has a rectangular western façade of open Late Pointed screen-work. Doubtless it was intended to soar far above the roof-line, like the gigantic one at Strasburg, but it has never risen beyond the apex of the nave roof, being finished with an elegant quatrefoiled parapet out of which rise small pinnacles.

A small square tower stands to the east of the south transept at Meissen. It afterwards becomes octagonal, has a parapet pierced with quatrefoils, and supports a short Flamboyant open-worked spire, with very pronounced crockets and a huge finial.

This cathedral at Meissen—now Lutheranised—is one of a number of the most elegant churches exhibiting the hall arrangement in this part of Germany, being a good specimen of Saxon Middle Pointed Gothic. Here as in Westphalia this

and serves not only in adding breadth and dignity to the western façade, but forms an important factor in breaking up the outline of a very short but lofty church. Towards this picturesque grouping of parts a circular stair-turret in the angle formed by the tower and the porch in no small degree lends its aid.

The interior of this church at Zwickau affords a specimen of that almost flat vaulted kind of roofing so often employed by the Southern Germans in the fifteenth century. Another example of this is afforded by the Franciscan church at Saltzburg. At Zwickau the groining ribs die off into the sides of huge capless octagonal pillars, which have tall bases, like some of those seen in our Late Perpendicular churches. Somehow or other the spectator is unable to divest himself of the unpleasant impression that these great post-like pillars are thrusting themselves up beyond the vaulting. Despite these vagaries the cross views afforded by this great Late Gothic church at Zwickau are undeniably picturesque, and the same remarks apply to the more delicately pillared five-aisled interior of St. Peter at Görlitz.

NOTES AND COMMENTS.

THE question of ownership of building materials has given rise to much litigation. It was laid down by Lord WATSON that materials provided by the builder and portions of the fabric, whether wholly or partially finished, although intended to be used for the execution of the contract, cannot be regarded as appropriated to the contract or as "sold" unless they have been affixed. But the building owner can obtain the right to unaffixed materials by contract or agreement, or delivery on ground is supposed by itself to confer some rights over materials on him. A case has just been decided at Liverpool in which an ingenious point was raised, for the defence turned on the argument that a building agreement to be valid in such cases required registration. The plaintiff, Mr. W. O. CALLOW, entered into a contract with a builder to sell the land for building purposes on a building agreement which vested the materials brought on the land in Mr. CALLOW, and gave him a right to take possession of and sell the land and materials upon default by the builder in fulfilling his part of the agreement. The plaintiff having taken possession under the agreement, the defendants, Messrs. GALT, EDMUNDS & Co., a firm of timber merchants, with the consent of a partner of the builder, went on to the land and removed certain timber and materials which they had supplied to the builder and for which they had not been paid. The plaintiff thereupon brought this action for trespass to the land and for conversion of the timber removed by the defendants. It was held by Mr. Justice BRUCE that the decisions in *BROWN v. BATEMAN* and *REEVES v. BARLOW* applied to the case. In them it was held that the moment materials were brought upon premises the property in them passed in law to the building owner, and that an agreement respecting them was not a bill of sale, and did not require registration. His lordship thereupon gave judgment for the plaintiff for 60%, the agreed value of the timber removed, in addition to 1% paid into Court in satisfaction of the trespass.

THE little Temple of Nike Apteros, or Wingless Victory (*i.e.* loyal to Athens), in the Acropolis of Athens, is generally supposed to have been erected when CIMON was in power. Although it was visible in the eighteenth century, when WHELER and SPON visited Athens, the temple was subsequently demolished. In 1835 some explorations were undertaken which were successful in unearthing several fragments of builder's and sculptor's work. A restoration was accomplished by SCHAUBERT and ROSS, which suggests the charm of the temple when it was perfect. The building was supposed to commemorate the victory in 466 B.C. on the Eurymedon, when on one day two hundred Persian ships were destroyed, and immediately afterwards the invading army was defeated. But from inscriptions lately discovered, and which were produced for the first time at the WINCKELMANN celebration in Athens on the 9th inst., it would appear that the building is twenty years later in date, and would therefore be one of the works undertaken by PERICLES. The name of KALLIKRATES is given as architect. He co-operated with ICTINOS at the Parthenon.

Two competitions were arranged in July for almshouses at Brocco Bank and a convalescent home at Whiteley Wood, which were to be erected under the will of the late GEORGE WOOFINDIN. The two were restricted to members of the Sheffield Society of Architects and Surveyors. Mr. E. M. GIBBS was appointed assessor for both competitions. Five sets of drawings for each building were received on October 22. Mr. GIBBS, after examination, reported to the Trustees that while all the "instructions" were conformed with, "none of the competitors have conformed with all the 'conditions,' and that my duties being so clearly defined, I have to exclude the whole five sets of designs. Some do not conform with the condition as to expenditure, and others do not conform with the condition that the description and specification of materials is to be letterpress or typewritten, as handwriting appears." Mr. GIBBS said he did not know of any previous competition where all the designs were excluded, and, under the circumstances, he recommended the Trustees to divide the four premiums of 50% each into five of 40% each, in order that each competitor might receive one. The "relative merits" are as follows:—*For the Almshouses.*—First,

Mr. W. R. BRYDEN, architect, Buxton; second, Messrs. HEMSOLL & PATERSON, architects, Sheffield; third, Messrs. W. H. LANCASHIRE & SON, architects, Sheffield; fourth, Messrs. GEORGE SAMPSON & SON, architects, Sheffield; and fifth, Mr. FRANK WILSON, architect, Sheffield. *For the Convalescent Home.*—First, Messrs. HEMSOLL & PATERSON; second, Mr. H. W. LOCKWOOD, architect, Sheffield; third, Messrs. HOLMES & WATSON, architects, Sheffield; fourth, Mr. W. R. BRYDEN; and fifth, Messrs. GEORGE SAMPSON & SON.

THE device of the city of Paris, an ancient boat with the motto "*Fluctuat nec mergitur*," so well suggests the participation of victory over foreign enemies, it should have obtained more general recognition from artists. M. ZOLA must have been thinking of the neglect when he made Claude Lantier in "*L'Œuvre*" paint an allegorical subject of a nude woman standing at the prow of a boat on the Seine. It is now proposed to erect on the Ile du Vert-Galant, near the Pont Neuf, an immense representation of the arms of the ancient Lutetia. The idea is due to M. MONCEL, and he has had the aid of M. GRAVIGNY, architect, and M. LAGRANE. M. BOUVARD, the director of municipal works, has given them much advice. The memorial will be about 20 metres in height. The vessel will resemble an ancient galley with a high prow, and the deck takes the form of a fortification, from which rises a pedestal resembling a capstan. On the latter is a globe supporting a figure of Paris, which will be 8 feet in height. The expense, it is said, will not exceed 400,000 francs. The vote for the money has yet to be passed by the Municipal Council.

APPARENTLY the competition for the Harrisburg Capitol, Pennsylvania, although supposed to be decided in the American courts, can still afford material for future litigation. It will be remembered, says the *American Architect*, that six architects were specially invited to submit designs, and were promised, in consideration of their doing so, compensation to the extent of 1,000 dols. each. This compensation, we are told, will probably be withheld from five of the six architects in question, on the ground that, as their designs could not have been executed without modification for 550,000 dols., they have violated their part of the contract and are not entitled to require from the State performance of its part. The sixth competitor, whose design could, it is claimed, have been carried out for the sum mentioned, and will therefore, according to the story, receive his 1,000 dols., is the one whose drawings were excluded from competition by the experts, on account of their violation of the terms of the programme. The agreeable impression which this proceeding is calculated to produce upon the profession is likely, it seems, to be intensified by the determination which is said to have been taken by the Capitol Commission, to refuse to pay the expert jurors the agreed compensation for the time and trouble which they expended in examining and reporting upon the competitive designs.

THE reconstruction of the Royal Infirmary in Glasgow which is to be a memorial of the Jubilee year, has been for some months under consideration. A block plan has been prepared by Mr. JAMES THOMSON, architect, according to the instructions of the committee. It shows four detached blocks, running east and west, almost parallel, and connected by a corridor of one storey. At the eastern part of the site it is proposed to place the kitchens, engine-house, &c., besides an additional ward for special cases. The committee have approved of the plan, which is to be submitted to the directors, who will hold a conference on the subject.

ILLUSTRATIONS.

THE LADY CHAPEL, ST. AUGUSTINE'S CHURCH, KILBURN.

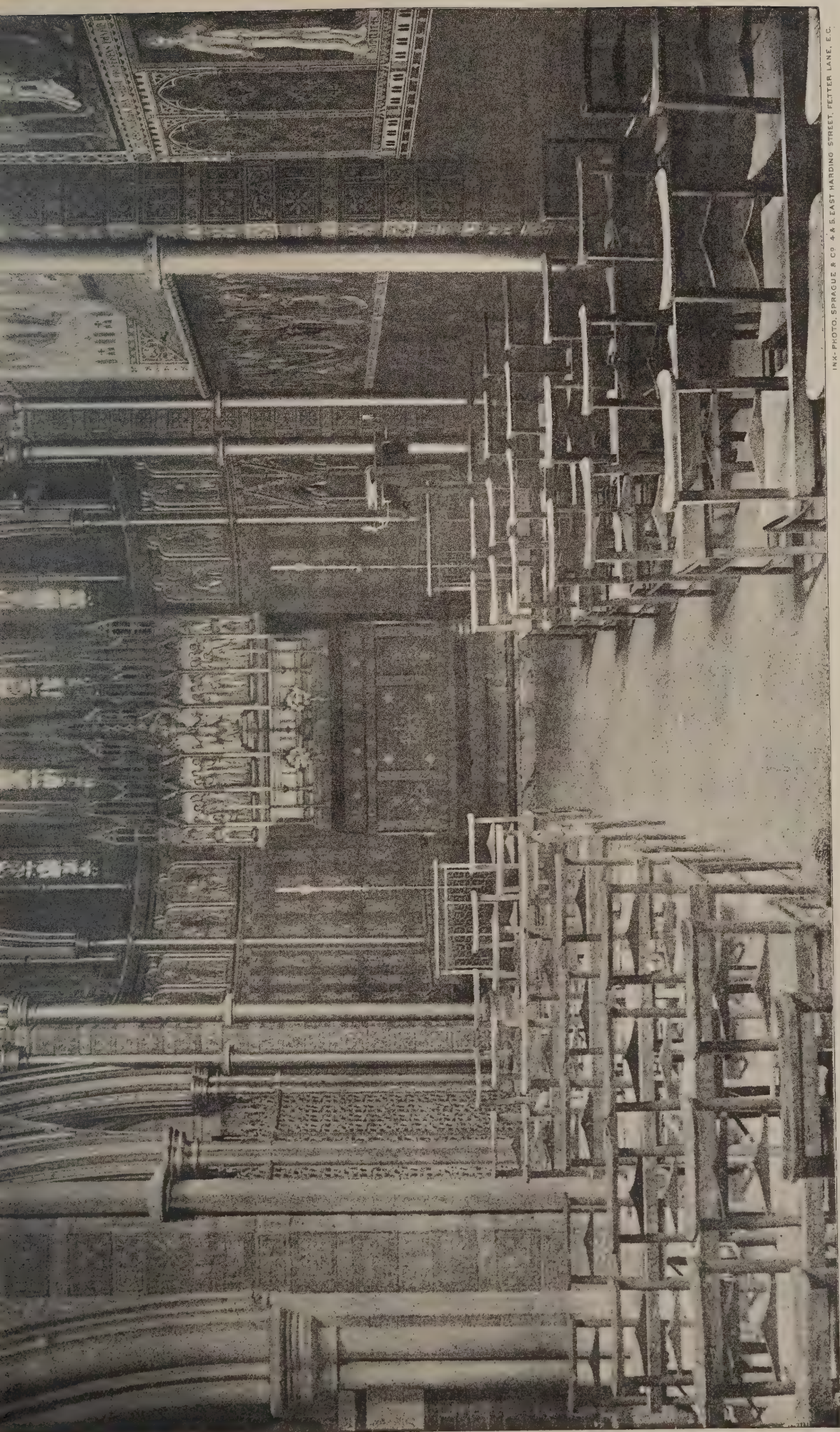
PRIMITIVE METHODIST CHURCH, WELLINGTON.

DEVIZES CASTLE, WILTS.—GARDEN FRONT.

CATHEDRAL SERIES.—SALISBURY: VIEW FROM NORTH TO SOUTH TRANSEPT.—ELEVATION AND SECTION OF THE END OF THE SOUTH TRANSEPT.

Öhr Architekt. Der. 24^{te} 1897.



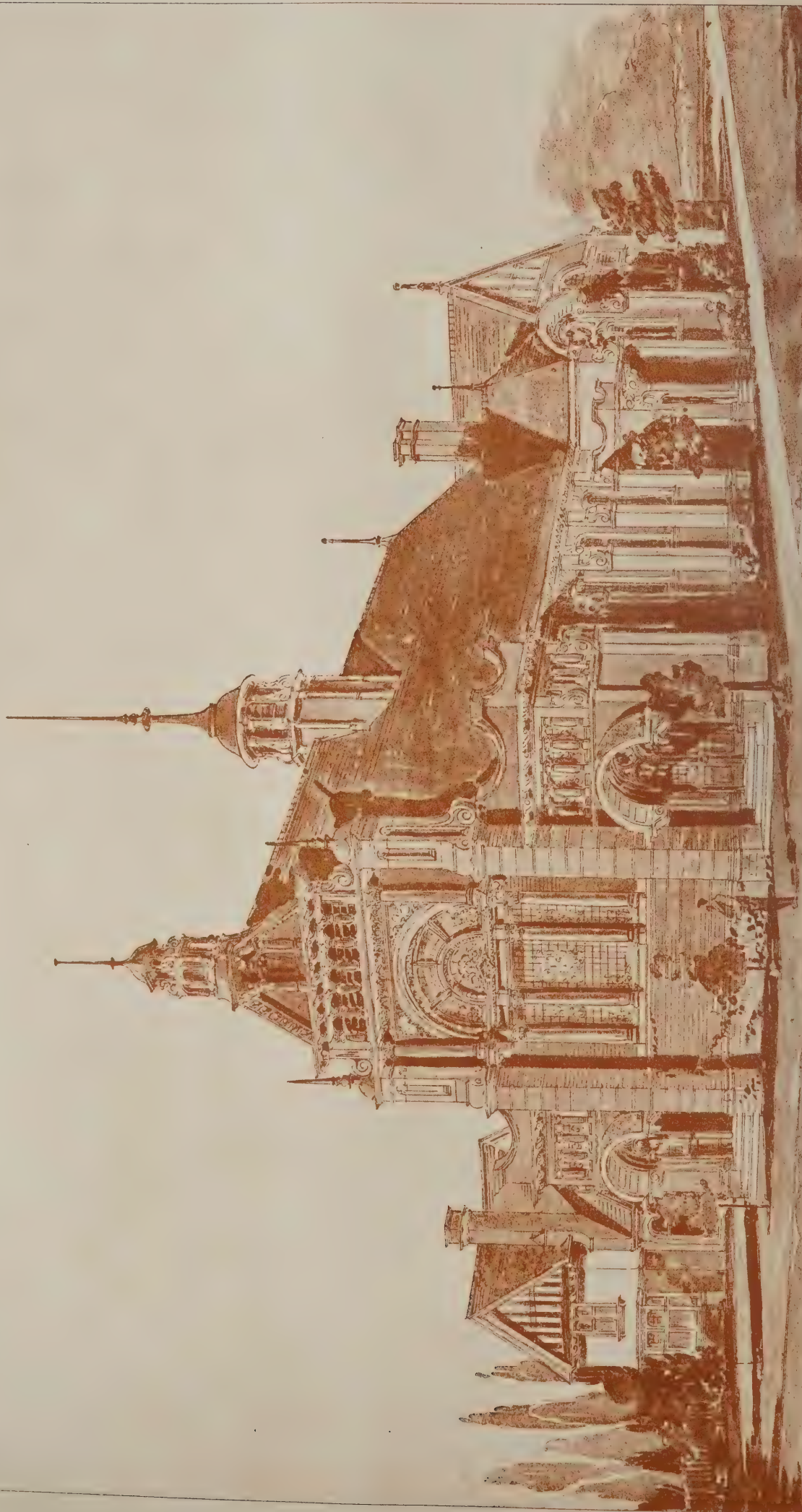


INK: PHOTO, SPRAGUE & CO 44 & 45 EAST HARDING STREET, FETTER LANE, E.C.

PHOTOGRAPHS BY BEDFORD LEMERE & CO

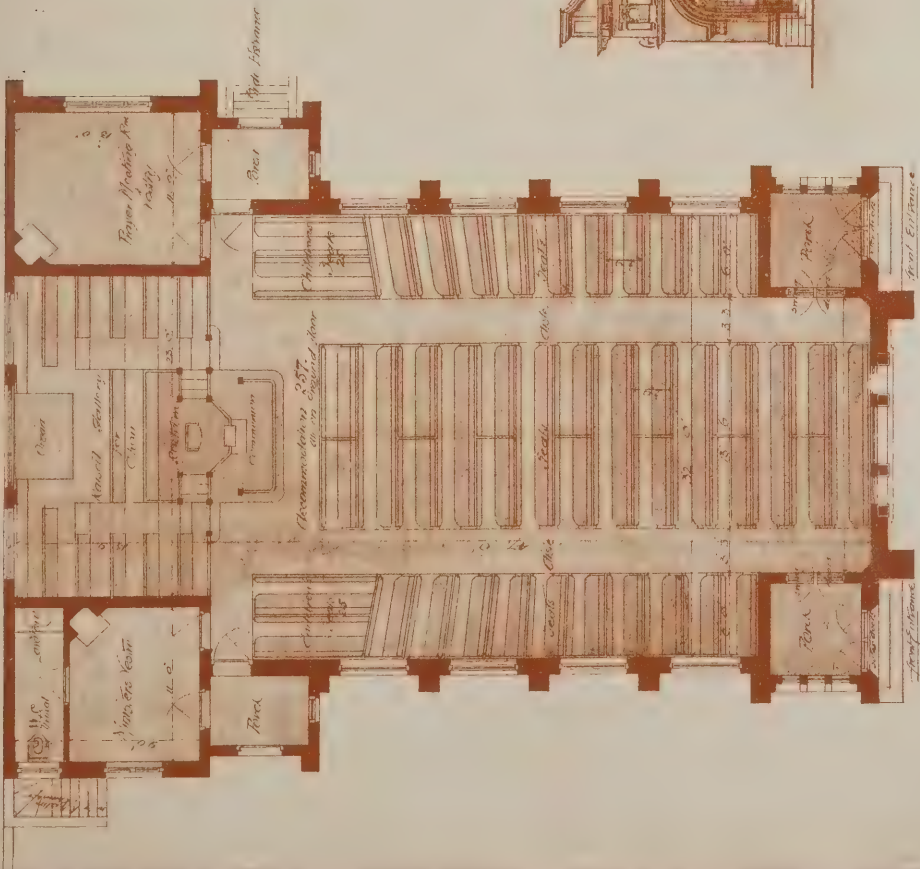
THE LADY CHAPEL, ST. AUGUSTINE'S CHURCH, KILBURN.

The Late J. L. PEARSON, R.A., Architect.

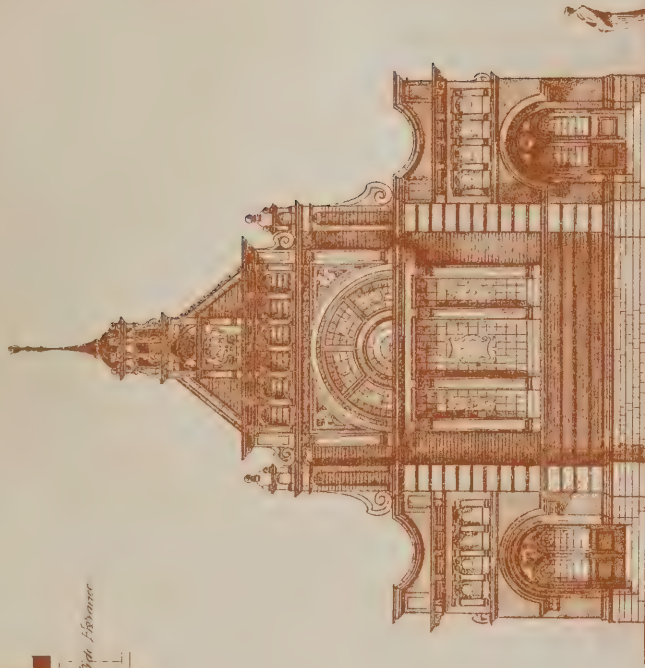


Primitive Methodist Church -
Elstree -
Hickox & Farmer Architects
Wellingborough -
Notts

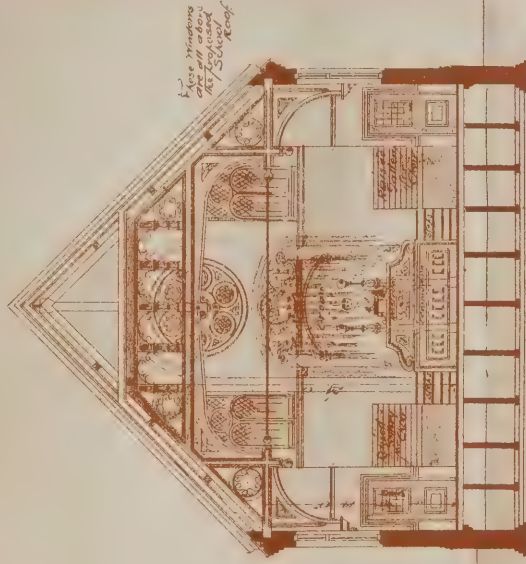
PRIMITIVE METHODIST CHURCH
WELLINGTON.



Plan.

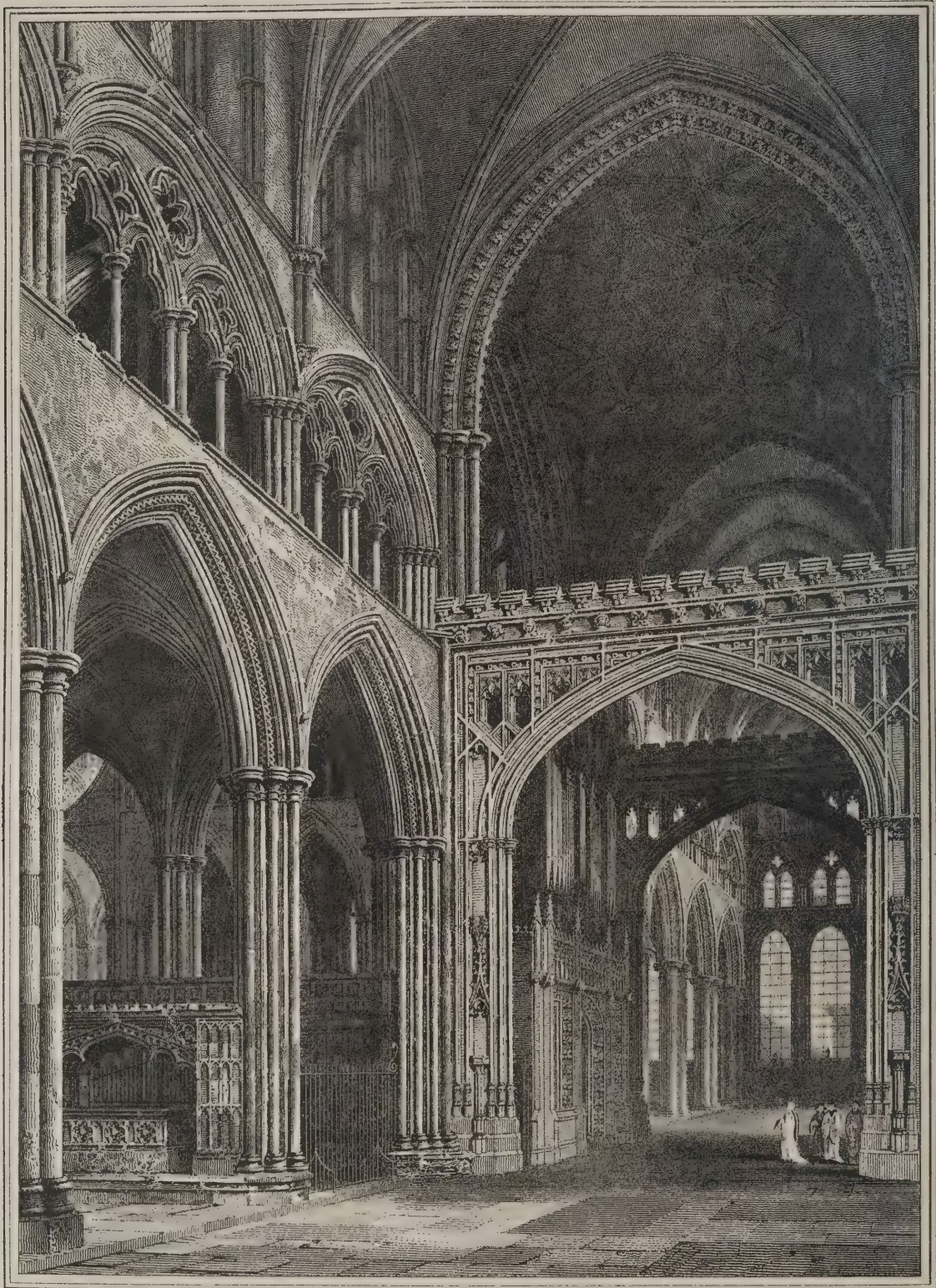


Front Elevation, East End.



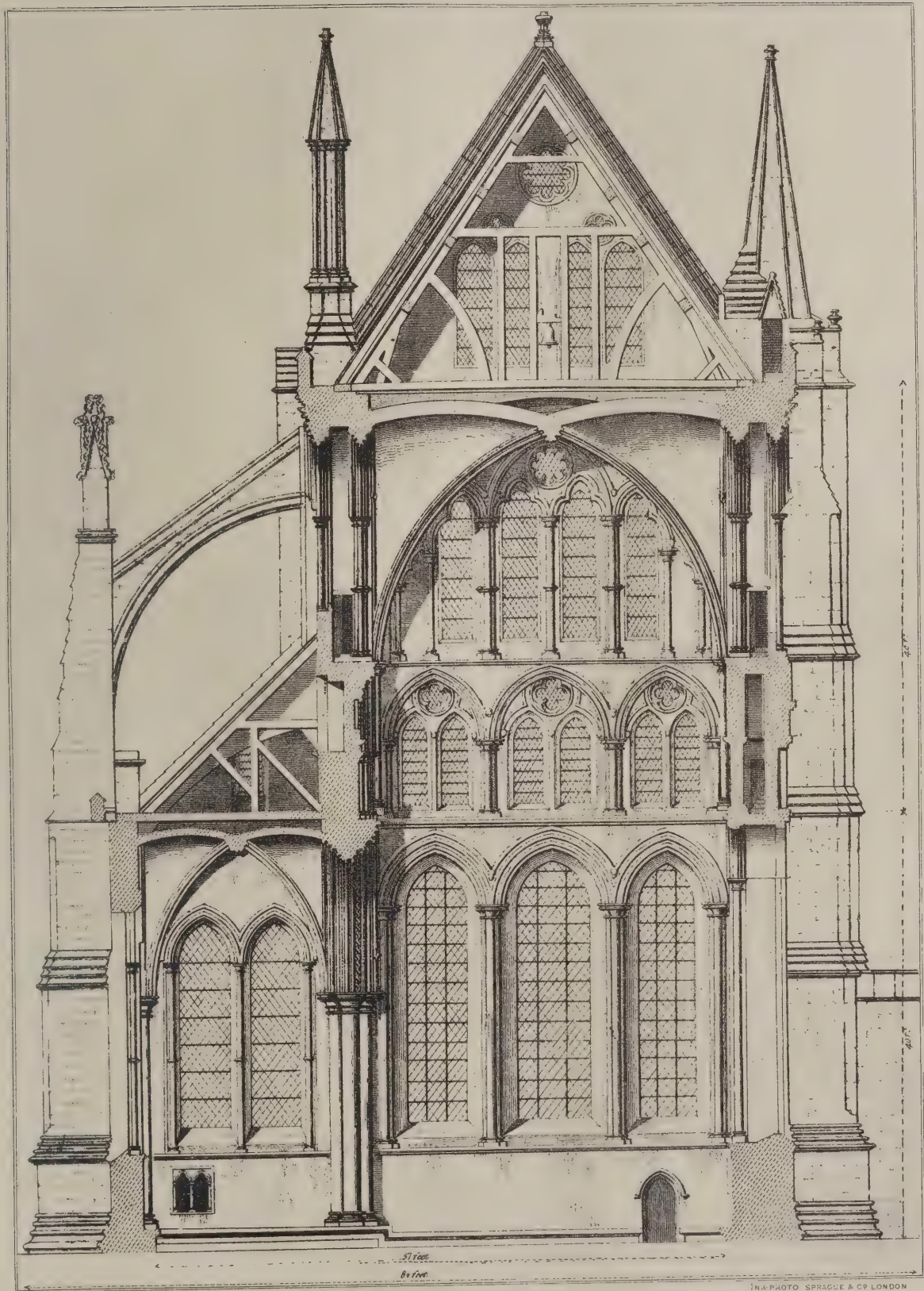
Section.

J. H. Hickson & H. E. Hume
Architects
Wellington

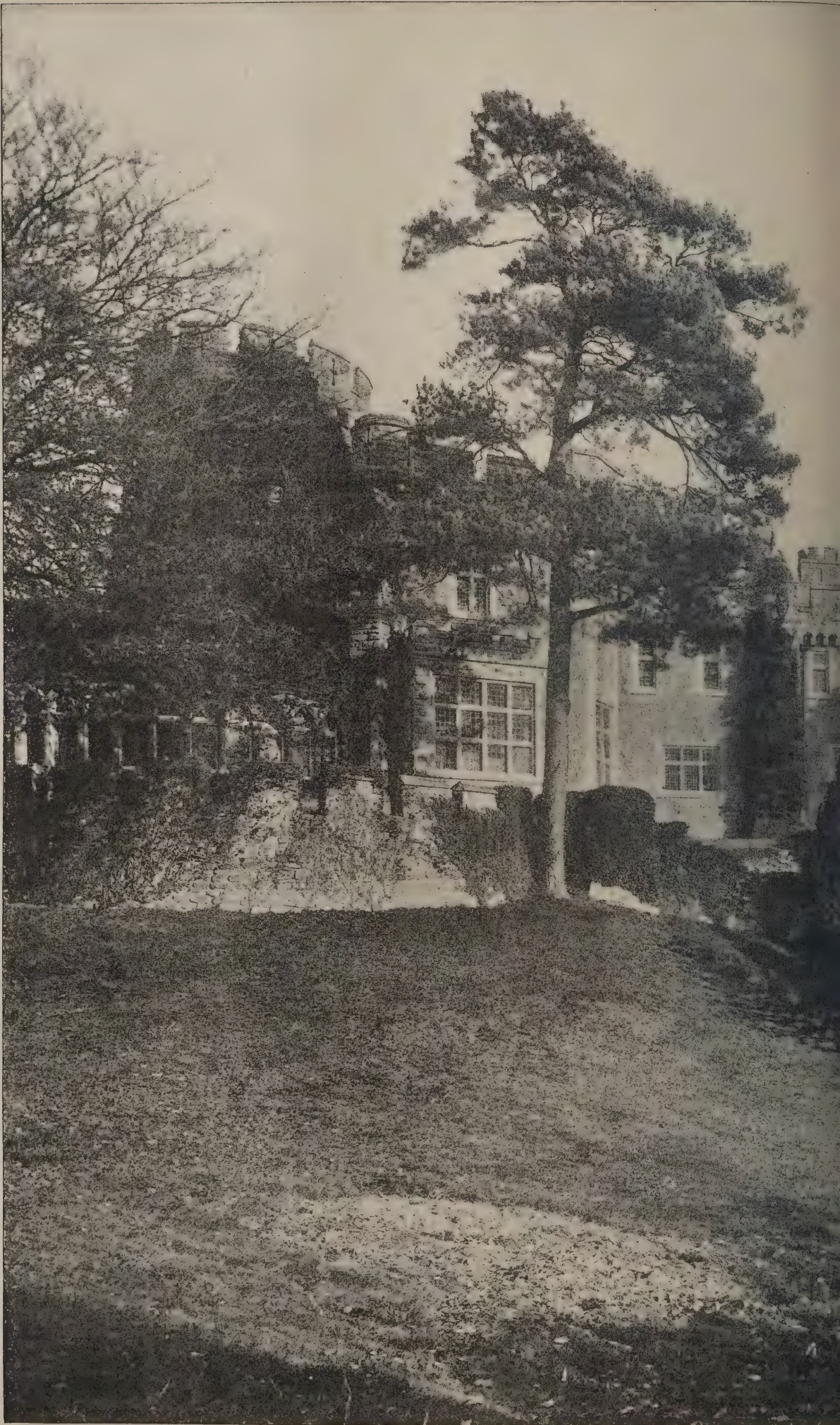


INA-PHOTO. SPRAGUE & CO LONDON

CATHEDRAL SERIES, No. 94.—SALISBURY: VIEW FROM NORTH TO SOUTH TRANSEPT.



CATHEDRAL SERIES, No. 94a.—SALISBURY:
ELEVATION AND SECTION OF THE END OF THE SOUTH TRANSEPT.



PHOTOGRAPHED BY BEDFORD LEMERE & CO



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GARDEN FRONT.

THE ARCHITECTURAL ASSOCIATION.

A MEETING of this Association was held on Friday evening last, Mr. Hampden W. Pratt, president, in the chair.

The following gentlemen were elected members:—Messrs. C. M. E. Armstrong, J. F. Bull, C. H. H. Henman, A. C. Notley and C. Newborne.

A vote of condolence was passed to the relatives of the late Mr. Pearson.

Mr. L. A. Shuffrey read a paper on

House Decoration.

The invitation which I received from the committee to read a paper before the Association was accompanied by the suggestion that the subject should be "House Decoration: the Preparation of Surfaces," from which I understood it to be desired that I should treat the subject from the practical rather than the æsthetic side. This I shall endeavour to do, confining myself mainly to the skin or surface which appears to the eye and the preparation of the ground to receive it. You will doubtless agree with me that the subject is an important one, as the most regular features will fail to please if disfigured by a bad complexion, and the most ordinary be made attractive by a good one; a shining nose will not compensate for dullness of the eyes, teaching us not to get up a shine in the wrong place.

The trade "painter" hardly gets its share of attention in many specifications, and the description "clearcole and distemper ceilings, hang paper at so much per piece, and paint all work usually painted four coats of good oil colour," will not insure a good result in the hands of the ordinary contracting builder.

For many years the tendency has been towards depending upon manufactured wall and ceiling coverings rather than upon hand-painted decoration, panel and pilaster treatment, and arabesques, until the practical painter who can carry out work of this kind has become a rarity. In fact, decoration is now done mostly by selection, which has advantages in the saving of time, but does not tend to elevate the workman and to give him interest in his work.

A difficulty in the painting trade is that fluctuations of work at the different seasons of the year have a demoralising effect upon the men. When work is slack many are thrown out of employment, and when busy others are taken on who can just handle a brush, but who have served no proper apprenticeship to the trade. It is absolutely necessary to the successful carrying out of a job that a skilful and experienced foreman painter should have charge of it, whose duty it should be to control the execution of the work, mix all materials, see that proper tools and plant are used and taken care of and that rubbish is cleared away from time to time and the rooms kept clean.

I do not propose to go into the proportions of the mixtures of materials to be used, as I could not give information on this subject from actual experience; it would probably be tedious for you to listen to, and it is a part that an architect can hardly be expected to remember, and must leave to the foreman painter. It is, however, a great convenience, and commands respect from the workmen, to be able to take palette and knife in hand and mix the tint required on the job. In so doing it is very desirable never to use a colour or vehicle without knowing its name and qualities, as the experience gained thereby will be very serviceable. It is difficult to gauge the amount of time this mixing of tints will take, and I can say from experience that it is desirable not to make a following appointment too soon after.

In the progress of a new building you have no doubt, when visiting the works, been suddenly confronted with the question from the foreman of the job, "What colour are we to paint the outside woodwork and the down pipes and gutters?" and in making the design you will very likely have mentally disposed of the questions whether the frames and sashes should be white, the down pipes green, whether the iron gutter running along the extreme projection of the heavy overhanging main cornice should be treated as a member of it, at great inconvenience on account of its falls, or to a quite different colour on its own account; whether the outside timber framing, if any, shall be coated with Stockholm tar, in strong contrast to the white plaster panels treated with a coating of boiled tallow and lime; and whether the bargeboards or verge mouldings shall be light, like the sashes, or dark, like the framing; whether the front door shall be dark, and, if so, shall the solid frame which surrounds it be the same. The raising of these questions should be a hint that the inside colouring will be coming on shortly for determination, and a scheme of colour for the various rooms should be thought out.

The principal objects of painting are to preserve the material painted, to produce a surface which can be kept clean and to give it a beautiful appearance. When applied it must become hard, and must adhere firmly to the substance painted. It is desirable, if not absolutely essential, that it should retain its colour, as although many beautiful effects come through

change and exposure, they are generally due to the disintegration of the surface, or decay, which can only go on for a limited time. Many of you may have admired the greenish-blue colour, originally a common green, of an old garden gate; but if you examine it for the purpose of imitation you will find that the colour eludes you, being made up of different coloured particles which you cannot match. The pleasant pinky red of old cart-wheels, which looks so nice in a farmyard, is a cheap vermilion which has faded. Tints should be made stronger in outside painting than at first desired to allow for some diminution from exposure, which will most certainly occur, and for the reason that colours are softened by the atmosphere. In this respect colours vary very much, losing less as they increase in warmth. A soldier's coat will appear its reddest on a foggy morning.

White lead, *i.e.* carbonate of lead, ground with linseed oil is the principal ingredient used in painting, and it is important that the best quality should be procured. It has more covering power if kept for some time after manufacture. It is capable of adulteration, but I am not acquainted with any simple method of testing its quality, except that any adulteration would be lighter than the lead, and thereby increase its bulk. It is a drier, and can be relied on when mixed with turpentine alone; but it is found for convenience of working that a proportion of linseed oil should be mixed with it and a small quantity of drying oil varnish.

A purer white than white lead is zinc white, oxide of zinc, but this lacks the requisite covering body possessed by white lead, and is used mostly for finishing pure white or delicate tints. It is more permanent than white lead, and is not poisonous.

Where a pure white is required the ground can be brought forward with two coats of white lead, then one of half white lead and half zinc white, and finished with zinc white, light copal varnish and turps.

The principal vehicle used in painting for mixing with white lead and colours is linseed, the natural oil expressed from the seed of flax; it should be yellow, transparent and sweet to the taste and have little smell. It has a tendency to darken in colour after drying. If opaque, acid to the taste and with a rancid smell, it is not of good quality. It is an indifferent drier, but when mixed with white lead the drying properties of each are improved thereby.

Boiled oil is linseed oil boiled with litharge, which makes it a good drier, but darkens the colour so that it is only suitable for dark colours. It is much used for outside work.

Turpentine is a volatile oil distilled from the resinous oil of fir trees and is very useful as a solvent and a medium in combination with other substances. It has a bleaching quality, and to some extent corrects the tendency of drying and expressed oils to discolourment. By the over use of turps a coat of colour may be made too thin to be of much service. The residuum, after the distillation of the oil or spirits of turpentine, is the common resin or rosin of commerce.

Varnish is used to make colours hold out to their full brilliance of hue, also as a protection. It varies very much in quality, and it is best to specify that of the best-known makers. The most serviceable are the oil varnishes, which dry by oxidation of the oil and form a transparent skin over the work. For outside work an elastic varnish should be used, which will not readily crack. In applying varnish it is necessary to see that the surface should be free from dust or grease. Flaking varnishes are supplied by the manufacturers intended to dry with a dull gloss, but there is some uncertainty about them and many painters prefer to mix some varnish with the last coat of paint to produce this effect.

Exterior.

The earliest opportunity of a fine day should be taken advantage of to paint all the external wood and ironwork, the priming having been done before fixing. The woodwork, if it be a light colour, will require four coats of white lead, mixed with linseed oil and driers; if to be finished a dark colour, boiled oil, which is a better drier, should be used. It is requisite that outside painting should possess good body. For external ironwork, paint composed of oxide of iron and linseed oil is the best protection. In cases of engineering works which have been sent abroad, ironwork which has been painted with oxide paint has stood much longer than similar work with red lead.

A drawback to the use of oxide paint is that the range of colour is limited, being principally red, which, in the case of a red brick house, is the last colour one would desire. Other colours can be obtained by mixing, but the protecting qualities of the paint are reduced thereby. All gutters should be painted inside as well as out. A painted front door to a house if exposed to a sunny aspect is a constant source of expense, as the paint soon cracks and blisters, and has to be burnt off down to the wood each time it is repainted. A practical painter has told me, speaking from actual experience, that if zinc white is used entirely instead of white lead this will not happen. The plan of recessing the front door or providing an outside porch

has the double advantage of providing shelter and protecting the door from the sun's rays. The front door being the most noticeable feature of a house calls for special attention, and should be well rubbed down and have two coats of varnish. A well-painted front door with hand-polished brass fittings bespeaks a well-conducted house.

In the case of town houses, cemented or stuccoed fronts often have to be treated, and this is generally done with oil paint; it is a heritage left to us by a former generation, and we must make the best of it. The only satisfactory feature about painted cement-work is that it keeps the wet out. The money spent on the painting of cement fronts in London would have paid for the use, in many cases, of Portland stone or rubbed brick—the two materials which, in my opinion, are pre-eminently suited to the London atmosphere. Fresh Portland cement is the greatest enemy of oil paint and should not be painted for two years. When cement is left from the float with a granular surface it has a pleasant enough appearance, but it gets so grimy in time painting in oil is resorted to, and this looks very well until successive coats have filled up the grain, which then has an unsatisfactory reflecting surface, cracks appear which have to be stopped, and as Portland cement cannot be painted with safety until it has stood about two years, these cracks have to be repaired with Roman cement. A distemper which will stand the weather would be the solution of the problem. This merit is claimed for Duresco, and provided that it is used under favourable conditions as to weather, so that it has time to harden, I consider it very suitable for outside stucco.

The clubs in Waterloo Place are an illustration of the treatment of stucco. The United Service in its natural colour is depressing in the extreme. The Athenæum, with its white painted dressings and grey distempered walls, shows about the best which can be done with it; and the Travellers' is an illustration of how a good design suffers from being executed in an unworthy material. The conclusion which I come to is that Portland cement facing is not suitable for London. For reasons of economy, outside painting should be limited in extent as much as possible; woodwork should be painted every three years with good white lead and linseed or boiled oil, special care being taken to see that the surface is dry and free from dust when it is applied.

Interior.

In dealing with the interior of the house, I propose to take the parts of the rooms in the order in which they are usually painted—ceilings, woodwork, walls and floors.

Ceilings give the decorator more trouble than any other part of the room, for various reasons, the principal being the cracking of the plaster. I have no doubt you are all familiar with the maps of rivers which present themselves when you look at the ceiling on a bright morning a year or two after a house has been built, caused partly by the shrinkage of timbers or vibration from persons walking on the floor above, defective sand, lime or hair, or by the floating and setting coats following too quickly after the rendering, before it has had time to get thoroughly dry. To prevent this important ceilings should be lathed on cross battens or ceiling joists fixed beneath the floor joists. If ornamented, the most convenient plan is to make them of fibrous plaster, the method being to make models of the various parts, and then from plaster, wax or gelatine moulds make their casts of plaster-of-Paris which have embedded in their thickness canvas and sawn laths of pine, in places where required for strength or fixing. These slabs are then fixed to the battens with screws, and the joints made good with plaster and canvas. Existing ceilings can be covered up by fibrous plaster screwed to the lath and plaster, provided, of course, that the latter is sound. Brass screws should be used, as iron ones rust and stain the plaster.

Ceilings on the underside of floors composed of iron and concrete can be plastered right on to the concrete if the boarding on to which the concrete is thrown is kept down low enough beneath the joists for the concrete to pass under. Cracking sometimes occurs through the iron joists being run into flues, and the expansion and contraction of the metal caused thereby. In fixing ornamental ceilings of fibrous plaster, battens should be used nailed to the concrete. The most usual method of finished ceilings is in distemper or tempera. In the case of new work the surface should be clear-coated, *i.e.* washed over with a coat of thin size and whiting, and a little alum, having previously removed all excrescences. This is to make the absorption equal all over the surface. The distemper is made by dissolving the best whiting in clean water until it is of the consistency of thick cream, and perfectly smooth to the touch, to which should be added prepared size, previously warmed, and the necessary colour, the colour being separately rubbed up with some of the distemper; the whole should then be gently mixed together and strained through a coarse cloth or metal strainer. When allowed to set it should be of the consistency of jelly, in which condition it should be applied to the ceiling.

As distemper changes its colour very much in drying, it

should be tried on a piece of white paper and allowed to dry. The drying may be assisted by holding it against the face or back of the hand, but not by holding it to the fire, which would prevent its drying its natural colour. Having procured the right tint it should be applied quickly to the ceiling with large brushes, preferably by two pairs of hands. For high-class work distemper is frequently stippled, taking care not to go over the same part twice. There should be no draught in the room whilst this is in progress, but when completed the sooner it is dried the better. If this operation is successfully carried out, a very pleasing effect is obtained. Even with experienced hands distempering is not always successful, particularly if done during foggy weather. If it does not dry out evenly it should be washed off and redone.

If dealing with old ceilings the distemper must be washed off right down to the plaster face, all cracks raked out and stopped with putty (plaster-of-Paris and distemper mixed), and the whole rubbed smooth with pumice-stone and water; stained parts should be painted with oil-colour and the whole clear-coated and distempered as before described. If old ceilings are in bad condition it is desirable that they should be lined with paper, which should have a coat of weak size before being distempered.

Distemper is superior to oil-colour in the clearness and delicacy of its tints, and in that it does not discolour in the same way with age. It is also very much cheaper. Its demerits are that it will not bear washing, and, being thick, it soon chokes up delicate mouldings or ornament; it is, therefore, the custom, where there is a considerable amount of elaboration or ornament, to execute the work in oil-colours, either flatted or flat varnished. This in a country house, or where no gas is used, will last a great many years, and bear washing and touching up. If dealing with ornament in relief, it is a good plan to paint the work twice with oil-colour and then distemper it. The distemper coat rather pleasantly softens the ornament, and can be washed off down to the oil-colour when the work has to be redecorated.

Some of the coarsely-modelled ornament of the Jacobean period may owe its charm to the indistinct suggestiveness caused by successive coats of distemper, but it is hardly desirable to aim at an effect of this kind.

The style of ornament which we understand as "Adam's" is often executed of composition fixed with tacks and glue in small repeats on a plain ceiling previously lined with paper. This is a very refined style of ornamentation, and is often pleasantly relieved with painted medallions, in which case a parti-coloured treatment is desirable to hold up the medallions in appearance and prevent their spotting too much. The light to a ceiling is to a great extent from a horizontal direction and the amount of relief should be tried in position. Ornament, whether in relief or painted, should be simple, and depend rather upon graceful lines than upon elaboration.

Covering a ceiling with a pattern paper is a simple and satisfactory way of treating it. The pattern should be centred with the room and the joints carefully butted. Stamped materials for ceiling coverings are numerous, and by their use an exceedingly elaborate effect can be obtained at a very moderate cost. The best are they which do not imitate plaster-work. They are very useful for strengthening and hiding the defects of old ceilings in a bad condition, but have not the individuality which can be procured by even a little plaster ornamentation designed for its special position, and I look upon them as suitable rather for old than for new buildings.

The plan of hanging a heavily flocked paper on the flat of a ceiling and painting it is a good one, and the effect is much improved if a flat band forming a frame to it next the cornice can be arranged so that the ornamented portion has a recessed appearance. This flat band was much affected during the Greek revival period, and often had pateræ fixed on it at intervals.

In applying to an old ceiling either ribs or any relief ornament which has strongly pronounced straight lines, it is necessary to apply a straight-edge to the surface to ascertain whether it sags or undulates, otherwise you may find that what appeared level before becomes like the waves of the sea.

Woodwork.

Painting on new woodwork will require at least four coats, and it is better to specify five, as on joinery well prepared four is only just enough.

If it is desired that the woodwork of a house should be painted, and not stained and varnished, a process which I am thankful to believe has almost died out, the knots should be covered with patent knotting to prevent the resin discolouring the succeeding coats of paint; or, if bad, they should be cut out or covered with silver leaf. Before the work leaves the carpenter's shop it should be primed with red or white lead, mixed with linseed oil and turps, to prevent its being affected by a damp atmosphere. Backs of panelling or any woodwork which has to be fixed against a wall, should have a thick coat of oil-colour before fixing. Before the next coat is

applied the surface should be lightly rubbed down with glass-paper, and the brad-holes, open joints or cracks filled with hard stopping, and the dust removed. The second coat, mainly of linseed oil and white lead, should then be applied. Any filling up required should be done after the second coat. In new work and if the joinery has been well prepared little will be required. It consists of a paste made of plaster, whiting and size, and is required to level up hollow places. Three coats are required after filling up. The third coat, which is the ground for the finished colour, composed of white lead and linseed oil and turps in equal proportions, and with an approach to the finishing colour, should be evenly laid on, the direction of the brush following the direction of the grain of the wood. Some judgment is required in selecting the ground colour, as the finished coat will be affected thereby; in many cases a brighter colour may be used than finished colour, with advantage. This should dry out uniformly, and if it does not do so should be repeated before the finishing coat is applied. By mixing varnish with the finishing coat an egg-shell gloss is obtained, and this is the finish which appears to me most suitable for work generally. It does not require so much preparation as varnished work, does not show up slight unevennesses and will bear washing. It is sometimes called a bastard flat. If it is desired that the surface shall not shine at all, it will require a flattening coat of the required colour mixed with white lead and turpentine only. Flattening should follow the previous coat about twenty-four hours after, before it has had time to get hard, so that it may be incorporated with it, and the more shiny the previous coat the more dead will be the flat. Flattening is easily soiled and will not bear washing. As it dries very rapidly it is necessary that it be done quickly, and without break, something like putting on a large flat wash of water on a drawing.

Old work should be gone over with the stopping knife, then rubbed with pumice-stone and water; greasy parts should be washed with turpentine, and, where the paint is rubbed away, primed; cracks or holes should be stopped and hollows filled up, being left full to allow the stopping to shrink, and then levelled off afterwards. The first coat should be mixed with turps, and the succeeding ones as before described. Wood-work intended for varnishing requires extra care bestowed upon it from the beginning to secure an absolutely smooth surface, and after the fourth coat should be applied one or more coats of French oil, varnish or pale copal for delicate tints, being rubbed down between each coat with pumice-stone, powder and water, and a felt float to remove all inequalities. This can be repeated until the work has the finish of a coach panel or Japanese lacquer tray. Work of this kind is expensive, but very durable, and should be designed with this finish in view with very simple mouldings and large plain surfaces. It is, in my opinion, only under these conditions that internal varnished work is tolerable.

It would be unwise to treat the work of a new house in this way before it had got over its infantile diseases. If it can be so arranged, a good plan is to leave a house with three coats of paint and lining papers on the walls for a season or two, when the finishing decorations can be carried out with the satisfaction that they are being executed on a good basis. Often the contractor who builds the house is not the best man to employ for the decoration, and one set of men is conveniently got rid of before the other commences.

Some of the most beautiful colours can only be obtained by "glazing," the term given to painting with a semi-transparent colour mixed thin over an opaque colour. This is generally done with tube colours.

In treating of house-painting the subject of graining should not be omitted, although out of favour at the present. Personally I dislike it, mainly for the reason that I rarely meet with any that is pleasant in colour. The merits justly claimed for it are that it wears well on account of its broken colour and varnished surface, and can be easily touched up without repainting. I see no reason why combed work, in colours not necessarily resembling wood, should not have a good appearance; also the merits claimed for grained work. Another plan is to stipple the second colour and then varnish.

Walls.

New walls, if intended to be painted, should be plastered with Parian or Keene's cement, and should have two coats of white lead and linseed oil and litharge mixed rather thin to soak into the plaster and stop absorption; the third coat should be thicker and mixed with spirits of turpentine and colour, and the fourth thicker still and mixed with equal parts of linseed oil and turpentine, with sugar of lead as a drier. The colour should be darker than intended to be finished, each coat should be allowed to dry thoroughly before the succeeding one is applied, and should be well rubbed down with glass-paper. The finishing coat is best stippled with large flat brushes, as a granular surface is obtained, the wearing properties are not impaired, and the unpleasant reflecting surface is broken up.

The internal walls of large rooms and passages are best left from the trowel with a granular surface.

Any appearance of damp must have the cause removed, as no tinkering with the face of the wall will be a lasting remedy.

Any patching or chases should be made good with Parian or Keene's cement, which can be painted soon after, provided that the bed or backing has been first painted with oil-colour to prevent the damp from the cement soaking into it.

It is claimed for Adamant plaster that it can be painted in twenty-four hours, but my experience of it is that this cannot be done with safety if cement has been used in the wall or floor, as the salt from the Portland cement will continue to come through for weeks after the plastering is done. The manufacturers recommend a wash of barium chloride, but this I have not tried.

Another trouble which affects the finishing of walls is discolouration in patches where Fletton bricks have been used. I have spoken to the manufacturers about it, and am informed that it is caused by using overburnt bricks, and that a brick-layer experienced in the use of these bricks would not make use of these overburnt ones for inside work. Considering the very large quantities now being used in London in place of stocks, it is very important that the matter should be understood, the only remedy being to cut the brick out.

Wall-papers.

The most convenient way of finishing walls, and that most largely adopted, is covering them with printed wall-papers. It is a simple process, and may be quite inexpensive, and they are easily cleaned off and renewed. Skilful paperhangers are not difficult to find, so a badly-hung wall-paper should not be tolerated. The surface of the wall should be rubbed over with glass-paper to remove all excrescences, and it should then be clearcoiled, and the papers hung without joint from top to bottom, having their joints carefully trimmed and butted. On new walls it is a good plan to hang white lining paper preparatory to hanging a more expensive paper; this gives the latter a much better chance as far as discolouration from the fresh walls is concerned. Walls should be lined with brown paper before hanging embossed or strong papers, as otherwise they are liable to slide in shrinking, and open at the joints. It is a good plan also to line and clearcole preparatory to distempering walls; it has an advantage over using a tinted paper, as the joints need not show, which they would do in the case of the latter.

The varieties of wall coverings which may be suitably used for the space usually called the filling are numerous. Immense talent has of late years been employed in the designing of wall-papers until we almost have more than enough, and there is a temptation, when choosing from a number of ambitious designs, to forget that in most cases the wall on which they are to be hung should be looked upon as a background—a purpose for which many of them are eminently unsuitable, and if there could be more connection between the designing and the using of them, the designs and colourings would be very much modified. I am not now referring to the large flowered designs in natural colours which are exhibited in drapers' windows, accompanied by the notification that they can supply the chintz for hangings to match. A less interesting arrangement I cannot conceive. A piece of English wall-paper is 12 yards long by 21 inches wide, containing 63 square feet. French paper is 9 yards long and 18 inches wide, containing 40½ square feet; so in estimating the quantity required half must be added to the measure for English papers, and the price considered in relation thereto. The simplest wall-paper consists of a pattern printed from a wood-block, in repeats, with distemper colour on previously distempered rolls of white paper, and in this form is suitable for use from the servants' bedroom to the principal reception-room, the dignity required depending upon the form of design and colouring, and if we had nothing more than this we should still be very well off.

The varieties of embossed coverings for walls now available in decoration are numerous, and I have thought it the best plan to exhibit specimens, and make any remarks about them which occur to me.

They have the merit, when hung on an ordinary plaster wall, of presenting a wearable surface, and one that is capable of decoration after hanging in various ways, either by painting all over, parti-colouring, rubbed out or stippled effects. The skill displayed in the Japanese leather papers in design, modelling and treatment of the surface with metal and colours made them very popular, and they have been used in place and out of place until we are rather overdone with them.

A luxurious finish to a wall is covering it with silk damask or brocade, and this plan can be adopted with more propriety now the electric light is more general, and the dirt and discolouration from gas got rid of. It may be treated as a continuous band round the room, or introduced in the form of panels.

In either case it should be so arranged as to have a solid

back to prevent the accumulation of dust behind it and to enable it to be brushed.

Lastly, I may refer to the hanging of real tapestry, which I consider has a value beyond any other wall-covering, either as covering the entire wall, suspended from the top, or in panels. No other decoration is required, and a tinted white for the woodwork appears to give the best value to the tapestry colours.

Following the order which I first laid down, we come to floors. The ordinary deal floor, by the process of building, gets so stained and disfigured it is necessary, if any part is intended to show, to stain it a dark colour and varnish it. A border around the room enables a reversible square of carpet to be used, which is easily taken up and shaken. The reception-rooms should be laid with solid oak or $\frac{1}{4}$ -inch parquet over the ordinary floor, which makes a very good job, provided the floor has got to its normal condition. It is best deferred for a season, as the best flooring will sometimes swell and buckle, when, if laid, the parquet will follow it and present a series of corrugations. The usual plan for finishing the oak is to give it a "stiffener" of French polish, and then brush over with bees'-wax and turpentine. Waxing without the polish is slippery and does not keep the dirt out. Plain linoleum of its natural reddish-brown colour will be found serviceable and pleasant for many of the secondary rooms of the house; it is very durable, and although I have heard something said about its rotting the boards through excluding the air, I have never found this to be the case.

Natural Woods.

Oak, if left its natural colour without varnish, gets dirty where in contact with much wear, as in living rooms, and if French polished of its natural state a light yellow colour is produced which it is not easy to decorate to.

The best plan is to darken it by fumigating with ammonia by the dry process, as it does not raise the grain; it can then have a stiffener of French polish, and be finished with bees'-wax and turpentine. No liquid stain should ever be used to stop up and dirty the pores of the wood. Mahogany is pre-eminently the wood which is improved by polishing; good wood may be left its natural colour of a golden brown, but if a darker colour is desired it can readily be done without the beauty of the wood being destroyed. The dark purple colour so much affected by makers of antique, and called imitation rosewood colour, which it is not, is most objectionable. The difficulty comes in with mahogany where there is any carving to be treated; as to polish, carving ruins it, and you must either give up your carving or your polish. A compromise is sometimes arrived at, and the whole is dull polished. The makers of furniture at the end of last century no doubt realised the difficulty, and we find sideboards inlaid and without projecting mouldings, so that the whole surface could with fitness be very highly polished. Walnut gets most of its beauty from polishing, the same as mahogany. Pine and pitch-pine are not pleasant woods polished, as it brings out a hot yellow, which is most difficult to decorate to, almost demanding a strong scheme of colouring to make them harmonise. American ash and basswood take a green stain very well; but the colour fades, and if in positions where there is much wear the wood soon gets shabby. Trying to make a common material look like a rarer one does not often pay in the long run.

Before going on to the subject of colour, I may sum up in a few words the processes which I have been describing, omitting for want of time descriptions in detail of the materials, pigments and vehicles used.

Surfaces which have to stand wear should be painted with oil-paint, composed of white lead, linseed oil and driers.

Surfaces which do not come in contact with any bodies may be treated with less labour, and as good an effect with distemper composed of whiting and size and the necessary colour.

Oil surfaces may be made more durable by varnishing, the degree of finish being a question of labour and expense.

It is important for the stability of painted decoration that pigments of a fugitive nature should be avoided as much as possible, also that their chemical action when mixed one with another should be understood, and this subject has been treated of by Mr. W. J. Muckley in one of the handbooks of the Science and Art Department at South Kensington Museum. He therein gives a list of permanent, semi-permanent and fugitive colours, and practice might very well be confined to the use of the first two classes, if not of the first only. As house-painting must necessarily be renewed, there is not quite the same necessity for permanence as in a painted picture. The simpler the mixture of colours to produce the required tint the more likely it is to be satisfactory and to keep its colour. I have read that the "quickest way to good colouring is through a short palette."

The theory of colour is treated exhaustively in the work of M. Chevreul, an eminent Frenchman, "The Principles of Harmony and Contrast of Colours," and to those not acquainted with it I would recommend it as a winter evening's amusement, as also the works of Owen Jones on the same subject, with his series of propositions on the principles which should govern

the decorative arts; but the best study for colour is the book of nature, and to an enthusiastic student her instruction is infinite. Suggested schemes of colour are all around us. Combinations of clouds, the spring and autumn tints of trees, with their leaves back and front for colour or texture, fruit and flowers, the plumage of birds, vegetation on buildings, oxidising of metals, marbles—all present beautiful combinations which may be made use of, and an enthusiastic study of colour in the ordinary walks of life will well repay the time and attention given to it. When an impression has been received, take the earliest opportunity of registering your recollection of it with your colour-box; it will then be ready for use when the opportunity occurs.

In a satisfactory scheme of decoration the three primary colours, yellow, red and blue, should be in some degree represented, not necessarily on the walls of the room, but supplied by the hangings and furniture. They need not be represented in their primary condition, but in the form of secondaries and tertiaries. I should say that the most useful colour for the background or walls is green, contrasting with the furniture of yellow or red browns, with blue introduced in the hangings.

Yellow being a primary colour cannot be produced by mixture of other colours; it is an advancing colour, has great power of reflecting light, and, compounded with red, gives the range of warm colours, orange and brown. It diminishes in power by artificial light, and for that reason is difficult to make satisfactory for both day and night effects. It is a delicate colour as a pigment, and is easily killed by admixture with other colours. It contrasts powerfully with black, and may be represented by gold in a colour scheme.

Red is the intermediate primary coming between yellow and blue, and in like intermediate relation also to light and shade, white and black.

It is a most positive colour, forming in combination with yellow the secondary orange range, and with blue, the secondaries purple, crimson, &c. It gives warmth to all colours, especially to yellow. In combination with yellow it becomes advancing, and with blue retiring. It is very much affected by the quality of the light in which it is viewed. Reds easily spoil one another side by side, and great skill is required to print one red on another. Red lights up by artificial light better than any other colour. Vermilion is the pigment which most nearly represents this primary.

Blue is the third primary, and the coldest of colours. It is best represented by the genuine ultramarine, which is said to be a true colour, neither inclining to yellow nor to red. Blue is a retiring colour. The blues most used, on account of the high price of genuine ultramarine, are cobalt and Prussian blue; but the former inclines to purple by artificial light and the latter to green. These colours are very useful and pleasant in light tints for making greens, but as blue lights up so badly, it may well be represented in the colour scheme by curtains or carpet.

Having gone through the usual processes in the decorating of a house, I will proceed to consider the points which should influence us in settling on a decorative treatment, and will commence with the vestibule. For the walls of this an excellent plan is to line to a height of about 4 feet with Dutch tiles, leaving the brickwork above, or if too dark this may be tempered on the brick with a stencilled pattern. The dado may go down to the tile floor without plinth and all be washable. If the house be sufficiently large the entrance hall often becomes a room, with its entrance lobby screened off and the staircase recessed from it or leading off from one side. It may contain an open fireplace, and the doors to the principal rooms open immediately out of it; it is therefore desirable that the colour should be considered in reference to the adjoining rooms. As the sunniest aspects are required for the living rooms, that of the hall is likely to be a northern one, and consequently a warm colouring would be best—a high wall panelling or dark wall treatment to about the level of the top of the door architrave, with deep frieze of stencilled ornament in red tones, with an olive cornice and the ceiling a lighter tint of the same. There would be very little blue or cold colour in this arrangement, and the fireplace might supply this in the form of blue tiles on a white ground and the grey metal of the stove. The old-fashioned crimson, blue and green Turkey carpet would complete the colouring, bordered by a parquet floor, yellow stain being introduced in the window-glass. The red colouring could be carried up the staircase above a wall panelling, repeating the handrail on the wall side, or in the absence of this a wood moulding at this level, with the space below painted a greenish brown on a simple pattern embossed paper. This gives a durable surface where the wall gets most wear, and the papering above may reasonably be left unvarnished, as, except on the score of durability, varnished papers have nothing to recommend them. The varnish changes colour, and becomes in most cases very unpleasant, and is more susceptible to changes of temperature than an unvarnished paper, a sudden change from a cold day to a hot one covering the walls with moisture. An oil-printed paper on an oil ground is a good substitute, a pattern which I have here, as it is pleasant in

appearance and can be sponged without harm to it. We seldom now see the walls panelled out in plaster or wood. It has a good architectural character, and it is astonishing what can be done with a few hundreds of feet of wood moulding judiciously disposed on the walls. It is tedious making a drawing of the four sides of the stairs, so the best plan is to set out the panels on the walls with a piece of chalk. Everything above dado level can then be distempered. Duresco is a good material for the purpose, using the petrifying solution supplied with it. It is more expensive than ordinary distemper, coming between that and oil-paint, but has the merit when hardened of being to some extent washable, and it is much less liable to discolouration from defects in the walls than ordinary distemper. It is also pleasant in appearance. The treatment of the wall panelling suggested applies rather to old than new buildings.

In considering the horizontal divisions of the walls of a room I have in mind the ordinary house, with rooms from 10 feet to 12 feet from floor to ceiling. The necessary skirting, if with about 6 inches of plain face, is generally sufficient if of good thickness, with a simple mould receding to the wall, thickness rather than height being required; this will keep the furniture away from the walls without considering what is called the chair-rail, which should in most cases be lower than the back of a chair—from 2 feet 6 inches to 2 feet 9 inches to the top of it. The space between these two is best of wood, the face of it projected somewhat from the face of the upper wall. The skirting, plain or panelled, face and rail, should either be of one colour or of harmonising colours of the same depth of tone; to cut it up into thin lines is a mistake. Above this the wall may be plain and uninterrupted up to the frieze-rail. This, with the frieze-rail and cornice about one seventh the height of the room, should all be designed together and kept to about the same tone of colour, of sufficient weight to look like a part of the wall. In designing these mouldings, mould the top of surfaces below the eye and the bottoms of those above the eye.

Another division as to height is to increase the frieze with rail and cornice to about one-fifth of the height of the room, giving the extra space to the frieze, and if the room is very low, sacrificing or squeezing the dado. In a drawing-room this plan will be found convenient, as pictures being generally small will not look well if skied, and the ornamental frieze furnishes and gives interest to the upper part of the wall. If there is height enough, the cornice mouldings can be moderated in size to form the starting of a hollow, connecting it with other mouldings to form the frame of the ceiling. The cove, so very general in the French work of the last century, is much out of fashion, but is undoubtedly serviceable in softening the connection between the decoration and walls and ceiling. If there is not height enough for a cove, the cornice kept down a few inches from the flat of the ceiling will give an opportunity of adding recessing mouldings and preventing the sagging appearance of an absolutely flat ceiling.

For bedrooms the deep frieze arrangement is very suitable, either with or without the dado, according to the height of the room.

It is a good plan, when arranging window-casings and architraves, to break the cornice out so as to form a boxing for the top of the curtains. The breaks have a good appearance, give good shadows falling on the curved surface of the curtains, and preventing the accumulation of dust.

Wall surfaces should be squared up; a narrow slip of paper over door or window architraves is best got rid of, also the long spandrel piece over an arch. It is better to break it forward with a vertical line and break the cornice over it. Soffits of arches should not be left plain as ceiling, but should be treated same as arched mould. These are points which cannot well be carried out unless done at the time of building. I have often had to ornament a ceiling where all the mouldings have had to be suspended from it, as it were, on account of the fixed position of the cornice. In low rooms the plan of treating the whole chimney-breast as a feature instead of applying the chimney-piece is a good one.

Dining-room.

The division of the wall space in this room might conveniently be by a wood skirting, plain face and rail, to a height of about 2 feet 9 inches (pictures could then, if of large size, occupy the space up to the frieze rail), the cornice, frieze and rail, grooved for picture hooks, being one composition. The heavy, Early Georgian type of cornice and dado appear to suit a dining-room. If it gets the morning sun the main filling of the walls might be a wall-paper two tones of deep green, the ground being warm in tone, with a lighter and colder print. The paint a golden green, and the flat of dado a deep, rich red, inclining to crimson; cornice and frieze tones of citrine, and the ceiling a still lighter tone. If the owner of the house has any oil-paintings they are likely to be hung in this room, and the question of the best background colour has to be considered; this may very well be studied in the public galleries which we have

access to, and that used in the entrance-hall of the National Gallery appears to me most satisfactory. It is a flock paper printed in two tones of a mellow, dark green, inclining to olive. It is there very pleasantly contrasted with dull red marble columns. Both the colour and texture contrast well with the oil-paintings, and give the very greatest value to them. There are other colours adopted, including red, which, I believe, is generally considered a good oil-picture background, but none appear to me so satisfactory as this. At South Kensington a dark, neutral green wall-paper of Morris's is very much used, but it appears to me too cold or grey for the purpose.

The question whether the cornice of a room should be treated dark or like the paint or light like the ceiling is always cropping up, and although it is rather trying to darken some nice plaster-work, which looks so fair in its natural white, I consider it should be treated with the walls, not necessarily so dark, but sufficiently so to prevent the sudden contrast from dark to light just below the cornice.

The Drawing-room.

The decoration of this room, of all others, should be bright and cheerful, and should light up well. Here light or white paint is in place. For this room the mistress of the house must be consulted and the various parts thought out with furniture, hangings and carpets to make the picture complete when furnished and occupied. Should the lady be a brunette, a cream paint and walls of a yellow tone may be suitable; if a blonde, a bluish grey or grey-green. The architectural panelling out of the walls of a room is but little practised now, although nothing gives such size and dignity to an apartment, whether by framing with large panels or by painted styles and rails. The tendency of late has been to ignore symmetry and to indulge in corners and recesses, and small windows in odd places, by which a certain picturesqueness is obtained, but unbecoming cross-lights are developed and a mere prettiness without dignity is the result. There is little fear of stiffness in a drawing-room, and when the furniture and upholstery come, the severe lines of an architectural treatment of the walls will be pleasantly contrasted.

Library.

In this room a quiet, restful tone of colour should be aimed at, bearing in mind that books are the best ornamentation of the room, and choosing colours which will give value to their bindings. The fittings should be of hardwood, and as it is inconvenient to reach books higher than about 7 feet 6 inches, this should regulate the height of them; a rail at this level (grooved for picture books) may be conveniently carried round the room where the bookcases do not occur. A fairly strong green is, in my opinion, the best to show off bindings, and this may cover the space above the bookcases with a deep vellum-coloured cornice and ceiling. The floor should be felted all over.

Bedrooms.

The deep-frieze treatment for these is generally most convenient, and the chief characteristic of the colouring should be freshness. Here white paint, which in sitting-rooms makes the furniture, hangings and carpets look dirty, is in place, and should be the standard of cleanliness and freshness generally in the room. The space above the picture-rail looks quite well in plain distemper, but may have a running frieze in colours with good effect, and in the ceiling I would plead for a little ornamentation to relieve the absolute blankness which is so very general.

I will not weary you by referring to other rooms without illustrations to refer to. Colour is too subtle and indefinite to talk about with advantage. Colour is relative; there is no such thing as a bad colour when regarded alone, as there may be a situation where that particular colour would be the best in combination with others for its position. A parti-coloured suit will keep fresh longer than a suit of one colour, and the same holds good in decoration. Contrasting colours enhance the value of one another, and it is quite possible by altering one colour in a decorated wall or ceiling to give freshness to the whole which before may have looked dirty and worn out. The coloured decoration of a room should be the conception of one mind, and the plan I advise is to make your scale sketch and stick to it as you would to your $\frac{1}{8}$ th scale drawings in a building. I am well aware that in practice this cannot always be carried out, and it comes to doing the best you can under the circumstances, and if your lady client has set her heart upon shrimp pink or hedge-sparrow-egg blue for her drawing-room, why, do the best you can to make a satisfactory combination in which those colours would predominate. What I should like to impress upon all who are not in the habit of doing so is that a constant study of colour brings great enjoyment with it. The critical faculty can be used everywhere. As you study old buildings to improve your sense of form and proportion, study natural objects for improving your colour sense. The most unlovely object if left alone will be covered by nature with the most beautiful colours, and the book is open for our delight.

The Chairman said that architects designed beautiful houses, but they had not always the opportunity of decorating them. When the decoration was undertaken, a scheme of colour should be arranged for the whole house. The great help to decorators was the electric light, which gave the same effect as natural light, except as regarded the shadowing; there was a sharpness to be got from the brilliancy, which had to be considered, however. The treatment of walls and decoration had been of late years overdone. He did not advocate a plain ceiling, but he thought to treat a ceiling and wall with raised decoration was overdoing it. When using a raised ceiling the wall should be plain and *vice versa*. As architects had often to deal with the decorating of old buildings, a knowledge of colours became important. They might have to treat a room or a house which had bad proportions, and very often by skilful colouring the bad proportions would be diminished.

Mr. Cole A. Adams proposed a vote of thanks, which was supported by Mr. W. Millard and Mr. Maurice Hulbert.

Mr. Shuffrey, in returning thanks, spoke in eulogistic terms of Mr. Walter J. Pearce's book on "Painting and Decorating." The author was a practical man, and his book was the best one on the subject.

It was announced that Mr. F. T. Baggallay would read a paper on January 14, entitled "Composition in regard to Public Buildings."

LISKEARD CHURCH TOWER.

AT the last monthly meeting of the Liskeard Town Council the Mayor read a letter from the vicar and another from the churchwardens, in reply to the report of the borough surveyor, which condemned the tower of the parish church as being unstable and dangerous to persons in its vicinity. The vicar wrote under date of the 13th inst. as follows:—

"In reply to your letter of November 11, I fully agree with the Town Council that immediate action should be taken to render the tower safe, and, for myself, will welcome and support the Council in every legitimate manner in the carrying out of their powers. That the tower is in a dangerous condition there can be no doubt. The reports of Mr. Prynne and of Mr. Sedding corroborate the fact that the tower is in a bad condition. I shall not hinder, but will support your Town Council in their removal of what is a menace to the lives of the people and the nave of the church."

The churchwardens wrote on the same date as follows:—

"Your letter of the 11th ult., addressed to the vicar, enclosing a copy of the report of the borough surveyor on the state of the tower, is receiving our anxious attention. The circumstances are, of course, well known to all. By the decision of the chancellor of the diocese, who held a court in Liskeard on September 23 last, we are at present prohibited from removing any portion of the structure. Under legal advice, we intend to again approach the chancellor, and trust to receive authority from him to remove all source of danger. The lord bishop has expressed his approval of the course we are pursuing."

The Mayor said the churchwardens wanted to pursue a legal course, seeing that they had no right, according to the decision of the chancellor of the diocese, to remove any portion of the structure. The vicar was willing to support the Town Council in every legitimate manner. In one sense both letters agreed.

Mr. Stantan inquired if, in the event of nothing being done by the churchwardens, the people of Liskeard were to continue to be in danger of the tower falling upon them. Was no one responsible?

The Mayor said he took it the vicar and churchwardens have the same end in view. The churchwardens trust to receive authority from the chancellor to remove all source of danger.

Mr. Henwood said there was a difference in the letters. The churchwardens still relied on the help of the chancellor and the bishop. The vicar, on the other hand, was willing to support the Town Council in anything they might wish to do. There was a very great difference between them. He thought the Council should thank the vicar for his kind letter.

Mr. Husband said the report of the borough surveyor on the condition of the tower pointed to the necessity of work being done which a private individual would be compelled to do. If the Council had power to deal with the matter their proper course was to proceed with the work forthwith.

Alderman Glubb: You mean to take down the tower?

Mr. Husband: Certainly.

Alderman Glubb: Then you don't make any distinction between a church tower and a barn? Some people do, you know.

The Town Clerk said there was a difference, as Mr. Glubb had pointed out, between the case of a barn and that of the tower of a church. At the same time, if the tower was in such a condition as to be a source of danger to life and limb—and he had been assured by an architect, apart from the report of

the borough surveyor, that it was a danger, and that portions of the masonry might come down at any time—it seemed to him that the Town Council had a duty to discharge in the matter. Then came the question, How could the Council deal with the tower of a church? He raised the question a month ago, pointing out that under one of the sections of the Towns Improvement Clauses Act, 1847, the word "passenger" was used. That raised a doubt in his mind as to whether or not anybody passing by the church tower might be a passenger within the meaning of the Act—whether it only applied to the highway. His attention had been drawn to a recent case under the Metropolitan Building Act, 1855, a similar Act that also used the word "passenger." It was an appeal to the High Court against the decision of the magistrates. Mr. Justice Cave said, and Mr. Justice Collins concurred, "In my judgment, these sections were intended to apply to all structures which were in a dangerous state," whether adjoining the highway or not. That seemed to give the Council power to deal with church towers. As to serving notice on the owners, who, he asked, were the owners of the church? There was no difficulty in serving a notice, because if the owner could not be found there was a special clause in the Act which gave them power to serve a notice by posting it up. Supposing the Town Council were to apply to the magistrates, in the first place, for an order to make the tower safe—to pull down such portions as necessary—the question arose, Who was to pay the costs? The Act provided that the owner should pay the costs. There was a case in which an ecclesiastical building was concerned, and it was decided that the vicar was not the owner of the fabric for that purpose, and that he was not liable to pay costs. That was their position as a Town Council. So far as he could see at present, it was their duty to remove such portions of the tower as were dangerous to life and limb. At the same time, there was no provision in the Act whereby, if they removed the tower, they could call upon any owner to pay the costs. There was a difference in that no rent was received as in ordinary cases.

Mr. Stantan: There are the pew-rents.

The Town Clerk: They don't go to the vicar.

Mr. Henwood proposed, "That as the vicar and churchwardens are doing their best to get over the difficulty, the Council allow the question to 'slide' for the present." Alderman Glubb seconded.

Mr. Young: At the same time, I think the public ought to be protected from the dangerous portions of the tower.

The Town Clerk: I take it the churchwardens will see that people are kept away from the dangerous portions.

The Mayor: I have every faith in the churchwardens, who are doing their work very well.

Alderman T. Lang: I think the best thing to do would be to fix a hoarding round the tower. As to deferring the matter, the same difficulties will confront you in the future as at present.

Mr. Young: Does the borough surveyor say the tower is dangerous as a whole?

The Town Clerk: The borough surveyor, after describing the defects, goes on to say that "these facts, coupled with the settlement above referred to, have seriously interfered with the stability of the structure—so much so that portions of the masonry may fall at any time."

The Mayor: He does not refer to any particular portion of the tower.

Mr. Lee: He says "portions may fall at any time."

The Mayor: Yes; that may be anywhere.

Mr. Lee thought, after such a strongly worded report from the borough surveyor, the proper course for the Council to pursue was to post notices round the tower pointing out that the fabric was in a very dangerous condition, and requesting people not to go near it. It was, in his opinion, a very serious matter. As members of the Council they were there to look after the interests of the public, and they ought to let everybody know the condition of the tower, so that they might avoid going near it. Mr. Lee put his suggestion in the form of a resolution, which was seconded by Mr. Husband.

Mr. Young said if the churchwardens put up a warning notice the public would laugh at them and not at the Town Council.

Mr. Henwood said the posting of a warning notice should be left to the vicar and churchwardens.

Mr. Lee thought the object of bringing the tower question before the Council was that they might have an opportunity of assisting the churchwardens out of the difficulty they were in. The tower was in a very dangerous state, and something should be done for the safety of the public either by pulling it down or rectifying it in some way. What was the object of deferring the matter when they all knew the dangerous conditions of the structure?

Mr. Husband: We have nothing at all to do with assisting the churchwardens. As a Town Council, it is our duty to protect the public. There is no reason why we should deal in a different way with the tower to what we do in the case of the property of a private individual. The borough surveyor reports

that the tower is in a dangerous state, and we are bound to take notice of what he says.

Alderman Glubb pointed out there was no conflict between the resolutions of Messrs. Henwood and Lee, and both were then carried.

EDINBURGH ARCHITECTURAL ASSOCIATION.

A MEETING of the Edinburgh Architectural Association was held on the 15th inst. in the Royal Institution, Princes Street—Mr. Thomas Ross, the president, in the chair—at which Mr. Leslie Ower, president of the Dundee Institute of Architecture, read a paper on "The Evolution of Style in Architecture." There were, he stated, many influences at work in the development of the styles, such as climate, materials, habits of the people, political disturbance, and so on; and in modern days they had such influences as new materials, scientific inventions, facilities for travel and transport, and the like. One of the baneful influences of our commercial and city life on architecture was smoke. It was not encouraging, to say the least of it, to see a fine piece of architecture become in a year or two, sometimes almost before it was completed, so soot-begrimed that it lost much of its effect. Surely engineers and scientists were not yet prepared to admit that everything had been tried, and that the cure of this great evil was beyond them. The thought had been expressed by many, Why was there no new style of architecture invented? And they lamented the inartistic spirit of our time, which seemed to them to fall behind past ages in this respect. These people forgot that no architectural style had ever been invented, but had been the slow growth of centuries, and a little reflection would show that it was not to be expected even in an age like ours, unsurpassed for progress in science and invention, that either new materials or inventions would quickly work such a radical change in building design and construction as to create anything that could be called by the honoured name of a style. The world moved slowly in such matters, and it might even be that, all unknown to ourselves, as it had always been to those who were the busy agents in producing it, a style might be developing under our hands and eyes which, in the estimation of following generations, would be fit to take rank alongside the great architectural styles of the world. The lecture was illustrated by lantern views of ancient and modern buildings.

GLASGOW ARCHÆOLOGICAL SOCIETY.

A MEETING of the members of Glasgow Archæological Society was held on the 16th inst., Mr. John Honeyman presiding. Mr. T. L. Watson read a paper on "The Vaulting of the Lower Church of Glasgow Cathedral." He said that the purpose of his paper was to show that the design of the lower church was not of one period but of several. The middle compartment was later than the aisles, and there was evidence that this part of the work was delayed in order to facilitate the completion of the cathedral. When it came to be carried out as the cathedral approached completion, the original design was abandoned or modified, or a new plan adopted. The evidence of these facts was to be found in the mouldings, which indicated a considerable advance in the style of architecture. It was also to be found in the general design followed, which was decidedly later than that of the aisles, and the last evidence of it was in the springer stones of the vaulting, where it could be distinctly seen that the old plan was abandoned, and a new design engrafted on old pillars. The respective dates of the period of construction were:—South-west compartment, 1190-1225; lower aisles, 1230-40; upper aisles, 1240-50; middle compartment, 1256-60; and the vaulting over the stairs, east end, 1260-1300.

THE NATIONAL PORTRAIT GALLERY.

THE following portraits have recently been acquired by the Trustees of the National Portrait Gallery:—

By bequest—

A large family group of Adam Walker (1731-1821), natural and experimental philosopher, with his wife, his daughter, afterwards Mrs. Gibson, and his three sons—William and Deane F. Walker, lecturers on experimental philosophy, and Adam Walker, afterwards Prebendary of Hereford; painted by his friend, George Romney. Bequeathed by the late Miss Ellen Elizabeth Gibson, of Durham, granddaughter of Adam Walker.

By presentation—

Sir George Hayter (1792-1871); a sheet of sketches by himself, representing himself in the act of painting the large picture of the House of Commons in 1833, now in the National Portrait Gallery. Presented by Major Harrel.

Mungo Park (1771-1806), the African traveller and explorer of the river Niger; a miniature painting after H. Edridge, A.R.A. Presented by Mr. Lawrence W. Adamson.

By purchase—

Thomas Gainsborough, R.A. (1727-88); a drawing by F. Bartolozzi, R.A., taken from the original portrait of Gainsborough by himself for the purpose of engraving.

Jane Porter (1776-1850) and Anna Maria Porter (1780-1832), novelists; companion drawings by G. H. Harlow, which were engraved for Jerdan's "National Portrait Gallery," vol. v.

Tobias George Smollett, M.D. (1721-71), the eminent novelist; painted at Pisa, probably by an Italian artist, and formerly in the novelist's own possession at Leghorn.

General James Wolfe (1726-59); a full-face portrait seen to the knees, in the uniform of the Marines; painter uncertain.

A full-length portrait of Henry, Prince of Wales (1594-1612), painted by Paul Van Somer, and formerly at Blenheim Palace, has been purchased from a fund presented by the committee of the Stuart Exhibition in 1890.

TEWKESBURY ABBEY.

THE following appeal has been issued by the Archdeacons of Gloucester and Bristol and the vicar of the parish in behalf of the restoration fund of Tewkesbury Abbey:—"It is not too much to say that Tewkesbury Abbey is the noblest parish church in England. Larger than many cathedrals, second to none for its historic associations, enriched with architectural features of matchless interest, with its massive Norman nave and tower and graceful Decorated choir and ambulatory, this famous abbey is one of the few survivals of the great destruction which followed the dissolution of the monasteries in the sixteenth century. The inhabitants of Tewkesbury—then as now a small country town of 5,000 people—saved their church, which with its monastic buildings was actually scheduled for destruction, by a large money payment to Henry VIII. For three centuries great efforts have repeatedly been made by them to preserve it from decay. Seventeen years ago the restoration of the interior was completed at a cost of more than 11,000*l.*, the work having been carried out under the supervision of the late Sir Gilbert Scott and his son, Mr. J. Oldrid Scott, the present architect of the building. This admirable restoration was accomplished by the untiring efforts of the then vicars, Canon Davies and Archdeacon Robeson, generously supported by good laymen too numerous to mention, and many valuable gifts have since been added. But the exterior was scarcely touched for want of funds, and the time has now arrived when extensive external repairs to roofs and walls are absolutely necessary. For the maintenance of this magnificent and once wealthy abbey there remains an endowment of not 20*l.* per annum. The benefice is of a net value of less than 200*l.* per annum. The weekly offerings of the congregation and the casual fees paid by visitors are not sufficient to provide for the ordinary church expenses, such as warming, lighting, organ and hydraulic apparatus, choir and vergers, together with the constant small repairs and replacements needed in so large a building. Feeling, therefore, the immense importance of preserving for future generations their noble church, the abbey restoration committee have resolved once more to appeal to the generosity of churchmen at large to aid them in completing the restoration of the whole building, and providing effectually for its future substantial maintenance and care. For this a sum of 10,000*l.* is needed, to be thus employed:—(1) 7,000*l.*, of which from 2,000*l.* to 3,000*l.* will have to be immediately expended in repairing and in many places renewing the roofs of nave and transepts, that of the north transept, immediately over the great organ, being now in a very deplorable condition, and in arresting the decay rapidly going on in the stonework of the walls; the remainder to be invested so as to provide a permanent fabric fund, by means of which the whole building may be constantly attended to. (2) 3,000*l.* to be invested in order to efficiently maintain the spiritual work and services of the Church. The committee are confident that the generous instincts of English churchmen will not allow this great national monument longer to remain in its present precarious position. Donations, to be spread over three years if desired, which may be devoted to either of the objects stated, will be gratefully acknowledged by the hon. treasurers, the Archdeacon of Gloucester, College Green, Gloucester, and Mr. Alfred Baker, the Old Bank, Tewkesbury."

EDINBURGH ARCHITECTURAL SOCIETY.

AT the fifteenth meeting of the session held on the 15th inst.—Mr. A. R. Scott, ex-president, in the chair—Mr. T. Kershaw Bonnar read a paper entitled "Mosaics," in which he first treated of the art from an historical point of view, tracing it from its earliest time in Egypt down to the present day, and then described the several methods, ancient and modern, of carrying out the work.

TESSERÆ.

The Roman Campagna of Antiquity.

THE temples that ancient Rome raised to Fever and Mephitæ were memorials of the victory of the plough over an enemy terrible still in his overthrow. It is probable that the marsh fever, quite as much as the hostile tribes around, worked towards the clinching of the Latin confederacy. Whenever discord among the small communities of Latium caused the implements of agriculture to rest the malaria raised its head. A disused drain in which under the burning sun weeds rotted in stagnant water, mixed with the mire of the volcanic soil, carried fever and death into the nearest houses. Thus neighbourly friendship found its mightiest advocate in the fever, which well deserved a temple by the side of that of peace. To the patron of neighbourly friendship, Jupiter, the Latins built a shrine on the highest summit of the Alban chain, on the brow of the extinct fire mountain Monte Cavo. Once a year from all the villages of Latium a procession in holiday garb moved along the sacred way up to this spot, to celebrate the feast of the confederacy and sacrifice to Jupiter; and delegates from them all assembled in the beautiful valley adorned with evergreen oaks down by Marino, to settle by the Ferentine spring their disputes and take council together touching their common affairs. A hundred years ago venerable remains of the very ancient temple of the confederacy were yet standing. In the year 1783 they were torn down by the last Stewart, cardinal bishop of Frascati, who out of the fragments built a Passionist convent. With this achievement did that royal race go into its grave.

Primitive Irish Churches.

Although the primitive churches of Ireland have little in them to interest the mind or attract regard as works of art, yet in their symmetrical simplicity—their dimly-lighted nave entered by its central west doorway, and terminated on the other side by its chancel-arch, affording to the devout worshipper an unimpeded view of that brighter sanctuary in which were celebrated the divine mysteries which afforded him consolation in this life and hope in the next—in the total absence of every thing which could distract his attention—there is an expression of fitness to their purpose, too often wanting in modern temples of the highest pretensions; as the artless strains sung to the Creator, which we may believe were daily hymned in these unadorned temples, were calculated, from their very simplicity and artlessness to awaken feelings of deep devotion which the gorgeous artificial music of the modern cathedral but too rarely excites, even in minds most predisposed to feel its influences and appreciate its refinement. In short, these ancient temples are just such humble, unadorned structures as we might expect them to have been; but, even if they were found to exhibit less of that expression of congruity and fitness, and more of that humbleness so characteristic of a religion not made for the rich, but for the poor and lowly, that mind is but little to be envied which could look with apathy on the remains of national structures so venerable for their antiquity, and so interesting as being raised in honour of the Creator, in the simplest, if not the purest ages of Christianity. That the unadorned simplicity and contracted dimensions of the earliest Irish churches were not at least altogether the result of poverty and ignorance of the arts in their founders appears to be extremely probable. Poor those honoured individuals unquestionably were, but that poverty generally, if not in all instances, appears to have been voluntary, as became men who obtained their simple food by the labour of their hands; but that they were ignorant of the arts, or insensible to their influence, could scarcely have been possible in men very many of whom—Romans, Gauls and Britons—were educated where those arts, though they had become debased, were still cultivated; and we have not only abundant historical evidence to show that many of the ecclesiastics in those early times obtained celebrity as artificers and makers of the sacred implements necessary for the church, and as illuminators of books, but we have also still remaining the most indisputable evidences of their skill in those arts, in ancient croziers, bells, shrines, &c., and in MSS. not inferior in splendour to any extant in Europe.

French Pulpits.

In France none of the ancient churches have, as far as we know, preserved any pulpits of an earlier date than the fifteenth century. It was customary from the commencement of the twelfth century in our northern churches to arrange a rood-loft at the entrance of the choir, from the top of which the epistle and gospel were read, and exhortations addressed to the faithful when occasion served. In every case these sermons, before the institution of preaching friars, only took place occasionally. It is probable that in particular cases sermons were preached from a movable pulpit, arranged in some part of the church for that occasion. The pulpit was then only a little wooden stage, closed on three sides and covered in front with a hanging. But in the thirteenth century, when the preaching orders had been

established to combat heresy and to explain to the people the truths of Christianity, preaching became a necessity which the architectural arrangements of religious edifices were compelled to obey. Exactly to fulfil these conditions the Dominicans and the Jacobins, amongst others, built churches with two naves, one being reserved for the monks and divine service and the other for preaching; then the pulpits became fixed and entered into the construction. They formed, as it were, a balcony projecting into the interior of the church, carried on corbelling, accompanied by a niche taken out of the wall, and generally lit by little windows. Access was gained by a little staircase contrived in the thickness of the wall.

Expression in Architecture.

All objects that enter into the composition of a piece of architecture have some particular character which seems especially to belong to them and which it behoves us to pursue. However we may vary the treatment of them, however much we may overlay them with ornament, we should be careful to do nothing calculated either to disguise or conceal their special character. Their motive and rational principle should be apparent and unimpeached, and honesty and good taste alike demand that in the treatment of their details we should seek rather to display their purpose than to conceal it. Thus, a column is a vertical support, and in designing a column its fitness as such should never for a moment be forgotten. Yet there is nothing perhaps which exhibits the waywardness of art more than the column. Its purpose is simple and obvious; its duty is as apparent as it is possible for any architectural feature to be, and yet it would seem that architectural ingenuity has been racked and tormented to devise modes of departure from that simple type which its mechanical duty seems to render so obvious. The Hindoo builder rests his weights upon fanciful and extraordinary compositions of animal and vegetable life. A similar barbarity was prevalent in Italy in the early Mediæval period, when we see the shafts of columns poised most inconveniently upon the backs of monstrous animals. But without dwelling on preposterous excesses of this nature, which are the natural results of a bold but uncultivated fancy, propriety has been defied in a great variety of ways and at perhaps all periods and ages of art.

GENERAL.

A Meeting of the Council of the Architects' Benevolent Society was held in the rooms of the Royal Institute of British Architects on Monday, under the presidency of Professor Aitchison, A.R.A. There were seventeen applications for assistance, and out of this number relief was afforded to fourteen, 21s. being distributed. During the meeting the honorary treasurer (Mr. W. Hilton Nash) reported that many subscriptions due on January 1 of the current year had not yet been received.

General Billot, the French Minister of War, has prepared a Bill for the demolition of the northern and western portion of the fortifications of Paris, between Pantin and Point du Jour. The estimated value of the building sites thus provided is 700,000,000 francs.

Mr. S. L. Rymer, chairman of the Court of Governors, announces that the Whitgift Hospital, Croydon, is not in danger of demolition, as no proposal of the kind has been brought forward.

The Queen has appointed a new Historical Manuscripts Commission, consisting of the following members:—Sir Nathaniel Lindley, Master of the Rolls (chairman), the Marquis of Lothian, the Marquis of Salisbury, the Marquis of Ripon, the Earl of Crawford, the Earl of Rosebery, Viscount Esher, Lord Edmond Fitzmaurice, the Bishop of Oxford, Lord Acton, Lord Carlingford, Sir Edward Fry, Mr. Lecky, M.P., Sir H. C. Maxwell Lyte and Dr. S. R. Gardiner. Mr. J. J. Cartwright, of the Public Record Office, is reappointed secretary.

Mr. Ernest Normand has presented to the Scarborough Corporation on behalf of his wife, so well known as Henrietta Rae, a three-quarter life-size portrait in oils of Mr. George Lord Beecroft, an ex-mayor of Scarborough and the founder of the Doré Gallery in London.

The Asylums Committee of the West Riding County Council are making arrangements for the erection of an additional asylum for about 2,000 patients.

The Liverpool Corporation have agreed to pay 1,500*l.* and costs for interference with ancient lights by the erection of the museum extension and technical schools at the corner of William Brown Street and Byrom Street.

The Exhibition Committee of the Fanmakers' Company in their report state that while the exhibition was not a pecuniary success, they have the satisfaction of knowing that the company has given a fresh impetus to the fan trade. Over 480 exhibits were submitted to the judges, and all the fans, with the exception of one, were returned to their owners. The missing fan was, the committee have every reason to believe, stolen, but its value was returned by the insurance company.

The Architect.

THE WEEK.

WHENEVER there is an inquiry into Government Offices it is usual to call attention to the waste of space in the Home Office and the Foreign Office. The rooms on the principal storey are too high. The explanation given by Mr. J. O. SCOTT to the committee on Government Offices was that the height entirely arose from the original instructions issued when the buildings were competed for. They were to the effect that it was necessary to have a great suite of reception-rooms in connection with the Foreign Office, and that was allowed to regulate the height for the whole of the rest of the building. Architecturally it was considered that the point was settled by the height that was given to the Foreign Office, and that height was carried through the whole block. The Government authorities of the time are therefore responsible for the loss of space, but we suppose the blame will continue to be cast on the late Sir GILBERT SCOTT.

THE fire in Melbourne, which broke out two days after the fire in Cripplegate, would appear to have been extended mainly by the aid offered to the flames by flimsy construction. The chief officer of the Melbourne Fire Brigade in his report says:—"In my opinion the cause of the rapid spread of the fire was the construction of the buildings. They could scarcely be better constructed for the spread of fire, put up as they are without a fire-break wall. Only very narrow right-of-ways run down to the rears, and it is almost impossible to get appliances to work effectually in these. Windows, unprotected by iron shutters or fireproof apparatus of any kind, overlook these right-of-ways from adjoining buildings, and afford the best possible means for a fire to get from one place to another. The right-of-ways, too, act as immense flues, through which the flames are continually fanned. The falling walls and roofs so completely blocked up the right-of-ways that work in them was most dangerous. Several firemen had most narrow escapes from being crushed to death in this way. The Mutual Store was saved simply because, being a modern building, it was constructed as far as possible on fireproof principles. The rooms are made so that little or no draught can take place from the main buildings through the stairways and lift-channels. The windows on the outer walls are for the most part shuttered with iron gauzework, on the principle of the Davy safety lamp. These answered exceedingly well in preventing the flames making their way through the windows into the building. There are several weak points in the building, however, and these the fire found out. The fact that the Mutual Store, surrounded as it was for hours by the fiercest flames, was saved, proves to my mind that if the other warehouses in this block had been constructed on similar lines we should have been able to extinguish the fire before it had done one-tenth of the damage." The use of wire gauze shutters is a point worth the attention of architects.

AN interesting "find" was exhibited by Mr. MANNING at the last meeting of the Oxford Architectural Society. In last March a labourer in digging for gravel on Standlake Down, eastward of the well-known British cemetery, found at the depth of about 3 feet a skeleton, lying at full length, with the head to the east. The articles deposited with it were:—(1) A saucer-shaped fibula of bronze, 2 $\frac{3}{4}$ inches diameter, ornamented with an incised cross and some S-shaped designs; two concentric circles at the intersection of the cross-arms, and at the back attachment for a pin. (2) A bronze disc fibula, 1 $\frac{3}{4}$ inch diameter, with ornamentation done by puncturing. (3) A flat bronze ring fibula, 1 $\frac{1}{2}$ inch diameter, having arrangements as if for a pin. (4) A bone ring, 2 $\frac{1}{8}$ inches diameter, in four places ornamented with four dots, arranged as a lozenge. (5) A bronze needle, 3 $\frac{3}{4}$ inches long, the part for the eye flattened out, and round the eye a line of shallow notches, forming a chevron ornament. (6 and 7) A bronze pin and needle. (8) A necklace of fifteen amber beads and four of coloured clays, some in patterns of blue, red, yellow and white.

(9) An iron spearhead, with socket; a long narrow blade, socket open; length, 11 inches. (10) An iron knife-blade, with thick back and one cutting edge; pointed tang, part lost; present length 5 $\frac{1}{4}$ inches, width $\frac{3}{8}$ inch. (11) A second knife-blade, imperfect at each end; length 4 inches, width $\frac{3}{4}$ inch. The articles proved that the Ancient Britons were not always indifferent to the adornment of their bodies.

WE lately noticed some of the defects of Roslyn Chapel, which is the most over-ornamented Gothic building in all Britain. The severest criticism on it is that by the late Lady EASTLAKE, an authoress who wrote much concerning Mediæval work. In her "Journals and Correspondence" is the following passage:—"We proceeded to the chapel—that luscious conglomeration, that inlaid cabinet of all the imaginable sweets of architecture, that *pot-pourri*, that *biscuit* work of a composition, which has been lauded as something beyond all praise, but which had it been built by NASH in the nineteenth century would have been abused as it deserves. One is equally taken by surprise at the beauty of the workmanship and the vileness of the taste. All styles, all ages are petrified here into perpetual disagreement: the Grecian ceiling bent into the Gothic arch, the Gothic arch laden with Grecian entablature, ornamented everywhere *ad nauseam*, and not enough of any one kind to show its real effect; an exquisite niche with most elaborate tracery of canopy and pedestal carried out into a set of starfish rosettes, which perform—what such ornament never did before—a Gothic arch round a squat, thick-set window; and bring your eye again, before you can recover your temper, to another little niche of Christian perfection, which, like its fellow, met the overlaid framework of the window. Below are the gorgons of a Popish legend, above the bells of a Chinese pagoda, buttresses and pinnacles in juxtaposition, which are countries and centuries apart in art and history, a very fancy ball of architecture. Within there is more to please and more to lament, a greater beauty of form and greater perversion. If you stand in the nave and do not lift your eyes above mid-height of the pillars, nothing can well exceed the beauty both of the forms and proportions, but if you look higher or step aside, you are puzzled with huge tusks of open tracery, which point and stare at you, or worried with garlands of flowers bent into the angles of a Grecian border and bisecting the tiny Mediæval shaft, or excoriated with clumsy leaves of decorated stone which hang above your head, and cut the arches of the side aisles into a succession of heavy steps." The criticism is the more remarkable as coming from a lady, for, as a rule, the work has a fascination for the fair sex which is irresistible.

M. BOUVARD, who holds the position of the late M. ALPHAND as director of the Paris municipal works, has received a present which he must value highly. All the officials connected with the various departments under him have subscribed for a memorial of their gratification on his promotion to the rank of commander in the Legion of Honour. The gift consists of a reproduction in silver and ivory of COUTANT's statue *Armed Peace*. A similar copy was presented to the Russian marines in 1893 by the Municipal Council. The relations between M. BOUVARD and his large staff are watched with interest by the people of Paris, for Paris suffers if there is any sign of disloyalty.

ONE of the oldest of French railway engineers of the first class has passed away. CHARLES EMILE-LOUIS-THOUIN was born in Douai in 1819. He studied in the college of that city, and then passed to the Central School of Arts and Manufactures in Paris. From it he obtained his diploma as a civil engineer. In 1843 he entered the Government service, and was first employed on the railway between Lille and the Belgian frontier. He afterwards received an appointment from the Northern Railway Company, and rose by degrees to the post of engineer-in-chief. M. THOUIN rendered many services to the French army in 1870-71. His name will be associated with those of PELLET, MATHIAS, SAUVAGE, FRANCHAT and POLONCEAU as contributing to the efficiency of the French railway system.

THE EVE OF THE RENAISSANCE.

ONE of the peculiarities of the Sketch Book of WILARS DE HONCOURT is the number of novel forms which were introduced as practicable in building. To the Picard architect stone seemed to be an almost plastic material which could be adapted to represent bizarre designs. Unlike his predecessors, WILARS was not satisfied with France as a region which afforded objects for study or commissions in which he could display his versatility. He not only gives sketches which are evidence that he visited several of the great churches of France, but, as he tells us, he resided in Hungary, and saw there such a piece of mosaic pavement as he represented. The church of St. Elizabeth, in Kaschau, has so much resemblance to the church of St. Stephen, in Meaux, there seems to be little doubt that when WILARS was summoned to Hungary it was for the purpose of designing a church in the French style. While in that country he seems to have had his eyes opened to a new world of wonders. He drew strange animals, among them some lions, the tomb of a Sarrazin, examples of Byzantine art and other novelties for a Frenchman.

WILARS'S Sketch Book is generally esteemed as a unique curiosity, but it has a higher value. It is evidence of the beginning of a new era in architecture. The schemes of construction suggest the draughtsman who considered that anything which appears feasible on paper, can be realised in stone. Geometry was supreme, and gravitation was to succumb to it. The more difficult the task of execution appeared to the mason, the more credit redounded to the designer. In France and Germany, as a consequence, extravagance was allowed the fullest license, and the sobriety of an earlier time was rejected as commonplace.

WILARS also appears as a personality, and in that way he is an indication of the coming Renaissance. One of the differences between the artists of the two periods is that the Goths accepted oblivion as inevitable, while the Renaissance men endeavoured to make their work a memorial which could not be confounded. In his book on "Church Principles considered in their Results," published in 1840, Mr. GLADSTONE wrote:—"It has been observed as a circumstance full of meaning that no man knows the names of the architects of our cathedrals. They left no record of their names upon the fabrics, as if they would have nothing there that could suggest any other idea than the glory of GOD, to whom the edifices were devoted for perpetual and solemn worship; nothing to mingle a meaner association with the profound sense of His presence, or as if, in the joy of having built Him an house, there was no want left unfulfilled, no room for the question whether it is good for a man to live in posthumous renown." The investigations of records which have been carried on during the past sixty years have not furnished information which would make it necessary for Mr. GLADSTONE, if he were reprinting his book, to modify the above passage. Similar darkness prevails in all countries where buildings were raised in Mediæval times, and in consequence the history of architecture becomes a narration of effects for which no causes are apparent. A few names like WILLIAM of Sens, WILLIAM the Englishman and ERWIN of Steinbach have survived, but they only, as it were, increase the gloom which has overspread the lives of other architects. It is not too far fetched to suppose that the antipathy to Gothic works which was exhibited by VASARI arose in a great measure from his aversion to find hundreds of artists passing away and leaving no more record of their existence on the earth than if they were so many weeds. To him the least small-beer chronicle, when it related to a painter or a sculptor, was interesting, and as an architect he saw no reason why men who were abler in construction than himself should be deprived of their fame. He could not understand a system where individuals were ignored or bore only numbers to distinguish them. From the early days of the Renaissance an opposite system prevailed, and VASARI was able to find in small towns and villages throughout Italy information about the lives of men who, although artists, were not always renowned for masterpieces. VASARI'S occupation would have gone if the Mediæval indifference to fame prevailed in Renaissance times. Accordingly, whenever he has an opportunity to refer to the architecture which was the controlling art among the

Goths, he gratifies himself by describing it as the art of barbarians and the buildings as bringing shame to the builders. VASARI did not remember that when Gothic was purest there was a common impulse among builders and congregations, and it was supposed that the people who contributed stones or carted materials would have as good right to fame as those who directed the operations. When the figures of bullocks were introduced in the towers of Laon a sort of sermon was preached against the vanity of seeking after a posthumous reputation.

WILARS DE HONCOURT was not so well-disciplined in self-renunciation. In his desire to leave a record of what he saw, he was a forerunner of the Renaissance artists. Secular patronage began to rival that of the Church, and a prince who lived surrounded by minstrels and rhymers was likely to take a different view of the future to what was always present to the monks. The Italian tyrants, to whom human life was of little account, were ambitious to resemble ancient Romans and to have their deeds recorded for the benefit of future generations. They had no objection to the artists who adorned their courts appearing for ever as a sort of attendants on them. When CHARLES V. ascended the French throne in 1364 a new era commenced for the arts. According to the "Songe du Vergier," every day a book had to be read to him, and he possessed no less than 900. While dealing with his time as became a sage, he used to dream of the past and of the future. The buildings which he erected have not the delicacy of those of the next century, but they suggest efforts to depart from the monastic type. At the Court of CHARLES the artist was prized, and it was only reasonable that a system should be admired which recognised that he was not made for a hermit. Is it any wonder painters, sculptors and architects endeavoured to advance a movement which led to their own glorification? VASARI tells us he was moved to indignation at the thought that some men's reputation might be concealed, and accordingly he wrote his "Lives," and the work was an extraordinary success. A Mediæval artist would not be able to understand the need for such a duty or the advantages which the souls of the artists would derive from the publication of accounts of their everyday work. There is much to be said for that theory, but it was one of the factors which promoted the Renaissance, for it no longer appeared to harmonise with the conditions of human nature. If Italy is more closely associated with the movement than any other country, it is in a large measure owing to the existence of enthusiasts in every town and village, who claimed a sort of property in artists and were ready to do all they could to assert the superiority of their townsmen over the artists of other places.

Gothic buildings were not favourable to that end. They were rarely constructed by the people of one generation, and their design and adornment were the work of several men. It would be unjust to give preference to a few. Then there were no spaces in which a painter could revel, and the sculptured figures seemed to be only elements in a system that was imposed by the clergy. Consequently architects were driven to attempt extraordinary feats in construction which would keep their names from forgetfulness, and sculptors endeavoured to make their work too emphatic. The Sketch Book of WILARS DE HONCOURT is therefore a sign of the times, a memorial of a craving which was not in keeping with the spirit which inspired the erection of Mediæval buildings.

MODERN ARCHITECTURE.*

THE new volume by Mr. STATHAM had its origin in a course of lectures given to the Association's Class of Design. Modern architecture is a subject more difficult to treat than is ancient architecture, for it demands frank criticism, which is not always acceptable. The selection of examples also gives rise to suspicion of partiality. It must be allowed that Mr. STATHAM has shown much tact in his treatment, and although there may be differences of opinion about his judgments, his honesty cannot be doubted.

* *Modern Architecture.* A Book for Architects and the Public By H. Heathcote Statham. London: Chapman & Hall, Limited.

To discuss modern architecture needs an exposition of principles, and after the failure of FERGUSON'S efforts to explain how designs were produced and could be improved, few men will care to assume the rôle of a law-giver. But it is well for students to know there are principles and that they are now being utilised. Some of the members of the Class of Design must, from what they see performed in their masters' offices, believe routine is omnipotent in architecture, and a very profitable practice is to be produced by the adaptation of drawings which have already served for a variety of buildings. It is an advantage for them to learn that, although there may be no abundance forthcoming of novel forms to reward the earnest designer, there is enough visible in England to prove the existence of discontent with stereotyped versions of styles, a feeling which is probably the most hopeful sign of the times. Modern buildings have not the fidelity to ancient details which used to be a *sine qua non* of "purity," but the departure from established forms, it must be acknowledged, involves far more thought and labour than are needed for exact reproduction. A book like Mr. STATHAM'S, which brings progressive work into prominence, is able to counteract the trading influence which is exercised over pupils in many offices.

The book is also addressed to the public. To them its guidance will be less certain. It is easy for a pupil after a few weeks in an office to discriminate between art and pelf, but how is an outsider to know that the unguarded expressions of some of the "artists" recorded in the pages do not express the convictions of a whole class? Suppose a plain man is desirous to build, and reads that the true artistic method of carrying out architectural work is to have no fixed plan and no contracts, and that drains and ventilation do not come within an artist's purview, will he not be disposed to seek out the representative of routine who will be able, if necessary, to get from his surveyor a bill of quantities before drawings are prepared and a provisional agreement from a builder? In one case he has to leap in the dark, in the other he is always on sure ground, and it is not difficult to imagine which course he will follow. Affectation of superiority is an old weakness of artists, but when it takes the form of incapacity to meddle with business or builders' extras it is merely increasing the power of the common practitioner. Mr. STATHAM therefore says:—"The modern architect will be wiser not to plume himself on being exclusively an 'artist' in the usual sense of the word. If he assumes that position and acts on that principle, he must inevitably neglect a portion of the work for which his services are demanded; he can only be 'the incomplete architect,' and the modern world requires the complete architect." The following passage shows that the artistic gift in its loftiness will not condescend to glance at ordinary requirements for comfort in dwelling-houses:—

In the plan in fig. 105 it may be noted that both the dining-room and drawing-room fireplaces are too close to the door for real comfort in gathering round the fireplace. This is a patent defect (or one would think ought to be) which is extraordinarily common in modern house-planning, and is more especially so among the school of architects who rather pride themselves on looking at house architecture from a specially artistic point of view. Plan after plan by these gentlemen I have come across in which there did not seem to have been any consideration given to such minor matters as the position of the fireplace in reference to the door, or even the way the door ought to open. Yet these things make all the difference in the comfort of a room. Fig. 106 is a plan typical of this class of defects. The dining-room door opens nearly on to the fireplace, and both this and the other door, from the kitchen region, are hung the wrong way, so as to expose the room fully from the outside when opened. They ought, of course, to be hung on the side of the doorway furthest from the wall, and open on to the wall, otherwise the privacy and comfort of a room are interfered with every time the door is opened. This is the kind of thing that even the speculating builder has his eyes open to, yet there are eminent architects who seem entirely blind to it. In the plan referred to it will be seen that when the dining-room door is wide open, anyone standing at the entrance door would see right to the back of the room. In the library the fireplace, though too near the door, is behind it as it opens, which is better. The kitchen window is placed so that the cook at the kitchen range must be in her own light, and it looks nearly west, which will be pleasant for the cook when dishing up dinner on summer evenings with the sunset pouring directly in.

All these little points as to the way a room will actually "work" in occupation ought to be present to the mind's eye of the architect in planning the rooms; but it is evident they often are not.

"Domestic Architecture," from which the extract is taken, is only one chapter in the book. Mr. STATHAM criticises in a like spirit "Church Architecture," "State and Municipal Architecture" and "Street Architecture." In each section he introduces French, German and American examples for the sake of contrast, and in most cases the foreign work is not superior. Frenchmen will be amazed when they are told that their architects are mostly very bad planners; "their houses rather convey the idea that to their minds any plan will do, so long as the requisite number of rooms are there and the architectural treatment satisfactory from their point of view."

In church work many experiments are illustrated. The late J. D. SEDDING was pleased to step over the boundary between Gothic and Renaissance whenever the chance was offered. He allowed himself to do stranger things when he became the tool of those who were desirous of obtaining worshippers under false pretences, such as ignorant Italians of the organ-grinding class, and erected the church on the site of the Huntingdon Chapel in Clerkenwell, which is supposed to be a Romanist building. His eclecticism in Sloane Street is admitted by Mr. STATHAM to have been carried too far. The pulpit "has the appearance of being an exotic work presented by some wealthy donor who had purchased it in Italy, and allowed to find room in the church out of complaisance to his generosity and good intentions. No one would suspect that it was, in fact, designed for the position." When so much inconsistency is exhibited by men who can claim to be leaders, what can be expected from the rank and file of the architectural army? While novelties are appearing, towers with high steeples are going out of fashion, and the change is significant of the new ideas about churches and their uses. Mr. STATHAM seeks a middle course in dealing with them. He would sometimes abandon high towers and spires in towns, but would retain them in the country, where they serve as landmarks and where bells are not distracting.

The towers of municipal buildings are supplanting church towers, although effective groups can be produced, as in Bath and Oxford, in which that feature is not emphatic. The *raison d'être* for a lofty tower is not always manifest. It seems a waste of ingenuity and money to construct one to serve as a clock case, such as we see at Westminster. The Victoria Tower is supposed to be a storehouse of Parliamentary papers, and on that account is excusable; but so much utility cannot be claimed for many structures of the same class. As a consequence a tower is with difficulty worked into the plan, and there is much to be said for those who propose to keep it detached, as if it were for ornament instead of use. In speaking of the tower of the Sheffield Municipal Buildings, Mr. STATHAM says:—

The angle position of the tower would be justified by the site if it were carried down to the ground, and if it marked a cardinal point on the plan. Unfortunately, it marks nothing but a strong-room on the ground floor, and a serving-room to the mayor's apartments on the first floor; and the descent of the lines of the tower to the ground is marked by the two small pieces of building which cling to it, one containing a serving store, the other latrines. This is perhaps hardly the way to render a tower a true architectural element in such a building, or to answer the criticisms of the French as to our introduction of "useless towers" in our town halls and other structures.

Mr. STATHAM'S volume should excite thought among architectural students, and that will be a boon. There is variety enough in the descriptions and illustrations to make them fairly representative of modern building, and of the efforts which are being made to arrive at an originality which will endure.

The French Minister of Public Instruction has suspended until February 1 the courses, competitions, &c., of the section of architecture of the Ecole des Beaux-Arts, in consequence of "grave disorders" being produced in the course on the theory of architecture.

ELECTRIC LIFTS.

THE subject of the type of lift to be adopted is often a troublesome one to the architect when his building is nearing completion.

Hydraulic power is that most frequently adopted, and for short distances no doubt the old direct-acting type of ram lift is hard to beat, although uneconomical on account of the dead load.

The ordinary suspended lift is the one now most employed, as it can easily be seen for a high building a direct-acting ram lift is expensive and inconvenient. With hydraulic lifts, however, the great disadvantage is that the power required is not proportional to the load lifted, and they are not therefore economical.

Where electricity can be obtained the advantages of electric lifts should be fully considered. With these the amount of energy used is fairly proportional to the load to be lifted, which as before mentioned is not the case with hydraulic lifts. Another advantage is the flexibility and convenience of the electric system of lifts compared with the hydraulic, and the former is not affected by frost.

Mr. RAVENSHAW recently read a paper on electric lifts before the Institution of Civil Engineers, which resulted in an interesting discussion. Mr. PREECE gave it as his experience with the lifts at the General Post Office and the post-office at Leeds that the working cost of hydraulic lifts was five times as much as with electric lifts; this was with a private plant. Taking electricity from public supply mains at $4\frac{1}{2}$ d. per unit, a case was stated where, with lifts working under similar conditions, the hydraulic lift cost rather more than double the electric. It was mentioned that the first cost of an electric lift is about 10 per cent. more than the hydraulic.

When considering the amount of current required for a certain lift for certain loads, the current whilst running must not be only taken into account, but the starting current must be considered, which is always in excess (about 25 per cent. or more); therefore the greater number of stops of the lift the greater is the average current.

An electric lift consists essentially of an electric motor connected to a winding drum, but the apparatus of chief importance is the controlling, regulating and braking arrangement. Shunt motors are mostly used, connected by worm-gearing.

The usual simple rope control of hydraulic lifts is generally adopted, connected to the switch and resistance instead of the valve, as in the case of hydraulic lifts. The brake usually employed is an automatic magnetic one. With regard to the motor used, this is practically of the ordinary type, but it must be capable of running in either direction without needing alterations of the brushes; it must also have good starting qualities and require little attention. Of course with lifts the variations in load are very great, but as Mr. RAVENSHAW says, "the maximum load is of short duration, the machine being idle for at least half the time."

The motor is connected directly to the winding drum through worm-gearing; worm-gearing, although being less efficient than spur-gearing, is nearly always used on account of its silent running.

Considering the control, the effect of pulling the rope in the car is that the switch is actuated and a resistance is inserted in the motor circuit; this is in order to prevent a sudden rush of current through the motor, which would occur until the motor attained its proper speed. This resistance only allows of current just sufficient to start the motor, and when it has started the resistance is cut out of circuit automatically.

The object of the brake is not only to stop the lift, but it also has to hold it. This brake is usually of a magnetic type which works automatically and applies the brake when the current is switched off, and an automatic device is also generally used to apply the brake at each end of the lift travel. Mr. RAVENSHAW states that the ordinary bar electromagnet is generally adopted, as a magnet of reasonable dimensions can be made to give a pull of a ton through a distance of half an inch.

A mechanical brake is used sometimes, consisting of a band operating on the motor-shaft, and worked by means of the rope in the lift.

It is very essential that a lift should start and stop

quickly without any jerkiness; an electric lift has these capabilities as well as the hydraulic, and the speed is also as high, and no more attention is necessary. It is also essential that an electric lift should not cause fluctuations on the mains from which it takes current, whether these be public supply or private lighting mains. This is overcome by the resistance in the circuit at starting.

It must be borne in mind, where there is a private plant already in existence for lighting the building, that the addition of an electric lift forms a means of further economy with the plant, as a day load is obtained.

It may prove interesting to give a test of the electric lifts at the Leeds post-office, which was made by Mr. PREECE:—

	Load (in lbs.)	Travel (in feet)	Average Current (amperes)	Average Speed (ft. per min.)	Cost in Pence (double trip)
Up...	896	52	26	78.0	05360
Down...	896	52	5	82.1	
Up...	0	52	3	82.1	0532
Down...	0	52	27	76.1	
Up...	448	51	15	80.5	0528
Down...	448	51	17	80.5	
Up...	448	12	13	42.3	017
Down...	448	12	10	42.3	

The balance weight equalled that of the cage plus 4 cwt. The pressure of the current was constant at 105 volts, and the price allowed was $1\frac{1}{2}$ d. per unit, which is what electricity can certainly be supplied at for a day load from a private plant.

In a test made by Mr. RAVENSHAW of an electric lift, he found that the cost of working is lowest at about half load, the cage and load being almost exactly balanced.

These few notes may prove of interest to architects, and they would be well advised to consider the advantages of the adoption of electric lifts where possible.

ST. EDMUND HALL AND ST. PETER'S CHURCH, OXFORD.

A PARTY of members of the Oxford Architectural and Historical Society recently met in the hall of St. Edmund Hall. The Rev. G. F. Lovell said he considered it was almost certain that St. Edmund of Abingdon lectured on "Aristotle" in a building on the site of the present structure, and that the Society whom he taught held their services in a chapel built by him in the church of St. Peter hard by. When that church was used for the Lenten sermons of the University the members of St. Edmund Hall always occupied the front seats in the gallery. In the church's accounts it was observable that members of four colleges who originally worshipped there paid dues to St. Peter-in-the-East, but St. Edmund Hall had never done so, while in several functions there the Hall always took first place. In a very early document three halls were classed together—one in St. Ebbe's, a second called St. Edmunds near or on this spot, and a third that of the four sons of an Edmund close by. Through confusing these Wood arrived at the ridiculous conclusion that the prefix of "Saint" was an error. The hall in which St. Edmund had lectured was given in 1269 by Edmund the Vicar of Cowley to Osney Abbey. This must have been because the Franciscans were not allowed by their rules to hold landed or indeed any property. These points were mainly mere hypotheses, and in actual masonry there is but one doubtful Gothic archway; of its age they could form their own estimate. The present dining-hall, which had not much pretence to architecture, was built in 1680, but it once had a music gallery, since turned into passages or rooms. Apart from the Franciscans, its former occupiers, the hall had not many illustrious names. A Peter Payne or Clerk is, however, on record as a preacher on Wicliff's behalf at the Council of Basle, but he is also stigmatised, when vice-chancellor, as a propagator of forged documents and as stealing the seal of the University. Perhaps their most distinguished member was Mill, whom Tom Hearne, another worthy, puts down as a "rascally Whig," but who was the founder of New Testament criticism. Shaw, chaplain at Algiers, Regius Professor of Greek, took away the lodge and turned it into his own kitchen. He must not forget the learned Tully, the opponent of Bishop Bull, nor Wilson, the Bishop of Calcutta. The buildings north of the small quadrangle were first erected by the monks of Osney in 1451, but they had undergone much change; those further to the east were rebuilt by Principal Airay; these extend to the pump and sun-dial above it, but the line of demarcation is becoming less easy of detection. Principal Shaw restored the rest of the north side in 1790 at a cost of over 300*l*. This range is much plainer on the side facing the churchyard. The

dormers also then introduced belong to this date. The large gap on the south side of the quadrangle was once occupied by a lofty and unpretentious structure. They were never part of the Hall, but were built by Airay's nephew with that intention, his sudden death putting a stop to the design. On entering the chapel, which is fitted with oak seating and cedar panelling, Mr. Lovell said it was erected by Stephen Penton, Principal in 1681, who with the Vice-Chancellor's permission proceeded to melt down the Hall plate and pay his workmen. It was believed to be the first purely Renaissance chapel in the University, Brasenose, which is just anterior to it, being of mixed design, a half-way style. The east window was about the third executed by William Morris. To Canon Liddon, Vice-Principal, they were indebted for the two candlesticks on the credence table, presented 1862, and to Lord Beauchamp for an interesting Common Prayer book, dated 1662, with many curious reprints. Part of the site of the chapel came within the limit of New College, and there was one shilling quit rent paid annually for it.

In the neighbouring church of St. Peter the vicar furnished a list of the more recent changes which had been made in the interior. He found that in 1760 the nave had been repewed with structures much loftier than those now there, which to some tastes are themselves far too high. He believed that these old pews had been cut down to their present level in the course of the alterations made in 1836. The parish had a vicar's house in the north-east angle of the churchyard. This was taken down in 1804, and the parishioners, by way of a substitute, subscribed 350*l.*, which was invested in Consols, and the interest paid to their vicar. This went on till 1870, when the fund was devoted to the present vicarage. In 1813 the gallery at the west end was enlarged, mainly to accommodate the children from the Grey Coat and National schools, nearly, if not quite, the only elementary schools then existing in Oxford. The galleries had during the Lenten services of the University been occupied by undergraduates. From 1820 to 1830 there were many references to gallery accommodation; 1836 brought several changes, but in 1856 it was agreed that the east end was in danger; the turret to the south-east had to be underpinned, the plaster was removed from the chancel walls, and two doorways on the south were for the first time brought to view, the more westerly of which was clearly of an early period as it had a lintel and tympanum. In 1844-45 there were restorations and a new roof to the nave. In 1856 Merton College did a good deal to the church. This was the last material alteration before he himself took charge of the parish in 1867. During the last thirty years considerable repairs had from time to time been carried out. In 1875 the galleries were removed; these were a large western one erected in the seventeenth century for undergraduates, and a small one west of the north aisle. Within living memory there had been a gallery fitted with sash windows, which took the position of the old rood-loft, shutting off the nave from the chancel, which was not then used for any ecclesiastical purpose. The seats lost by the destruction of the western gallery were practically not very numerous, as those below it were so dark and ill-ventilated as to be very little used. Such loss as actually did occur seemed warranted by the diminution in the numbers of the inhabitants. In 1841 the population of St. Peter's parish alone was 1,550, by 1861 it had sunk to 1,174, and now the population of the two parishes—St. John's and St. Peter's—was not much more than 600. The screen north-east of the nave was a benefaction; it served to part off the vestry from the nave. The whole system of lighting had been very much improved. An engraving in "Ingram's Memorials," showing the church without any of the fittings then in it, represented the chancel as approached by three steps which extended right across the church, about 6 or 8 feet westward of the present wall-screen, and then by two more on to the chancel floor; but the steps that were there when Mr. King first knew the church occupied much the same position as those existing now. But when he came there were no choir seats, only an overabundance of lofty pews reaching within 18 inches of the altar steps, inconvenient, ugly, and giving no proper accommodation to choir or clergy. He had considerable difficulty in persuading Merton College to remove such substantial modern fittings, but at last they were convinced of the great inconvenience caused by them, and they entirely refitted the chancel with a new tiled floor, handsome seats for clergy and choir, and the present dwarf wall which bounds the chancel. The pulpit, which formed a part of Mr. Graham Jackson's plans for the alterations, was added by the parish. In 1888 the reredos was erected as a memorial to Mrs. Jelf, and in the present year Mr. Powell presented the opus sectile work on either side of the altar. The Litany desk was also given within the year. Seven stained-glass windows have been inserted within the last thirty years. The vicar said he was staying near Parham, in Sussex, and was shown in the private chapel of Lord Zouche a font which clearly belonged to that church seventy-two years ago, when Professor Westwood made a drawing of it, since published by the Society in 1890. The card attached to

it made its origin quite certain. It had gone by the name of the Adam and Eve font, our first parents standing near a tree of a shape not unlike a common wine-glass, having a serpent winding up the stem, and the part above the stem covered with branches of an apple tree bearing apples. A cover which concealed a marble basin was richly decorated with grapes and vine leaves, and was counterpoised by a leaden angel. Those wooden fonts, he was told, were exceedingly scarce, and there was a great probability that the one in question was carved by Grinling Gibbons. It was said on the card that it was sold to Mr. Robert Curzon, the great collector of antiquities, afterwards Lord Zouch, by Mr. Denison, the rector, and Mr. Hamilton, successively Bishops of Salisbury. As Mr. Hamilton was curate under Mr. Denison, and succeeded him as vicar, the combination of their names points to about 1838 as the probable date of the transaction.

The President, in reference to the drawing of the interior which the vicar had mentioned, said that Mackenzie, who sketched the view, was generally an accurate artist, and it was a well-known fact that Sir Henry Parker had asked him to draw the interior without galleries and pews, as by so doing the good points of the church would be shown best. A prominent object in that sketch was a stone pulpit near the chancel arch on the north side, which had a double entrance, one destined for the use of the University preacher, who was privileged to pass through an arch in the north wall, the other for the vicar. The older font, the original twelfth century one, was ornamented by an arcading carried round it, and figures of the Twelve Apostles, probably, in all but two; three of these panels remained on the portion still preserved in the porch window. It was first figured in one of Hearn's publications, and then in the first volume of the "Archæologia," and was then put aside and used for a well-head in the vicar's garden, north of the church.

The vicar then gave a short account of the stone slab, once used as a credence table, now placed on the north side of the chancel, and explained the origin of the cross patée south of the sanctuary.

Mr. Hurst said the distinctive features of the church were the crypt connected with the Grymbald legend, the very complete ambulatory, the six newelled staircases, the south door and the puzzling remains of an abode over the sanctuary, which was probably the only priest's room over the altar in Oxford or its neighbourhood. Part of the ambulatory in front of the Norman chancel windows could be seen; the passages leading eastward would bring them to the stairs leading up to the angular turrets; by turning, however, at right angles the jambs of two more Norman windows would be found, just avoided by the present sixteenth-century east window. The cills of these windows, which reminded him of the two at the east end of the cathedral, were about 10 inches lower than those of the side windows. The angular turrets had most interesting stairways, of a design lying halfway between the concreted one at St. George's Tower in the Castle and those at four of the angles in the cathedral. The turrets themselves were square in their lower portions and circular above; just where the change was made a series of putlog holes, in all probability, could be detected, very likely used for building purposes. Each turret had three windows of small dimensions just under its conical capping, looking two eastward, two westward, one northward and the other southward. These made him regard the pinnacles, undoubtedly Saxon in outline, as watch-towers, and he would remind them of the Latin distich about one St. Michael guarding the north gate, another the south, and two St. Peters overlooking the east and west entrances of Oxford. Their elevation was not great, but the country they overlooked was in ancient days some of the lowest lying in the neighbourhood, and he was enabled to bring some evidence on this point. The first or Norman church he believed stopped before the line of the east face of the tower was arrived at; in fact, where the mural monument to Dilennius, the botanist, marked a change in the walls. Touching on the question of the tower being detached, as evidenced by the plinth which shows at the end of the Becket or north aisle, he remarked upon the very perfect muniment-room or port-loft, as our fathers called it, and how it contained one of the very earliest books of churchwardens' accounts, which supplied the reader with a mass of most interesting detail about the church, its fittings, its bells, and about the churchyard and vicar's house. In the year 1481 the material for the porch and room above was stated with its price; there were six or eight items about bells on nearly every page, the leathern loops which held up the clappers, the baldricks were always wearing out, the wheels and the ropes required constant renewing, the lusty peals that rang out every year on St. Hugh's Day, the day of Queen Elizabeth's accession, or for victory over the Armada, drew many a shilling from the churchwardens' pockets. There were beside the parish armour and fire apparatus to be kept in order, the bellows of the organs required mending, the "dung" from around the church must needs be carted away, not far though,

only into the adjoining lane. In 1507 Robert Carow was paid "for the makyng of the tymber work off the Rodelocht," Joan Olys for blacking its "bemys," and then the painter for colouring the same; the latter received 4*l.* 13*s.* 4*d.*, equal within fourpence to the vicar's salary for a year. In 1600 Mr. Howkens walled up the door to the rood-loft; its outline was just traceable in bright weather over the narrow arch near to the organ. There was frequent mention of the "alabaster man" in connection with this and another screen, and some might remember the alabaster work at Yarnton which was found in this neighbourhood. In some places they read of the parishioners decorating the church, once with whitewash, later on with Scripture texts. The parish had been loyal to Queen Bess all her life, and after her death a picture memorial of her lying in state, with a lion as her pillow and another as her footstool, was executed in gold and red and green on the wall next eastward of the northern doorway. Its repairs were often alluded to, as is the adulatory inscription beneath it. It was finally whitewashed over about 1818. Reverting to the east end, he drew attention to the beautifully carved shaft near the south window of the sanctuary, explaining that it was made up of an entire one and nearly half of another. It was in style like nothing else in Oxford, or perhaps the whole of the Midlands, till one arrived at Ely, where round the prior's doorway was some twelfth-century ornament of very similar design. The church had had three dedications, the original one to SS. Peter and Paul, as evidenced by the two statuettes over the porch, and by the two shields with cross keys and cross swords within quatrefoils over the monster buttress. A second is the usual one. A third is to St. Peter ad Vincula, or at the chains. This last does not seemingly occur before the true dark ages of Christian art, 1727, and the unique groining ribs quite at the east may have suggested the title. They would observe that there were in it broad links and narrow ones. The present gaslight was sufficient to show that the narrow ones had remains of chevrons along their edges; they were clearly cut from ribs like that transverse one which halved the vault of the choir. The origin of the double or wide links is equally evident. There are at Iffley, east of the tower, pateræ or little square ornaments, some identical with, some greatly resembling those in St. Peter's. In both cases there is one patera to one stone; these quasi broad links are each formed of two stones placed side by side just as at Iffley, a corner is clumsily hacked out of the angles, and no attempt is made to make the mouldings of the narrow link join those of the wider. These two ribs were surely never carved *in situ*. He thought the broad links were used-up material from near the chancel arch, clearly one of modern construction. With the drawings of these parts were circulated two photographs taken within the tower, which Mr. Park Harrison had caused to be done that he might give the Society an opportunity of remarking in the one upon the remains of a ledge-jamb to a window, and in the other the Saxon masonry which lined the tower. Mr. Hurst considered the whole tower to be post-Norman at least, and was unable to support that gentleman's views; he could very well understand that the older method survived even down to the Decorated period. In Carfax tower, too, where this feature occurred, there seemed to be nothing pre-Norman, since the supposed casing-in of its lower portion was found to be imaginary by the investigations lately made.

The question was raised whether the crypt should be inspected or not. The President thought the members would think the building was slighted unless they visited the crypt. The position of the two passages under the seats of the nave, which once led down to the chamber, had already been explained. It was too late for several of the party to proceed there, and nothing like an account of its architectural peculiarities was attempted.

SHETLAND BROCHS.

ON the coast of Shetland there are, says the *Scotsman*, the remains, in many cases only the sites, of ancient buildings, which of late years have attracted considerable attention. Many of them were large buildings, lofty, circular, of immense strength, and filled, tier above tier, with small rooms, to which a winding stair gave admittance. Much has been said and written about the purpose for which they were built and the people who built them. But the period of their erection has receded so far into the remote past, and the people who built and occupied them have so completely vanished that not a local trace of either purpose or people remain, except a faint tradition that they were a people of small stature.

The Broch of Monsa is now the only one remaining in what may be called a state of ruinous preservation. It appears to have been the last broch erected in the islands, and was in a perfectly habitable condition when some of the other brochs had fallen into decay. All who have entered Bressay Sound from the south have seen it, but those who have visited and examined it are so few that to give an idea of the class of

buildings to which it belonged, a brief description of its structure and interior arrangements may be necessary.

The diameter of the circular site is a little more than 50 feet, and the building itself is constructed of schistose stones nearly uniform in size and strongly built without cement. The building rises to the height of 40 feet, bulging from its foundation and drawing narrower towards the top, when it again enlarges in a bell-shaped form making the top overhang the portion of the wall below, thus making the wall most difficult to scale. The entrance-door is so low that a person can only crawl through it on his hands and knees, and the wall is of great thickness. The diameter of the area within the walls is about 20 feet, and the walls are perforated by three or four vertical rows of holes, numbering from eight to eighteen in each row, and designed to give light and air to their respective compartments. Above the ground-floor a door leads to a stone stair which communicates with the rooms, and the rooms communicate with each other. The shell of the broch consists of two concentric walls divided into apartments. The rooms are low, but a few of them rise to the height of 5½ feet. The building was evidently skilfully planned and strongly built for defence, and in those early days who could the dreaded maritime assailants have been? Defence seems to have been the absorbing aim. The rooms between the walls afforded concealment for the women and children and places of security for valuables and provisions. The entrance door could only admit one person in a crawling position, and the walls were so constructed that they could not be scaled. A long siege on such a coast was impossible. It could not be reduced by famine, as the shores abounded with small fish caught from the rocks at night. There were underground outlets and entrances known only to the inhabitants themselves, and yet the precautions taken prove that a powerful enemy had to be guarded against, who might render all their efforts futile.

A few of the brochs were in such a preserved condition that the Scandinavian chiefs found accommodation in them at the commencement of the Norse period. One of them built in the sea afforded shelter and defence to a valiant sea rover and outlaw, and in the tenth century Biorn was married in Monsa and lived there with his wife for the greater part of a year. In much later times an attempt to besiege Monsa was actually made. In the fourteenth century there were two earls in Orkney. One of them died and was succeeded by his son Harold. The widowed Countess was inclined to marry a man so objectionable to her family that Harold banished him from the islands. Soon after she captivated Harold's partner in the earldom, married without his consent, and fled to Monsa. Harold collected a fleet, sailed north and invested the island. The Countess and her husband retired within the castle, which Harold found impregnable. He was then reconciled to his father-in-law. They united their forces, sailed south together, conquered their enemies who had leagued against them in their absence, and lived in amity ever after.

The Broch of Ester on the north-west corner of the mainland must have been in its day one of the most imposing structures in the islands. It was built near the sea, and close to a small loch and burn from which the locality derives its name. There is deep water close to the rocks, along which a heavy swell from the ocean always runs, and for a considerable distance there is not the smallest creek where a boat can land. The castle stood towering alone on a long unbroken line of coast. Before it was removed, after 1840, it formed a huge unshapely mound of stones, and yet, unless the stories handed down were purely imaginary, it was inhabited by human beings, living apart from their neighbours, as late as 1715. Its size had been such that it furnished stones for building a park dyke 6 feet in height and a mile and a half in length, and the materials are not yet exhausted. Many of the stones were of such size that they had to be broken in pieces before they could be removed. Like Monsa, it was circular in form, and had concentric walls with compartments between them. Traces were found of the winding stair leading to the various rooms, and the underground passage leading from the area inside to a place some distance from the building was easily traced. As the excavations went on, several articles, such as querns, knocking stones, stone mallets, hatchets, corn hooks, knives, weapons, heaps of shells and fish bones, bones of sheep and poultry and of oxen of a large size, were found. There was also found a rude kind of pottery, and various other articles which, in the present day, would be considered of much value. Unfortunately the landlord, though a life-long student, was not interested, and the workmen looked on the finds as unhallowed things and threw them into the sea. A similar fate befel the articles found in the ruins of all the brochs when the stones were removed for building purposes.

There were between twenty and thirty brochs in Shetland. Several on the coast and all in the hills and on the holms in the lochs were of small size, but the whole were built on the same plan and with the same precaution. Some of the hill brochs must have fallen into decay when the islands were colonised by the Northmen, because Norse names signify-

ing a large cairn or heap of loose stones were applied to them.

To give an opinion as to the builders and occupiers and date of building of the brochs is to tread on debatable ground. Very seldom will two men who have given attention to them be found to agree. The materials on which to found an opinion are too scanty. The buildings themselves furnish the only data. Their builders must have been men of low stature, of great personal strength, foreseeing, skilled builders, considerably advanced in civilisation and liable to sudden attacks from dreaded and powerful enemies. They were acquainted with the growing of corn, the rearing of cattle, fishing, and they lived in small communities. The brochs themselves afford evidence of this.

It is difficult to prove, but Shetland must in early times have been inhabited by three different and distinct races, all of small stature, or the same race must have reached in the course of time three distinct stages of civilisation, culminating in the building of the brochs and the civilisation they indicate. The latter view cannot be the correct one. Owing to the isolation of the islands in those early times, it is most unlikely that a people so few and scattered, so remote from outside influences, and so very uncivilised as the earliest inhabitants were, could have any ideas beyond those of food and shelter. It is possible that they were here when the islands formed part of the continent, and that they were invaded and exterminated cannot be doubted. The civilisation of a people can be safely inferred from the nature of their dwellings, and the earliest inhabitants were so low that they seem to have taken their ideas from the inferior animals. They burrowed. Their dwellings were a round hole dug out, often in a level field, and approached by an entrance very like a rabbit hole, only it was covered and lined along the sides with rough stones. The head built or nest and the entrance were covered with earth. The holes between the stones in the entrance are filled with soot, which has taken to some extent the consistency of coal. The people who lived in those houses could not have built the brochs.

The second race was considerably advanced. They were mound builders. They built their houses of stone, tapering towards the top, roofed them with slabs, and covered the whole with turf, so that the building looked like a large knove; the entrance sometimes closed with a stone, made to move aside easily by the people themselves, but to look like the face of a rock to strangers. In almost every case an underground entrance led to them. They were devoted to hunting, lived in the pastures, were good archers, dressed like civilised people, and unless our forebears were for thirty generations the chiefs of romancers they were a living people from the beginning of the Norse period to the close of last century. The mound dwellers were a people of stationary habits and loved concealment. They were a one-roomed people. Danger might have compelled them to excavate a hillside and build there, but the conception of building a huge tower filled with rooms on the most exposed parts of the coast was far above them. The mound builders did not build the brochs.

The latest invaders of Shetland prior to the arrival of the Northmen were the Finns. They were driven out of Scandinavia some time about the beginning of the Christian era. They were a stock-raising, seafaring people, of low stature, skilled in several forms of workmanship, excelled as boatmen and were as civilised as their conquerors. Their occupation of the islands must have covered a period of 500 or 600 years at the least, and during that period the brochs must have been built. It is incredible that those buildings, however strongly constructed, could have withstood the tear and wear of a climate like Shetland for more than 2,000 years. In that time rocks have been worn down, islands have been formed and the coast line considerably altered. They must have been built within the Christian era, and it is not likely that any of them can date further back than the time when the Northmen, or men of that race, began to appear on the western seas. The first Vikings came as solitary stragglers. They frequented the voes and creeks, and it is there where the smaller brochs were built as defences against them, and which only could have been serviceable for a very few centuries. When they began to arrive in large numbers then the huge brochs were built on the coast. The Northmen did not build them. They were utterly unsuited in structure and interior arrangements to their ideas and habits, and they did not visit western lands with the intention of erecting defensive castles involving much time, severe toil and a very large number of men to complete. Besides, they had no formidable enemies to fear in the northern seas. They found the castles here at the period of colonisation of the islands. The larger of them, in cases of need, afforded them temporary shelter and defence, and the smaller were falling into decay. The name "Picts' castles" has been applied to them only in very modern times. Shetland has never been invaded from the south. There is no tradition of a Pictish occupation before Shetland became a Norwegian colony, and there has been none since. Unless the mound builders and the Picts were the same people, the Picts have never had a

residence in Shetland, and therefore could not have built the brochs. As high antiquity the brochs cannot claim. They were defensible fortresses in the time of the early Udallers, and in the fourteenth century Monsa was impregnable.

As the brochs could not have been erected by the Picts, nor by either of the two earlier races who inhabited the country prior to the commencement of the Christian era, and as they were not built by the Northmen who took possession of the country in the ninth century, the people who inhabited the islands at the period immediately preceding the Norse colonisation must have been the broch builders. The Finns, who were thoroughly acquainted with Shetland and Shetland people in former times, knew every rock and creek and every spot of fishing-ground around the coast, were friendly as individuals but enemies as communities, must have been the leading people in the islands when the Viking warships first appeared on the coast, and the brochs were built by them as places of defence, concealment and habitation against their invincible enemies, the Northmen. When they were at last compelled to fly from the islands they had claimed as their own for long, the mound dwellers, who had been subject to them, entered into possession of the brochs, and thus the brochs became associated in later times with the name of the Pechts.

THE STATUE OF CHARLES I.

IN the January number of *Middlesex and Hertfordshire Notes and Queries* is an interesting article by Viscount Dillon, president of the Society of Antiquarians, on the statue of Charles I. at Charing Cross. In 1631 Le Sueur (a pupil of John of Bologna) agreed with the Lord High Treasurer Weston (later Earl of Portland) to make a statue of the king, "the horse being bigger than a greater horse by a foot, and the figure of His Majesty King Charles proportionable full six foot." The whole was to cost 600*l.* and to be executed in bronze within eighteen months of the agreement, dated January 16, 1630-31, and was destined to be erected at Roehampton. However, the heroic size was abandoned, and we have the statue of life-size. It was cast near the church in Covent Garden, but does not appear to have been erected anywhere, and we only hear of it again when it came into the hands of the Parliament, who sold it to John Rivett, a brazier, living near Holborn Circuit, with orders to break it up. Rivett, however, had an idea that the whirligig of time would change matters, and accordingly he buried it, but produced pieces of metal purporting to be fragments of the statue. These he sold to both political parties with profit to himself.

In May, 1660, which must have been before the actual restoration, for Charles II. only arrived in London on the 30th of that month, the Earl of Portland requested the Lords to order that the statue, the whereabouts of which he professed to know, should not be removed from its then location nor defaced. In July of the same year the Lords ordered Rivett to permit the Sheriff of London to serve a replevin on the statue. Cunningham, who gives the above account, states that he was unable to learn more of the matter. Anyhow, about 1673 we have Marvel's sarcastic poem on King Charles I.'s statue, "Why 'tis so long before 'tis put up at Charing Cross." In this poem allusion is made to the other statue, set up May 29, 1672, at the Stocks Market, the site of the present Mansion House, by the loyal Lord Mayor, Sir Robert Viner.

The statue presents the king bareheaded, and holding in his right hand a bâton, which he rests on his thigh. He wears a demi-suit of armour, the lower legs being cased in boots much crinkled, as was the fashion at one time. Across his right shoulder is a scarf or sash, such as Cruso tells us in his "Instruction for the Cavallrie," 1632, all horsemen should wear "of the prince's colour whom he serveth, and not put it off whether he be alone or in companie upon great penalties, by which meanes (besides the ornaments) they will forbear many unfitting actions (as being subject thereby to be distinguished), and upon occasions of battell they shall be sure by that means not to offend each other." This armour, with which is worn also a high falling band or collar, does not resemble in form or ornament the complete suit of gilt armour presented to the king when young, and now in the Tower of London. The absence of any headpiece is noticeable, for though many portraits of the king show him with his helmet borne by an attendant or resting beside him, it will be remembered that at Edgehill he wore a black velvet-covered iron hat. The hat is said to be that now shown at Warwick Castle, but the covering has, of course, disappeared. The fashion of metal head-pieces so covered was very common, and readers of Pepys will remember his visit in March 1665, with Sir J. Minnes, to James Duke of York, who was about to return to sea:—"I saw him try on his buff coat and hat piece covered with black velvet." The hands also are bare. The horse furniture is a very good example of the equipment of that day, and closely resembles that shown in Cruso's work, some or all the plates of which are taken from Wallhausen's book, 1616. On the near fore-foot of the horse is the inscription, "Huber Le Sueur [fe]cit 1633."

NOTES AND COMMENTS.

PRIOR to the invasion of Venice by the French Republicans a century ago there was on the west side of the Doge's Palace at the middle gallery a very large relief of the Lion of St. Mark. It was erected between 1523 and 1538, during the reign of ANDREA GIOTTI. Sometimes the Doge used to invoke St. Mark in front of it. The relief suffered much from the vandalism of the invaders, and from time to time efforts were made for its restoration. In May 1895 a competition was arranged among Italian sculptors, one of the conditions being that the cost was not to exceed 18,000 lire, or 720*l*. The successful competitor was URBANO BOTTASSO. The work is now complete. The Lion is about 11 feet long, and a figure of a Doge is introduced kneeling and clad in the sumptuous official robes.

THE colossal relief of a wounded lion guarding the flag of the French kings, which is embroidered with fleurs-de-lis, at Lucerne, is one of the most remarkable of memorials. It is a tribute by their countrymen to the Swiss guard slain in defending the Tuileries on August 10, 1792. It was a happy thought of THORWALDSEN to propose that the relief could be carved on the face of a rocky surface. He prepared the model, and the work was carried out by a Swiss sculptor, LUCAS AHORNE. Of late years the lion has shown signs of decay. This is owing to the trickling of water through the rock. Several experts were asked to propose a remedy. They consider that the figure and its background must be completely isolated from the main body of the sandstone cliff, and that an extensive draining and drying of the rocky surroundings must also be carried out, so that the progressive decay of the monument may be reduced to a minimum. These works are already in progress.

THERE is an Historic Monuments Commission, which has its headquarters in Paris, and looks after the old buildings in the city as well as those elsewhere in France. In addition is a special society having for mission the care of antique remains in Paris. There are also, we believe, district archæological societies in the capital. The Prefect of the Seine does not consider they are sufficient, and he has established a new body that will be known as "La Commission du Vieux Paris." The members consist of architects, painters, men of letters and archæologists. It will be their duty to seek after vestiges of old Paris; to report on the condition of the remains, to watch over their conservation, to follow daily any excavations which may be undertaken or any transformations which are indispensable. Happily, explorations will only be intermittent, for it could hardly be expected that a dramatist like M. SARDOU, an administrator like M. JULES CLARETIE, a painter like M. DÉTAILLE and a manufacturer like M. FROMENT-MEURICE would be able to devote themselves to archæology.

A CONTRACTOR has more chance of success in a Scottish court when a case is brought against him under the Employers' Liability Act than in England. We have from time to time noticed cases which in the South would be decided for the plaintiff, but in the North have gone against him. The latest example was heard before Sheriff GUTHRIE in Glasgow and the judge dismissed it as irrelevant. The plaintiff claimed 250*l*. damages for injuries sustained through a fall from a ladder having one rung in a defective condition. Sheriff GUTHRIE held that as a ladder is a very ordinary piece of plant, the plaintiff could have discovered the defects by ordinary inspection. If so, why did he not see the defective rung himself, and either complain or avoid using it? He was using the ladder more than any other person. His lordship said he was not quite sure that a fall from the ladder was the necessary or natural result of a rung breaking, unless plaintiff was coming down in a careless way. A careful man has two hands and another foot with which to cling to the ladder. The plaintiff was ordered to pay costs. The result is according to common sense, but in an English court there seems to be a belief that a working man is like a baby, and must be protected as if he had no power over himself.

IN recording the death of the late Mr. J. L. PEARSON, R.A., the *Antiquary* says:—Mr. PEARSON was in his eighty-first year, and had been brought up in the old school of ecclesiastical "restorers," who considered that if you pulled down an old building and erected a copy of it you were preserving the old work. Mr. PEARSON seemed unable to shake off this exploded and destructive conception of what true restoration means. Hence he was brought of late years into constant conflict with antiquaries, more especially in regard to matters relating to Westminster Hall, and the Abbey Church, Peterborough, Rochester, Chichester Cathedrals, and other Mediaeval buildings. No one disputed Mr. PEARSON's great skill as a designer of new churches. What was disputed was his treatment of ancient ones. Perhaps Mr. PEARSON's interest in antiquities may be gauged to some extent by the fact that, although living in London and elected a Fellow of the Society of Antiquaries on June 16, 1853, he never attended a meeting of the Society, and was never formally admitted to his Fellowship in it.

THE Disney Professorship of Archæology in the University of Cambridge is vacant, five years having elapsed since the last election. The electors, who are the Vice-Chancellor and the heads of colleges or their *locum tenentes*, will meet on Saturday, January 15, 1898, at 12 noon, to elect a person to fill the office. The professor must be a member of the University of Cambridge and of the degree of M.A. or of some higher degree in the same. He is required to deliver six lectures at least in the course of each academical year, at such days and hours as the Vice-Chancellor shall appoint. The professorship is tenable for five years, and the professor may be re-elected. Mr. RIDGEWAY, whose term of office has expired, seeks re-election. Candidates are requested to send their names to the Vice-Chancellor on or before January 8.

A CURIOUS question has been raised, says the *American Architect*, by a bequest to Brown University, which provides that the whole amount, some 40,000 dols., shall be expended in the erection of a stone gateway to the University grounds. As Brown University is 'by no means' rich, and would be very glad of a fund of 40,000 dols., the income of which would aid materially in extending its range of instruction, the restriction of the bequest to the erection of a useless and pompous entrance to the modest grounds of the college is rather annoying, although, of course, the University officials are not wanting in gratitude for the intended favour. In some cases, however, gifts of the sort are encumbered with conditions which make it necessary to refuse them altogether, and it would be advantageous, both to intending benefactors of such institutions and to the beneficiaries, to have the subject of public bequests better understood. Everyone remembers the fund established by legacy for the benefit of indigent Hebrews in a city where no Hebrews lived; and the income of many charitable funds is now disproportioned to the objects to which it is specifically restricted. In London legislative action has been invoked to permit the diversion to other purposes of the income of funds left to support charities now obsolete or unnecessary; and colleges, hospitals and orphanages might perhaps with advantage present to the public occasional statements which would show the importance of bequeathing money to their general maintenance fund rather than to restricted objects, which, as in the case of the Brown gateway, add nothing to the efficiency of the institution, even if the sum received is sufficient, without additions from other sources, to carry out its intended purpose, which is not always the case.

ILLUSTRATIONS.

DEEPDENE, FRIMLEY GREEN.

RESIDENCE, LEICESTER WATER-WORKS.

ASTLEY HALL, LANCASHIRE.—ENTRANCE HALL, A.D. 1490.

CATHEDRAL SERIES.—SALISBURY: BRACKET, CAPITALS, ETC.—CAPITALS, ETC., FROM THE CHAPTER-HOUSE.



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SARACENIC ARCHITECTURE.*

THE influences of Saracenic art were felt wherever the Moslem religion prevailed, whether it was in India, Persia, Egypt, Asia Minor, Africa, Spain or the Holy Land, and for a time it seemed destined to become the prevailing style of architecture and the Mohammedan faith the universal literature. But for the courage and skill of the justly renowned Charles Martel, Moslem power and Moslem religion might have reigned as supreme in Europe as it has in Asia and the north of Africa. The defeats which the Moslems experienced in their battles with Charles Martel were the most severe reverses with which they had met, and from them may be dated the beginning of the decline of their power in western Europe. All Europe was aroused and the Crusades or Holy Wars raged with fury until the Moslem power was crippled if not destroyed.

"The art of the Arabs," says Lamartine, "is like a bright dream. It is a caprice of genius worked in rich work of stone, in delicate filigrees, in light fringes, in flowing lines, in lace-work, amid all of which the eye loses itself in pursuit of a symmetrical form which it is about to grasp, when the fair illusion changes into other beautiful combinations of forms, escapes and is dispelled." The various forms to be found in this species of architecture look like a strong vegetation—a vegetation luxuriant and also fantastic. Arab art is not nature; it is a dream of nature." Still, if the Arabs rioted in fanciful decorations they at the same time were careful to construct their edifices on the simplest and most natural plan.

In dimension and colours almost all their mosques are alike. Umbrageous courts of trees, refreshed by fountains surrounded by porticoes, stand in front of these sanctuaries, which form halls, square or round, surmounted by cupolas. At the four corners rise beautiful minarets. The interiors are simple in structure, all the ornaments consisting of arabesques painted upon the wall and of calligraphic inscriptions taken from the Koran. Lamps, ostrich eggs and bouquets of flowers hang in great numbers from the wires that stretch from one pillar to another across the interior. The flags of the floor are concealed by rich carpets. "The effect," says Lamartine, "is simple and impressive. It is not a temple in which a god dwells; it is a house of prayer and contemplation where men assemble to adore the one immortal God."

One of the most ancient and celebrated religious edifices of the Arabs is the mosque raised by Omar in Jerusalem, within the wall of Solomon's temple, and exactly upon the rock where they say Jehovah spake to Jacob. It is called El-Sakhra in memory of that event, and is octagonal in shape, each side being decorated with seven arcades of pointed arches. A second range of arcades, narrower and inclined inwards, supports a beautiful dome of copper, formerly gilt. The walls are covered with squares of blue enamel, and the gates ornamented with beautiful columns lead into the sanctuary which is covered with white marble. Visitors walk upon a rich and many-coloured pavement between two circular ranges of pillars composed of grey marble taken from Bethlehem and the Holy Sepulchre.

In the seventeenth century Mr. P. Rogers counted in the mosque no less than 7,000 chandeliers carved in copper or in iron gilt. All around the mosque branch off twelve porticoes placed at the same distance the one from the other, and irregular like the cloisters of the Alhambra. They are composed of three or four arcades and sometimes these arcades support a second range. This noticeable edifice was founded in the seventh century and was embellished by the caliphs Abd-el-Malek and El-Lanid. After the Crusades it was converted into a church by the Christians, but some hundred years later Saladin gave it back to Mohammed.

In early times Moslem art extended into Africa. Cairo, a town entirely Arabic, contains very ancient and very rich mosques, that of Ebn-Touloun especially being deserving of attention. It dates from the ninth century. Ahmed-Ben-Touloun, the founder of a brief dynasty, who caused it to be constructed and gave it its name, wished its porticoes to be sustained by 300 columns, but the architect was unable to construct such a great number. The mosque is built of brick, and stucco is used to conceal this material. The sanctuary is circular and its dimensions are very limited, the court and the porticoes actually constituting the mosque. The enclosing wall is pierced with nine gates. Around the court above the porticoes runs a high and beautiful frieze which crowns a highly ornamented cornice.

We must not quit Cairo without noticing the valley of the caliphs, as the religious art of the Arabs shows itself alike in their temples and their tombs. In this valley of the caliphs Mussulman dynasties repose in a marvellous necropolis at the foot of Mount Mokattam. Touloun and Biburs, Saladin and Malek-Abdul rest in a palace in which oriental architecture has abandoned itself to the most delightful caprices. It is quite a Gothic town with an air of extraordinary grace and of

devotion without gloom. The mosques are mingled with the tombs, and the minarets, symbolical of hope, rise from the midst of funeral cupolas. Space will not permit us to give a description of the tombs and mosques of the valley of the caliphs.

Nowhere have the Arabs left greater proof of their architectural genius than in Spain, where their civilisation flourished for seven centuries. The Alhambra, which is perhaps one of their greatest architectural marvels, must occur at once to the mind of the student of Moslem art. Specially worthy of admiration is the Court of Lions belonging to this edifice, a quadrangle 98 feet long by 65 feet wide. This court is surrounded by a peristyle of light columns ornamented on two sides by advanced porticoes like the bold portals of some Gothic churches, and is carved with wonderful accuracy, skill and elegance.

In the presence of innumerable vistas of courts and chambers, fantastic decorations of structures resembling the tents of the desert, terminating in conical vaults, the spectator stands immovable and mute, and thinks himself transported to the entrance of one of those fairy palaces of which we read in Arabian tales.

"Airy galleries," says Chateaubriand, "canals constructed of white marble, and bordered by citrons and flowering orange trees, fountains and solitary courts, present themselves on all sides before the eyes of the traveller, and across the long vaults of the porticoes he perceives other labyrinths and new enchantments. The beautiful azure of the heavens reveals itself between the columns that sustain a chain of Moorish arches. The walls covered with arabesques seem to the view like those cloths of the East which are embroidered in the leisure of the harem by the industrious hands of the female slave. Everything luxurious, religious, warlike, seems to breathe in this magnificent edifice. It is a sort of bower of love in a mysterious retreat in which the Moorish kings enjoyed all the pleasures and forgot all the cares of life."

The decoration of the Alhambra consists of varnished tiles of all colours—yellow, red, black, green and white—forming mosaics which cover the walls with a kind of carpet-work in flowers, knots, zigzags, and inscriptions sculptured in low relief upon the stucco and plaster. Nothing, for instance, could be more charming than the walls of the Hall of the Ambassadors, inscribed with verses of the Koran and stanzas of poetry in the Arabic calligraphy, while the ceiling of cedar wood—a marvel of carpentry—presents an actual problem of geometric forms.

If we except a number of columns, some flags, vases, basins, and little niches for placing Turkish slippers, there is not perhaps a single piece of marble employed in the interior decorations of the Alhambra. The same fact is to be observed respecting all the Arabic monuments of Cordova, Segovia, Seville, Valladolid and Toledo. Stucco and plaster were found to suffice for all the Moorish ornamentations.

The splendid and famous mosque of Cordova is composed of nineteen colonnades or porticoes in horseshoe arcades. In front of the façade is a court surrounded with galleries, commenced in 786. This edifice, which was as dear to the Arabs of Spain as Sta Sophia was to the Byzantines, and St. Peter's to the early Christians, was restored and enriched at different times. It received extensions and additions as late as the tenth century. Its height is not extraordinary, being only 30 feet from its base to the woodwork of the roof, but its horizontal dimensions are colossal. The mosque, properly so-called, is 400 feet long by 366 feet broad. Isolated columns to the number of 646 support the arcade, exclusive of the engaged columns, or those that form the three porticoes of the court. Formerly they were much more numerous, before the mutilations which the building has from time to time suffered took place.

Exquisite is the characteristic of all Arab conceptions; while the walls of the old towns of the north of Spain are heavy and coarsely built, like the defences improvised by people in extremities, the Moorish fortifications are light, graceful and constructed with true artistic skill. For instance, the towers of the walls of Seville, embellished with brick lines, courses of white stone and Arabic inscriptions, were so carefully built and with materials so well chosen that their edges and ridges are still as sharp as when first constructed. The length of the walls is about six miles. Of their fifteen gates the most have been reconstructed and modified, but the well-known "Gate of Cordova" among others has preserved its high square fortress. In the neighbourhood of this gate there is an aqueduct of 400 arches, eighteen miles in length, which shows that the Arabs were equal to the Romans in this form of construction.

It is in Spain that Mussulman art has displayed such bold and original invention. In the East it was often inspired by Byzantine models; and it is not astonishing that Sta Sophia, that queen of mosques, should often serve as a model for many of the smaller sanctuaries of Constantinople.

As we have seen, Sassanian architecture may have had some influence upon Moslem architecture. The Mosque of Achmet was entirely vaulted in semi-domes, which supported a

* From a paper by Mr. Cyrus K. Porter, published in *Stone*.

central cupola. In front of it was a court surrounded by a quadruple portico supporting columns with black and white capitals and with bases of bronze. The style of its architecture recalls the best epochs of Arabic art, although it was built in the seventeenth century. A gate of bronze gives access to the interior of the mosque. Says Gautier:—"What struck us first were the four enormous pillars, or rather fluted towers, which bear the weight of the principal cupola. Fifteen men, it is said, could not embrace them. These pillars, with capitals carved in stalactites, were surrounded at middle height by a plain band covered with inscriptions in Turkish character. They wore an air of robust majesty and indestructible power."

We have carefully traced the development of Saracen or Moslem architecture through its various stages, and have found in it much that is really beautiful and much that is to be admired. It has not to any great extent been adopted in America, nor is it suitable for our northern climate, especially for winter use. For summer hotels nothing could surpass it for elegance and comfort, and it is well adapted for our more southern states. The Hôtel Ponce de Leon, of St. Augustine, Florida, is an adaptation of that style for the purposes of a sea-side hotel.

OLD MONASTERIES AT CARDIFF.

A SERIES of excavations have been carried out for some time past in Cooper's Fields and in the grounds between Cathays Park and Queen Street by Mr. C. B. Fowler, architect, on behalf of Lord Bute, with the view of finding all possible traces of the ancient monasteries of the Black and the Greyfriars. The result of the investigations and operations carried out is that the sites have been discovered, plans of restoration on the old lines have been made, archaeological and antiquarian lore has been considerably enriched, and Lord Bute has had the foundations of the old walls of both places, long buried in the earth, brought up overground. In connection with the work that has been accomplished Mr. C. B. Fowler delivered a lecture in the Engineers' Institute, under the auspices of the Cardiff Naturalists' Society, on "Excavations of the Black and Greyfriars' Monasteries, Cardiff Castle."

In the course of his remarks Mr. Fowler said the monastery of the Blackfriars, Dominican Order, was situated near the east bank of the river Taff, without the meskin, or west gate, in the grounds of Cardiff Castle, and founded in 1256 by Richard de Clare, Earl of Gloucester and Lord of Glamorgan, son of Henry I. and Lady West, daughter of Prince Rhys ap Tewdwr, Dinwair Castle, ruler of West Wales from the Neath river to Cardigan Bay. The chief founder was the father of Gilbert de Clare, founder of the Greyfriars, and the monastery was probably dedicated to St. Dominic in 1216. The dissolution of the monasteries was the means of casting the brethren on the world without allowance, except that they received 40s. and a new gown. The Blackfriars monastery was no doubt approached by a bridge over the river Taff, about 100 yards higher up than the present one leading to Canton, and the foundations of it may now be seen at low water. The arms of the Order were a shield with cross, the motto being "Laudare Benedicere Prædicare," which means to praise, to bless, to preach. Several old graves were found inside the site of the old church, but only one contained a coffin and this one was in the choir. No doubt here rest the remains of Bishop Ecclescliffe, who was a Bishop of Llandaff for nearly twenty-three years, who died in 1346 and was buried in this church. Lord Bute, said the lecturer, intends having a memorial slab fixed over the grave with the following inscription cut thereon in Latin:—"Here lies the most illustrious and most reverend father and brother in Christ, John de Ecclescliffe, of the order of preachers of the diocese of Durham, Master of Theology at Oxford, who long dwelt with his brethren at London; Privy Councillor of Edward II., King of England; consecrated Bishop of Glasgow in the year of our Lord 1318; translated to Bethlehem in 1319, to Connor in 1322 and to Llandaff 1323. He died at Llandaff on January 2, 1346, and was buried here amongst his brethren, on whose soul may God have mercy. Amen." Sepulchral slabs, fragments of encaustic tiles of the fourteenth century, painted glass, several keys, a leaden bull of Pope Innocent IV., &c., were found among the débris. In his opinion the tiles were manufactured between 1320 and 1360. They are about 5 inches square and represent three subjects, namely, armorial, pictorial and symbolical. There are the arms of England and France, of Maltravers, Mansell, Craddock, Charlton, St. George and De Clare, together with doves, lions, fleur-de-lis, &c. Many such specimens he found in Gloucester Cathedral, the old vicarage of St. Mary, Bristol, and other places, including Abergavenny, Bath and St. David's Cathedral. There were also found some stone mouldings, door and window jambs, mullions, labels, window coping, a holy water stoup, a part of a piscina, arch moulds and several fragments of worked tomb canopies. The whole of the stone pitching was found intact all over the area examined, and so also was a piece of the

original altar slab. The habit of dress of the Order who occupied this monastery consisted of a tunic, leather belt, long scapular hanging down in front and back, also a capuce, or shoulder piece, and over this was placed a black cloak and black capuce. Indoors the dress was of white, but for outdoor wear the black cloak and capuce were put on. That was the full costume. To those who loved to revel amongst the remains of past ages, dry bones, old glass, floor tiles and sepulchral slabs, &c., broken and piled in heaps and surveyed not merely as broken fragments, but as living people, and which represented the feelings of which they at one time formed a part, one could almost imagine he heard the ringing of the dormitory bell at midnight and saw the little community rise from their couches, each hand making the sign of the cross and every lip moving in silent prayer, the forms clothed in white gliding down the steps wending their way to the choir, led by rushlight bearers and chanting in slow Gregorian tones those solemn old airs which reverberated weirdly from choir to nave, from nave to aisles in the dimly-lit building or by the soul-inspiring light of the moon; the sick, who generally occupied the dormitory above the sacristy, rising from their beds peering through the squints which gave them a view of the high altar and allowed of the sweet redolence of the incense pervading their sanctum; how when the service was finished the worshippers returned to their dormitory, getting to Mass again in the early morning next day, and later on in the cloisters of the grassy "garth" thinking in silence of their responsibilities and how best to discharge them. Having described the daily routine of the fathers from early Mass till the vespers, the lecturer said the preaching friars used to go about two and two preaching at village crosses, fairs, festivals, wakes, &c., and in all the parish churches when requested to do so by the rectors. In their own churches there was a short sermon daily, and a longer one on special occasions, such as festivals and during Lent.

The monastery of Greyfriars at Cardiff was founded by Gilbert de Clare, son of Robert de Clare, first Earl of Gloucester, the founder of the Blackfriars, and he died in 1147. The church was dedicated to St. Francis, and was under the wardenship of the Bristol House. It was situated without the eastern gate, but the exact position of the monastery and church were unknown by modern folks until the recent investigations and discoveries were made. The ruins of the Herbert mansion remain, that place having been at one time inhabited by Sir William Herbert. It was built about the year 1585, and was called "The Friars," and it was pulled down towards the end of the last century by the present Lord Bute's grandfather. The church was about 180 feet in length by 62 feet in width, and consisted of nave, north and south aisles and a large chancel about 30 feet wide. Many skeletons, over thirty in number, had been unearthed inside the walls of the church. Several coins of the reign of Edward and an abbey token were also found during the excavations, as well as a number of arch moulds, capitals, &c. In 1538 the Greyfriars surrendered to the king's visitor, the priors signing the surrender being Thomas Gwyn (guardian), Roland Jones, Owen Jones, Robert Castell, Richard Mellyn, Hugh Sawyer, John Brown, William Barber and Garwain Jones. They gave up the place to the bailey's deputy, John Loveday, and the visitor appropriated the most valuable articles there. Owen Glendower was very fond of the Greyfriars, or Franciscans, and refrained from destroying their convent in Crockherbtown when he sacked Cardiff, but he seized their valuables, which they had lodged in the castle for safety. Sir William Fleming and Llewellyn Bren were in charge of the Greyfriars Monastery, the former being high sheriff of Glamorgan in 1316, and the latter resided at Castle Coch, but held Caerphilly Castle, in a military sense, for the Earl de Clare. According to one writer, Sir Hugh de le Spenser, who was hated by all the barons of Great Britain, came to Glamorgan, dismissed Llewellyn Bren, and placed a Norman in his place. Llewellyn Bren took the field and 20,000 Welshmen gathered under the banner of Glamorgan, which he unfurled. They knocked Norman castles in all parts of the country to pieces, and the Normans bolted to England. Edward II. sent an envoy to Glamorgan and summoned Llewellyn Bren to the presence of the king in London, giving him a guarantee of safety. He went, and after stating his story to His Majesty in person, received a full pardon. He then returned to Cardiff with the king's pardon in his possession. He was, however, apprehended by Sir William Fleming, and hanged in a building which stood between the present Royal Arcade and Great Frederick Street. When the news of the tragedy reached King Edward he signed the death warrant of Sir William Fleming, who was hanged on the same spot on which Llewellyn Bren was executed. Sir William had caused the body of Llewellyn Bren to be buried in the Greyfriars Church, and he himself was buried in the same grave by the side of Bren. This grave had been found and opened a few weeks ago, and the remains of the two bodies were discovered lying side by side. It was, he said, surprising so little was known regarding this monastery.

The lecture was splendidly illustrated by means of lantern views thrown on a screen by Mr. John Storrie, these comprising specimens of fourteenth-century painted glass and encaustic tiles, graves and vaults, coins, plans, mouldings, keys, Papal bulls, monks' habits, sepulchral slabs, maps and sites, &c., and proved a most interesting one.

At the close Bishop Hedley in a few words proposed a vote of thanks to the lecturer, remarking that in Mr. Fowler's discoveries and restorations they had a thing unique in the history of ecclesiastical communities and buildings.

Canon Thompson seconded, and the vote was most heartily passed.

Votes of thanks to Mr. Storrie and the chairman brought the proceedings to an end.

ADMINISTRATION OF THE BRITISH MUSEUM.

THE following evidence was given before the select committee on museums by Sir Edward Maunde Thompson, the principal librarian and secretary of the British Museum:—

Sir Henry Howarth: I should like to ask you a few questions on the two sides of the management of the Museum. First, with regard to the method of purchase which is carried out at the British Museum. Will you explain to the committee how purchases are made, by what process they are made, and who is eventually responsible for their being made?—In the first instance, objects that are offered are taken into consideration by the keeper of the particular department to which they refer. He reports upon them, if he is going to recommend them; if he thinks them worthy of purchase, he reports upon them. His report is sent in to the trustees' next meeting through me. I see the objects before they come before the trustees and form my own opinion, together with the opinion of the keeper of the department; we consult upon the purchase, and, if we are agreed, it goes before the trustees and is recommended. If the trustees approve the purchase, they sanction it.

Are the objects produced before the trustees?—Yes.

Now, in cases where it is impossible to produce the objects before the trustees; supposing there is something offered in Italy. Suppose you have a collection offered in Italy, or in Paris, which cannot be transferred to England, what, then, is the process of purchase?—We should never purchase a large collection without an officer of the department seeing it; of course, the purchase would depend upon his recommendation, but such a purchase so very seldom happens; in fact, I do not remember a recent case where we have bought a large collection. We have occasionally bought at foreign sales, sales in Paris for instance, and then we have to depend on the discretion of the keeper. The keeper goes over, if it is an important collection, and sees it. It is a rule that the keeper of the department sees everything he recommends.

That is a point I rather wished to draw attention to first; that is to say, we want to know the amount of initiative given to the different keepers. If an object is reported from Italy as being deserving of your purchase, what process is gone through at the Museum in order to acquire the object? You send your keeper out?—In the first place we should try to get the object sent to England, and, of course, if it is considered so important that the keeper should go, he will go to see it if we cannot get it sent to England; and in any case of any great sale the keeper would go over and see the objects before the sale came on. An exception may be made in sales of books which can be identified by catalogues.

How far would the Museum be committed to the purchase without the intervention of the trustees in such cases?—There is no committal at all. If the trustees give their sanction for bidding for the objects, of course the trustees are answerable; but in any case the keeper would have to report first of all before he bid.

Where you had cases where a purchase was to be made immediately or peremptorily, or the object would be lost, what initiative is given to you or to the keeper?—In that case it depends upon the value. The keeper of a department may spend up to 20*l.*; he can spend up to 100*l.* with my sanction; but beyond that he must get the sanction of two trustees in writing.

The sanction of two trustees in writing?—Yes, any he can catch between meetings. Of course, if a meeting is available, it is brought before the meeting, but in an emergency he would get the sanction of two trustees in writing—he writes to them or sees them.

Now when you say that a keeper has an option up to 20*l.*, does that mean that he can spend 20*l.* between two trustees' meetings, or that he can buy a number of objects, each of them under the value of 20*l.*?—No, it is only in the case of an emergency. Suppose, for instance, a man is passing through London and has a rare book which is worth 5*l.*, he may say, 'I cannot wait, I am on my way abroad, I will let you have it

for 5*l.*," the keeper then takes the responsibility and purchases it, and he reports it to the next meeting.

With regard to the intrinsic value of an object, or in regard to its genuineness, do you take the opinion of your keepers, or do you go outside the Museum for such information?—It is got from the keepers.

In every case?—In every case.

Do you ever call in officially referees of any kind, or experts?—No; the head of a department is the best expert, we consider, in his particular line. We should not go outside to ask an opinion.

And you consider that the head of every department in such a museum ought to be sufficiently an expert to be able to buy on his own judgment, and be made responsible on his own judgment?—Yes, certainly.

In your memory, has the recommendation of any of the keepers been reversed in certain cases on the ground either of the object not being genuine or of its intrinsic value not being sufficiently good?—There have been cases; they are rare, but they occasionally happen. For example, my opinion may go contrary to the opinion of the keeper; I may think a thing is too dear. I should then tell the trustees I thought it too dear, and they could either take my opinion or the opinion of the keeper.

Or as to the object being a desirable one for the collection?—Just so.

But with regard to its being a genuine object, which is a very important matter, and in regard to its being a falsification or forgery, do you rely on and make responsible the keeper of the department?—Yes, the keeper of the department would be responsible then.

Entirely?—Yes.

And you find that that has worked well?—Perfectly.

Now with regard to the keepers of the departments, how many departments do you have in the Museum?—In Bloomsbury?

Yes?—We have nine, including my department, which is mere administrative office.

Apart from administration?—There are eight.

Will you enumerate them?—The printed books department, the department of manuscripts, the department of oriental printed books and manuscripts, prints and drawings, Greek and Roman antiquities, Egyptian and Assyrian antiquities, ethnographical and British antiquities, and coins and medals.

And the keeper of each one of these departments has the initiative you mentioned just now?—Yes.

Now your annual grant for purchases—take last year. What would be the amount of that?—22,000*l.* for our Museum.

How is that apportioned between the different departments?—Well, first of all, the keepers send in their reports when we are making up the estimates, and from these we get a general idea of what their requirements are; then the sub-committee of finance goes into the whole question of the details of the figures, and they are adjusted in different directions; cut down, perhaps, where the trustees consider a department is asking too much, or raised if it has not got quite enough. Then the estimates go on to the Treasury, and then, generally, comes a struggle with the Treasury; they generally cut us down; negotiations go on, and, finally, we come to an arrangement. The departmental grants are generally in proportions; we know exactly the proportion each department requires.

Those proportions are more or less the same from year to year?—Well, yes; generally they run on. I must explain that at the present time the 22,000*l.* is to be made a fixed sum. Up to now we have always varied, but the Treasury has now given us 22,000*l.* for five years, and we are to be allowed to carry over to the next financial year anything we do not spend. Formerly savings went back to the Treasury.

Supposing you have a special pressure on one department during the year, and that there is a sale of coins comes off, or a sale of Greek vases, which requires exceptional expenditure, how do you meet that?—If we foresee that we make representation to the Treasury when the estimates are being framed? If it comes on suddenly afterwards, and a large sum is wanted, we go to the Treasury for a special grant.

It is also possible to transfer from one department to another department?—Oh, yes.

And to deal with the whole as a common fund in cases of emergency?—Yes. I should explain further with regard to the 22,000*l.* which is now being assigned to us as a fixed sum. The arrangement which the trustees have made at present is that they have granted the head of each department straight off three-fourths of what would be his normal figure, considering the rest of the money as a sort of reserve fund, so that in case of an emergency we have that to fall back upon for any department.

Now, there are eight of these heads of departments; how many are there in the next grade?—There is a certain number of assistant-keepers as well as keepers. We call keepers and assistant-keepers officers, and we have fourteen altogether

Then the next class are assistants. They are, of course, all educated men; and we have altogether sixty-six in the British Museum, including three in my office. I am not speaking of the Natural History Museum.

By those, you do not mean mere attendants, but men who pass a Civil Service examination?—Very highly qualified men.

With regard to the discipline of these men, are the keepers of the different departments responsible entirely for their staff and the work they do?—Yes, of course, under me; I have a general control, but you may say each keeper is responsible for his own staff.

Would you define it a little more closely. For instance, taking the cataloguing of objects, or the arrangement of particular rooms, or any particular work that has to be done by any particular man, is the choice entirely in the hands of the keeper of the department for the time being?—Well, generally it is within his department; but, of course, if there is an arrangement of the public galleries I should give my opinion as well. For instance, in arranging sculpture and so forth, the keeper of the department always consults me.

With regard to the selecting of men for the making of catalogues?—It is left to the keeper; he trains his staff and knows best.

These sixty men, you say, are all educated men?—Highly educated. Perhaps I should not say all. We have a certain number of older men who came in under the old *régime*, and they are not so highly qualified; but the men engaged now are all honours men of the universities.

In addition to being honours men of a university, do they pass a special examination before they come to you?—Yes, they pass our examination.

Will you tell us whether your examination prescribes special knowledge in special subjects, if a man is to have charge of a special department?—Our principle is this—to get the very best material to begin with, and we therefore get the highest educated men we can. We have them examined in, of course, a certain number of preliminary subjects which do not count for marks; but the real competition lies in four languages, Greek, Latin, French and German; those being the languages that every public school boy and university man is supposed to know, and the marks got for those languages count for the competition. But in addition to that, we test the men for the particular departments; for example, if a man goes into the Greek and Roman department he must know something about archaeology; he must in his university career have taken up the subject to some degree. We do not expect an expert, but a man who has a bent that way; so that in addition to his four languages he would have to pass in an archaeological paper. With coins, in the same way, he would have a numismatic paper. In prints and drawings he would have some elementary paper on art, and also we give him a few prints to see whether he has an eye. In the oriental department it is a little different; for instance, in the Egyptian and Assyrian department we let them off two languages, prescribing either Greek or Latin, and either French or German, but also a Semitic language; we do not care particularly what the Semitic language is, because such a language is the foundation for all that side. It is generally Hebrew. In the department of printed books and manuscripts we do the same thing. We have to get men according to the vacancy; we may want a Persian, Arabic or Hebrew scholar, but we now always make it a point that he must be well educated as well, and he must not only know that one subject.

Once having got him into this department that becomes his department, and you do not transfer him to any other department?—Yes.

Mr. Bartley: May I ask at what age he gets in?—About twenty-four, as fresh after getting his degree as possible.

Sir Henry Howorth: You say you do not transfer your men at all?—I will not say at all; very rarely we do when they are quite juniors; for example, the other day there was a man who had been beaten by another for the prints and drawings department, but he came in at the next examination and was put into the printed books. A vacancy occurred within a year in the prints and drawings, and we transferred him because he had special qualifications that way, and he was a first-rate man.

Your object, as a matter of fact, is to train specialists in these different departments?—Yes.

You think that is in every way the best way of administering?—Decidedly; we could not carry on the Museum if we kept shifting the men.

That extends to the library as well as to the departments of antiquities?—Everywhere; all departments alike.

In your opinion, does a man require a special training to become a librarian in a large library, in the same way as he does as keeper of an archaeological museum?—When he is brought in, do you mean?

After he is brought in?—Certainly.

Would you deem it a necessity, if he is to be a librarian in a large library, that he should know some other language besides his own?—Decidedly, as many languages as he can; we begin

with the four languages I have mentioned, but a man easily picks up others as he goes along.

Do you consider it an essential that any man who is an assistant in a library of this size should have a knowledge of some modern language or two?—Are you speaking of our library?

Your library first?—Most decidedly.

And the art library, which contains a very large proportion of German, French and Italian books?—Every man, I consider, when he comes in as a librarian, should certainly know French, Latin and German; if he knows Greek, so much the better.

Do you think it possible for a man to catalogue books, or make slips of books in foreign languages, unless he knows that language?—He could not make them to be worth anything.

And you think any system which prescribed that he should make such entries and make an inventory or catalogue is in effect an unworkable system in a big library?—Unless he knows the languages, it is quite impossible.

In regard to promotions in the department, are the men promoted as a matter of fact by seniority?—No.

Do you think it advisable that they should be promoted by seniority entirely?—No, certainly not; if you have a good man, certainly push him on. Of course you must take seniority into account to a certain extent. If you get two men equally good, the senior man goes up; but if you have A. and B., and if A. is a stupid man and B. a very brilliant fellow, and a hard-working man, and so on, we put him up naturally. We must think of the good of the place.

His efficiency is the first consideration?—Of course.

And that overrides entirely any claims of seniority?—Certainly; and particularly in promotions to the higher places—the officers' places.

Does the head of a department have anything to say to the promotion of men in his department?—Yes, it is all done on his recommendation, which I check.

But the head of the department really is responsible?—He is answerable originally for the recommendation of the promotion of his assistants.

With regard to the cataloguing, are your catalogues done by your own men?—Well, yes, I may say as a rule; there are sometimes some few catalogues made by outsiders. For example, in the department of oriental printed books and manuscripts, you get a collection perhaps of some out-of-the-way far Eastern language. It is not worth having a man in for that particular work, and we try and get a missionary, or some one who knows the language, and he makes the catalogue for us. For instance, at the present moment we have a Cingalese, who is cataloguing in some of these out-of-the-way oriental languages.

With that exception, and including the series of objects for which you have no keeper, the catalogues are virtually done by your staff?—That is so.

Would you dream of going outside your staff to catalogue your coins, or your Greek vases, or your antiquities?—Certainly not.

And the same with the library?—The same with the library.

And you make the man, the keeper, virtually responsible for the cataloguing of his own department?—Yes.

As to the cataloguing. In the first instance, I believe, there is an inventory?—Register, as we call it.

What does the register consist in?—The register is a book kept for entering up in very brief form the acquisitions as they come in.

Is there a separate register for each department?—Oh, yes.

How are the things registered, according to classes?—No, as they come in, as a rule; the one after the other in numerical order.

Have you any classified list afterwards?—Then we make catalogues on the registers; those become the classified lists.

If a student comes into the Museum and wants to see a particular object, and knows its history, where can that be found without looking through the whole inventory?—The internal arrangement of the department would help.

That virtually would have to be postponed, that kind of knowledge, until the cataloguing of the department is completed?—In minute detail, of course; but of course the officers of the department know where the things are, and they can always assist students in finding them.

What portion of the time of your keepers is devoted to cataloguing do you suppose and inventorying your objects, and what portion to the actual supervision of the objects in the cases?—I do not quite follow; you mean of the staff generally?

Yes?—A good deal depends on the department. You must rather divide our Museum into two sides; we have what I should call the literary side and the archaeological side. On the literary side, of course, we have to catalogue to let people know what we have. On the archaeological side a great deal of exhibition comes in, and then, of course, a good deal of time is taken up in putting out the objects in the galleries, and labelling and so forth.

We have been told that at South Kensington it has been impossible for the staff to catalogue their own collections, because the staff is not sufficient in numbers, and there is not sufficient time?—You must have sufficient numbers, of course.

Have you any notion of the number of objects which is under the control of the keeper of any one of the departments or more than one of them?—It is impossible to say. I could not tell you. For example, in the printed book department you have something like two millions of books.

Would not your inventory tell you?—Yes, the inventories of the different departments would tell you.

As a matter of fact, in one department, the coin department, have you not published thirty volumes of catalogues?—Yes, very good catalogues, a very good series.

Entirely by the staff in that department?—No; some of the ordinary coins were done by outsiders, but as a rule all the ordinary catalogues are done by the staff.

Who is responsible for the custody of the building with regard to its safety and otherwise?—I am.

With regard to fire and with regard to policing, is it under the police authorities, the metropolitan police?—No; we should call in the Fire Brigade in case of fire.

Have you a special staff of firemen of your own?—Yes. It is a small staff, only four firemen.

Are you subject to supervision at all by the officers of the Metropolitan Fire Brigade—do they come and inspect?—Yes, up to the present time, as far as I remember, we have always had the chief officer of the Fire Brigade; he has been our superintendent of fire-engines, and we have given him a small fee. At present the County Council will not allow their officers to take fees, but Commander Wells takes the duty voluntarily, and he is allowed to come and inspect our place once a quarter.

Does he make you a report?—Yes.

As to safety?—Yes.

And so far as your experience goes, have his recommendations been carried out?—Always.

And you deem him as partially responsible for the safety of your buildings?—So far as a referee.

In regard to police, the staff which is employed in the Museum, is that a special staff?—No, they are supplied by the Commissioners of Police.

Do they change their men?—Oh, yes. As a rule we keep on the same men, but of course they are constantly changing within the force itself by retirements, and this keeps a flow of new men through the place.

Have you a separate staff over-night?—No, the same men have to take the rota; there are very few on at night, only one inside; four men and a sergeant altogether on duty at night. In the daytime, of course, we employ twenty-eight, including an inspector and two sergeants.

As to the attendants in the rooms, they are for the most part in your Museum laymen, not policemen or soldiers?—No, we are gradually shifting all our warding attendants and putting in police and commissionaires. We use a policeman in a long gallery and we consider him worth two ordinary men. In a small room it would be waste to put a policeman, and we put a commissionaire, as he is much cheaper. By degrees we are displacing all the old attendants or servants who used to ward the galleries; it was not found an efficient system at all; they went to sleep, and so on; and then the public did not, of course, quite attend to a man in plain clothes as much as to a policeman in uniform or to a commissionaire; we find the present system very good.

You mean the attendants who were appointed under the patronage of the three senior trustees?—Yes.

They are gradually being displaced?—Yes, those who used to be employed in warding. I am only speaking of the warders. Of course, in each department we must have attendants as servants.

And those attendants are still the class of men I have referred to, that is, old servants and others appointed by the three senior trustees?—They are partly old servants, but latterly we have been introducing a system of boy attendants. The general service tends to rapid increase annually; we require more hands and more hands, and we find it is better to have boys. They are more active; they can run about quicker and serve books more quickly than the men, and by degrees we have brought in a very large number of boy attendants. The Treasury will always allow us to engage two boy attendants if we get rid of one attendant.

Chairman: What becomes of the boys?—As a rule, when a boy does well, I get the principal trustees to nominate him as an attendant, and they generally will do so. All appointments are in the hands of the three principal trustees, and if I recommend a boy very strongly they will always give him an attendantship.

Sir Henry Howorth: Your better boys are drafted into the upper class of attendants?—They are nominated afresh, not promoted, but we find no difficulty with our boys; I mean in keeping the flow, for so many of them get appointments outside. We train them very carefully and they are all well taught and

looked after very sharply; outside people are beginning to find this out, and they have been drawing on us lately rather too largely. The boys get into commercial places and so forth.

Have you in your recollection ever had anything stolen out of the cases?—Yes, once, a long time ago—twenty years or more. A German student, who knew something, managed to steal some of the Assyrian cylinders and ivories. They were very few, but he managed to force the case and get hold of some of these, and took them abroad and sold them or pawned them in Holland. I think we recovered them all.

Is that the only theft?—That is the only thing I can remember being stolen from a case.

In the library have you had anything stolen or mutilated?—Occasionally we lose a book. A reader will carry off a book, but very rarely, and I suppose, perhaps, in the last six or seven years we have not lost half a dozen books; and they are always common cheap things—2s. books.

Have you had any mutilations of valuable books?—No, I do not remember any; the only mutilation as a rule that takes place is when they have cut out an engraving.

Have they not cut out the margins of certain famous books?—There was a case some time ago of a German who mutilated some of Bentley's books. It is a misfortune that the Germans know too much. This man was really a student.

And he was a specialist?—Yes, he got hold of Bentley's volumes and appropriated his notes; he was a classical scholar and brought out discoveries of his own which were really Bentley's, and in order to cut off the evidence, he cut off the margins of the books.

What are the precautions you take, that is what I am really driving at, against theft and against mutilation in this way; have you had any special recommendation as to cases?—As to the exhibition cases?

Yes?—We take the advice of the Office of Works; the head of that department always advises us on the large cases and so forth, and then, of course, we are particular about our system of keys and locks. Everything is made as secure as possible.

Is all the furniture for the Museum made by the Board of Works?—No.

Do you make a portion of it yourself?—No; we get it made by contract, but we take the advice of the Office of Works. But payments are made from our vote.

Do you think it would be an advantage that you should make a portion of your own furniture at all. Do you see any advantage in that?—No, I do not think we should in the large cases, except as a matter of expenditure. Formerly, when we managed our own affairs, perhaps our cases were really better than they are at the present time; for instance, we used gun-metal a good deal, which makes better cases than wood; but with the estimates cut low we are obliged to put up with the cheaper material. I must say that the cases are generally very well made; we go to the best men, for instance, Cubitt and Holland.

With regard to fire, have you ever had a fire in the Museum in your knowledge?—Yes; in 1865 there was a fire in the binders' shop. That was an outbuilding.

Where was the binders' shop?—On the east side where the white wing now stands.

Is it detached?—Are you speaking now of the present binders' shop? At the present day the binders have to work in the basement of the Museum. This is objectionable, I consider, and we have been trying to get the Treasury and the Office of Works together to build us outbuildings; and with that view, after the purchase of the surrounding property was made two or three years ago, we arranged then that we should cut off the lower part of the gardens of some of the houses so as to widen our roadway, and within that roadway we proposed in this year to build a long row of shops, and to put the binders into them. The objection to the binders working in the basement is that they use fire. We should have put them in those outbuildings, but unfortunately the grant was disallowed, and at the present moment we are having a struggle with the Treasury and the Office of Works to get them to do something.

With regard to the furnaces of another kind; for the boilers, and for the gas installation?—You mean the electric light?

Yes?—They are kept away from the Museum as much as possible. Unfortunately some are down in the basement.

You still have danger from them?—Yes, we should get rid of them by degrees; the last boilers we put under the roadway outside. I do not mean the public roadway, but our own roadway surrounding the Museum.

The houses of the keepers which are within the same great block of buildings, are they separated?—Yes; they are wings. They are only connected with the Museum by small corridors. My house, for instance, on one side, and the first house on the other side; the others are all independent.

You light the Museum entirely by electricity?—Yes. Well, we use gas to some extent, not upstairs, but among the shops downstairs in the basement; but we are displacing that as much as possible with electric light. We have our own plant, and we can run almost as much electric light as we want.

I believe you light one half of the Museum at a time, you do not have it lighted all together?—Not all together.

What provision is made now in the evenings in regard to relieving your staff; is there any extra pay given to the men who stay at night?—As a rule we do not have the staff remaining at night; all the attendants clear out. We only have one assistant as a responsible person, and he is paid extra, of course, but the warding is all managed by the police and commissionaires and the resident messengers and a few labourers; the police have to work eight hours a day, and anything beyond the eight hours they are paid for. An officer is also always in residence.

You have never had any charge in the Museum for entrance at all?—Oh, dear no.

Have you a system of students' days on which certain departments are closed?—On the east side of the building the ethnographical department has been closed on Tuesdays and Thursdays, and this is the last relic, I may say, of keeping the place closed.

Do you see any advantage in that?—No, I think we shall open everything; the only advantage of observing closed days is that it keeps the place a little cleaner.

And you see no advantage in having a charge for reserving certain days for the students?—I do not think so at all. Now almost every department has its students' room; we are increasing that system a good deal through the place, and besides it is very easy to rail off a piece if students want to draw or study anything particular; it is easy to draw a barrier across and prevent them from being interfered with by the public.

With regard to the control by your trustees, how often do they meet?—At our place once a month, and at the National History once a month.

That is a committee of your trustees?—The standing committee it is called.

Are they selected from the rest?—Yes.

By themselves?—By the general meeting.

They are co-opted by the general meeting of the trustees?—Yes.

And they meet once a month?—Once a month at both places; they meet the second Saturday in the month at our place, and the last Saturday in the month at the Natural History Museum.

What is brought before them, as a matter of fact?—The general business, of course. I act as secretary. All the reports from the different departments and the reports of the general administration, and so forth; anything that comes up in relation to the public; in fact, everything is brought before them.

EDINBURGH ARCHITECTURAL SOCIETY.

THE second annual dinner of the Edinburgh Architectural Society took place on the 22nd inst. in the Imperial Hotel, Market Street. Councillor Cameron, the hon. president, was in the chair, and the croupiers were Mr. W. N. Cumming, the vice-president, and Mr. J. F. Matthew, the hon. treasurer.

Baillie Mackenzie proposed "The Edinburgh Architectural Society." Speaking, he said, from a plain man's standpoint, he admitted that there were very fine buildings to be seen, with great detail on them, but he did not know that the public were sufficiently educated to appreciate such buildings. He did not doubt that there were beauties in such buildings if ordinary people were able to see them. But, after all, too much elaboration of a building had always seemed to him to be like an ugly woman overdressed in silks and satin. In the education of the professional architect he thought sometimes that there was a defect, in that the students did not study the kindred branches of the profession in regard to physics, chemistry and electricity. Architects, he thought, lost sight of these in pursuit of what was purely architectural detail. For example, he believed that a little knowledge of electricity and of electric lighting would be of great service to young architects.

Mr. Jas. A. Williamson, the president, responded for the Society. The Society, he said, had now been founded for two years. It consisted of junior members of the profession, and it had cut itself adrift, to some extent, from the older Association. Whether that policy was right or wrong it was not for him to say, but they felt that their own individuality was the very life of the Society. There was a disposition on the part of the older Society to take that, the younger Society, under its wing; but, apart from questions of policy, they could not overlook the fact that, so long as they had the funds to carry on the Society, and had life and vigour, they were perhaps better to remain independent. Mr. Williamson afterwards proposed "The Corporation," and said that they, as architects, had reason to congratulate themselves that the members of the Town Council were very jealous of the amenities of the city. They had an instance of that in the attitude which the Lord Provost had taken up with regard to the proposal to put up an electric sky sign in the Old Town.

Baillie Pollard, in acknowledging the toast, said that the Corporation were engaged in a great many matters that were purely architectural. For example, there was the rebuilding of the North Bridge Street, and he hoped, in that connection, that the Town Council would not be so far left to itself as to become the builder of the street. Then, again, the Corporation had in hand the matter of the Usher Hall. He did not feel, as a member of the Corporation, that they had very much credit in alluding to that question. He was sorry that the Corporation had not been able with greater promptness to show their appreciation of the most handsome gift of Mr. Usher by finding a site for the hall before the present time. He hoped, however, that before very long a suitable site would be found, and that Mr. Usher would have the satisfaction—and it was the only satisfaction that he desired—of seeing the hall in use during his lifetime. Other toasts followed.

SOUTH KENSINGTON MUSEUM.

ANOTHER Old English room has been set up in the western arcade of the South Court by the side of the "Inlaid Room" from Sizergh Castle. It is from an old house, now pulled down, at Bromley-by-Bow, and belongs to the early years of King James I., the date, 1606, having being carved on the outside of the house. The spacious stone fireplace has over it an elaborate mantelpiece in oak, with the royal arms very boldly carved. The ceiling bears in the centre the same arms with the initials I. R., and is covered with fine strapwork ornament having floral enrichments and medallions containing heads of ancient warriors. An extensive alteration was made in the last century whereby the room was shortened and the panelling was shifted to suit the new conditions. A few mouldings and door-heads of the latter period have been left out, as they were in pinewood, and consequently appeared incongruous by the side of the old oak; the room is therefore more nearly in its original form than when demolished. Specimens of furniture of the period have been taken from the Museum and arranged in the room in order to give it a furnished aspect.

The rooms in the picture galleries formerly given up to the pictures of the Chantrey Bequest have now been hung with water-colour paintings which were previously on screens. Many interesting works can thus be seen to greater advantage, but this change is only provisional.

The arrangement of two rooms in the Cross Gallery connecting the Indian Section and Science Collections has now been completed. The first room, on descending the staircase, is devoted for the most part to Cairene art; three of the well-known lattice windows are shown here with their curious projections for holding water-bottles; on one side is a mosque pulpit of wood decorated with delicate carved ivory plaques; specimens of doors with similar ivory plaques are arranged in cases against the walls; casts of architectural ornament from the mosques of the Sultan Hassan and Kait Bey, and the Wekaleh of the latter Sultan, fill the upper parts of the walls and the corners of the room. In the second room are textile fabrics and embroideries from various parts of the Turkish empire. To the left are brocades and velvets, probably from Broussa, while to the right are the remains of seventeenth-century brocaded dresses from the tombs at Constantinople of young princesses. The screens contain embroideries in endless variety of stitches from Syria, the islands of the Levant and other parts of the East; against each of the long walls is one side of a room from Damascus, one of the early eighteenth century and the other about fifty years later, with their quaint cupboards and recesses. On the ground floor of the Indian Section an important addition has been made to the plaster casts by a collection of ornamental details from the palace of the great Akbar at Fathpur Sikri, near Agra.

WROTTESELEY HALL.

THE following description of Wrottesley Hall, near Wolverhampton, which was consumed by fire on the 16th inst., appears in the "History of Tattenhall," by Mr. J. P. Jones:—

Wrottesley Hall stands in a commanding position, on the summit of a thickly wooded slope leading from the main road through the park, and is a conspicuous object from many points of view in the parish. The hall was built in 1698 on the site of an old picturesque manor-house, which was unfortunately pulled down to supply material for the new house. Originally the old Holyhead road ran through the park and passed in front of the hall. Since the diversion of this road, the chief approach to the house has been from a point on the present road, about a quarter of a mile beyond the fourth milestone from Wolverhampton. The present building is a plain rectangular structure of red brick with stone dressings, the flatness of the front being pleasantly relieved by two projecting wings. The principal entrance is approached by a flight of stone steps, and opens into the hall, a spacious and lofty room. From the hall access

is obtained to the drawing-rooms, which occupy the whole of the ground floor of the west wing, the windows of which look out upon the terrace and gardens. The dining-room is parallel with the hall and is upon the site of the cloisters of the old hall. From its windows are obtained fine vistas of mossy turf and winding woodland paths leading into the home park. Over the dining-room is the library. Every inch of wall-space in this noble room is occupied by shelving to receive the large number of volumes it contains. Amongst the treasures of the library are a first folio of Shakespeare, many early and rare editions of the Classics, a copy of "De Bry's History" and one of the finest and most complete sets of ancient historical chronicles extant. Leading from the library through a winding passage is the entrance to the Wrotesley muniment-room, where are stored priceless treasures of historical deeds ranging over a period of 700 years. These deeds and MSS. are valuable not only as the title deeds of a private family, but as containing much that would cast a new light upon the history, manners and customs of England during a very extended period, and especially is this so as regards the mass of materials for the history of the sixteenth, seventeenth and eighteenth centuries, contained in the various letters which abound in the collection. Taking them in chronological order, the rarest of the numerous deeds at Wrotesley is that of Robert de Stafford, giving Wrotesley and Livingston to the monks of Evesham. Then there are deeds of the twelfth and thirteenth centuries; one MS., which curiously illustrates the power of the Church at the end of the fourteenth century, is the letter of excommunication printed under Tottenhall Clericorum. Among the documents is a copy of the earliest statutes of the Order of the Garter, finely written on two membranes of vellum. There is also an ancient historical roll, nearly 20 feet long; it contains the history of Britain, preceded by a tabular conspectus of the Heptarchy, and portions of it are upon the history of the British kings. On the back of this roll is written, in contemporary handwriting, the pedigree of the claimants to the Crown of Scotland in the reign of Edward I., together with a copy of the deed of submission to the competitors. This part of the document is of considerable interest, as the character of the handwriting shows it to be contemporary with the events which it describes.

TESSERÆ.

Indian Ornament.

ABSENCE of symbolism is the weakness of modern European decoration, as, indeed, it was of Grecian; and yet, what conventional form is more beautiful than the French fleur-de-lis, more beautiful and worshipful than the Tudor rose, or than such heraldic symbols as the cross crosslet? And the most natural decoration for wall-papers, curtains and book-lining papers would be, for people who could afford it, to use family arms alone, or in combination with national symbols and conventionalised representations of national flowers or animals. But no symbols can approach in beauty of form and meaning to the knop and flower and the *hom* of Assyria, and purified of all local taint of Asshur, Ashtoreth or Astarte, they belong to all the Aryan races in the old world and the new. They are probably the most ancient badges of the Aryan race, but in India their employment in ornamentation under the influence of the Turanic mythology was for ages subordinated to that of the monstrous idol shapes of the Dravidian south, and it was by the Persianised or Arianised Arabs, Afghans and Mongols (Turkomans) that their use was reintroduced as predominant forms in Indian decoration, wherever throughout Hindustan and the Dakhan Mohammedanism prevails. They are seen figured everywhere in oriental art, and we cannot take up a talisman of Egypt, a Syrian silk, an alabastron of Persian perfumes, or a Persian illuminated MS. or carpet, a Cashmere shawl, an Indian jewel or kincob, any of the great store of these splendid and precious stuffs and arms, and vessels of wrought gold and silver, on which we do not find them represented, as the acknowledgment in their original use at least of the Divine Author and Finisher of every good and perfect work; under forms taken from the most majestic of trees and the most graceful of flowers, and which express more simply, directly and fully than can any form of words the wisdom and beneficence of the Creator and the gladness and praise of men. Thus Indian art in every decorative detail, Aryan or Dravidian, bears witness to the universal conviction that the character of man's being and destiny is supernatural; and that human duty and all that gives to daily intercourse the charm of art and grace of culture, possess their reality and true meaning only in the purposes of a life beyond life.

Consistency in Architecture.

To adhere accurately to any given style demands an intimate knowledge and close observation of its peculiarities, involving the necessity of a laborious and attentive study. This necessity is apt to breed a disposition, first, to depreciate, and

then to disregard all study of this nature—a study very unwelcome to the indolent and very distasteful to the self-sufficient student, who spurns the trammels of consistency, and who, ambitious to strike out a path of his own, would fain believe it to be beneath him to regard very narrowly the trodden paths and the more frequented highways of his art. No mistake is more dangerous than this; the only safe ground for hope of future progress lies in a clear and comprehensive knowledge of the past, and he who is earnestly anxious to extend the bounds of art must first make himself thoroughly acquainted with all that lies within those bounds. The contempt for consistency of style gives birth sometimes to very strange spectacles, many singular compounds of discordant types. We shall find perhaps very high-pitched roofs or French rococo work laid upon a structure having visible pretensions to Palladian art, whilst scattered glimpses of Elizabethan manner give to the heterogeneous mass still greater grotesqueness. Such are the deplorable results of the neglect of style. Be assured that no genius, however commanding, can indulge in these anomalies with impunity; whilst for the student of ordinary powers to venture upon them would be an act of imprudence which no sensible man would commit. It may be said that to inculcate so careful an adherence to style would be to set up a slavish doctrine, to shackle the fancy and to limit the freedom of genius. But this would be an error. As consistency of conduct in the ordinary affairs of life is an evidence of stability of judgment, so æsthetic consistency is a proof of a taste based on sound and intelligent principles. This consistency of style is peculiarly a mark of the best periods of art, and will never fail to be found to distinguish the productions of the best masters. If, for example, we examine the *chefs d'œuvres* of the thirteenth century we shall be offended by no inconsistencies. One portion of the building appears to arise necessarily out of or to be necessarily dependent on the adjacent portions, and generally a natural sequence of parts tending to one homogeneous whole seems at once manifest—a pervading principle, in short, appears throughout the structure. So in the best works of the great masters of the Renaissance period there is a well-regulated congruity of manner testifying that the artist was influenced by fixed principles, and that his work was as much the result of good sense as of good taste, or, rather, that these two qualities are necessarily associates of each other, for it cannot be too strongly impressed upon all how close a relationship it is which exists between them. The educated eye refuses to be pleased with that which is irreconcilable to reason in however fascinating a form it may be presented to the eye.

Theodoric's Mausoleum.

The mausoleum of Theodoric, raised during his lifetime (not, as conjectured, by Amalasunta under the reign of his grandson), is a marvel of construction, though by no means admirable in decorative details. Sharing the fate of those of S. Helena and S. Constantia, near Rome, it was at some Mediæval period dedicated as a church, S. Maria Rotonda, but is now again left to silent solitude, having been long since robbed of the sarcophagus in which Greek bigotry would not grant the repose of the tomb to an Aryan sovereign. A decagonal structure of marble, it rises with an upper storey on a high basement, at each of whose ten sides opens a deep recess under a semicircular arch; the interior, reached by two outer staircases added in 1780, is circular and quite plain, lighted by small windows opening near the summit between a simple band and a cornice, and roofed by a stupendous cupola one solid mass of Istrian stone, measuring in diameter 10·4 metres, from the base to the summit 4·5, in thickness 1·44; weight estimated at more than 200 tons, and by Ricci at 4,000,000 Roman lbs., about equivalent to that of 18,000 or 20,000 men in the scale together. Not, indeed, a beautiful but a striking object, this extraordinary tomb rises among woods at a short distance from the city, where a sylvan scene of quiet loveliness surrounds the monument of eventful history and perished nationality. It is popular belief that a huge porphyry urn like an antique bath, found near the outside of this building, and now standing below the ruins of Theodoric's palace in a street, is the violated tomb of that prince, but authorities decide against this local tradition; as also against the idea that the lost sarcophagus had stood on the summit of that massive cupola, the interior being its suitable place.

Coloured Sculpture.

In one of the dialogues of the fourth book of Plato's "Republic," Socrates, who was not only the son of a sculptor, but for some time himself wrought at the profession, is made to remark:—"Just as if when painting statues a person should blame us for not placing the most beautiful colours on the most beautiful parts of the figure—inasmuch as the eyes, the most beautiful parts, are not painted purple, but black. We should answer him by saying, 'Clever fellow, do not suppose we are to paint eyes so beautiful that they should not appear to be eyes.'" This passage alludes to the painting of statues—the word for

statue being *andrias*; but it does not say that the flesh was painted, nor that these were marble statues which were so treated. We ourselves in our towns possess painted statues of wood, as in those of that distinguished North Briton of which we still remark images in some of our old snuff-shops. The Greeks also, as Pausanias informs us, had in their gardens and groves figures of plaster and wood which were painted. By this people, however, without doubt, many statues were painted of a much higher order than these, and even occasionally those of their gods. Another remarkable passage from the ancient authors, brought to bear on this subject by the polychromists, is that from Pliny (lib. xxxv. cap. 2), in which he says, speaking of Nicias the encaustic painter, that Praxiteles, the great Athenian sculptor, when asked which of his marble works best satisfied him, replied, "Those which Nicias has had under his hands." So much," says Pliny, "did he prize the finishing of Nicias" (*Tantum circumlitioni ejus tribuebat*). Now the whole force of this passage turns upon the meaning of the word *circumlitio*. In the dictionary this word is translated "polishing," as indeed its derivation points out. But the polychromists say that Praxiteles could not have meant polishing. Nicias, they say, was an encaustic painter, i.e. one who painted in wax, laid on with heat; and that, therefore, *circumlitio* must have meant painting the statues in encaustic. This statement, however, contains no evidence, and may be taken as an example of what is called "begging the question." A little circuit perhaps may bring us round to a truer explanation of the passage. At times of festivity the Greeks delighted to oil their bodies, as did the Romans also—a somewhat barbarian practice, as it seems to us now, but so they did. To give a similar shine and gloss to their statues they occasionally waxed them, as the Romans did also. Nicias, as no doubt he used the best wax for his pictures, may probably have superintended this process for such of Praxiteles's statues as that sculptor prized the most; and there ends the whole story, for not a word is said about colour in it. Moreover, the question put to Praxiteles was rather a searching one, "Which of your statues do you like the best?" Also a direct answer might have given offence in some quarters. Thus however did he parry it gracefully by saying, "Those which Nicias has had under his hands." The whole misapplication of this passage seems to arise, not from what Praxiteles himself said, but from what Pliny has volunteered—*Tantum circumlitioni ejus tribuebat*—"So much did he attribute (or ascribe) to the polishing of Nicias." The truth is that it was as pretty a *captandum* speech—one such as Pliny loved to record, and as such has been handed down with a force and meaning attached to it to which examination shows it has no claim.

Art and Race.

The external world or globe we inhabit may be looked on as composed of two classes of objects—one great class invented by man, the social arts, as they are called; of a second great class of objects formed, created, or developed by nature. The objects made and invented by man constitute a large portion of human civilisation, and, indeed, without them civilisation does not exist. As wealth and the civilisation mainly occupied with the invention of the social arts advance, the nation and race recede further and further from nature, according to the disposition of the race; for nature's objects they substitute the artificial, their own inventions; and this may go on, as in China, until nature be all but put out of court. A race strongly disposed to admire their own inventions are generally despisers of nature and of truth, which resides only in those objects which nature forms. Thus, in estimating the character of a race, we have only to discover from what point of view they contemplate the material or external world; what value they attach to their own inventions, and what to nature's creations. The arts which man invents, and which so many races and individuals of all races admire and esteem beautiful, are constructed on principles addressed to certain faculties and instincts of the human mind which man values highly. They are addressed to his love for parade and magnificence, order, symmetry, grandeur, nicety of workmanship, difficulty of execution. When the objects thus invented and carried to perfection are presented to him, he calls them beautiful, esteeming them highly as the perfection of human handiwork. But he never imagines that there can be any truth in them excepting the mechanical, and he does not look for truth, knowing that utility is their aim. As regards all such inventions there is no standard of taste, each generation despising the inventions of the past, and more especially of the labours of the immediately preceding age. The reason why each generation when in its prime and vigour despises the inventions, thoughts, ideas, actions of the immediately preceding generation more than any more ancient one is this: the generation about to depart is before them in a senile, feeble, decaying and decrepit form, and the thoughts of the young and vigorous naturally class together the declining race and their inventions. In the presence of the aged and enfeebled everything connected with them, mentally or physically, seems redolent of antiquity—

dress, thoughts, inventions. It is not so with the generations which have passed away, of whom we are more likely to remember whatever was vigorous, youthful and great. But in contemplating nature's creations, and the imitations of such objects by the true artist, whether in marble or on canvas, the highly organised mind sees in the object the truth of nature, and demands in the imitation by the artist the presence of beauty and of truth. He is sensible that man cannot alter, cannot improve, although he may disfigure, nature's creations.

Patents for Inventions.

Invention is civilisation. The inventor is the first man in the world; for he makes something out of nothing, gives a value to what was valueless, motion to inert masses, power to weakness. Watt, in imprisoning steam in a cylinder, has given England fifty millions of hands; nature had not furnished her with this immense appliance. All which exists on the side of brute nature is the work of invention. Inventors seek out and find new processes, simplify mechanism, diminish bodily labour, shorten distances, explain phenomena, subdue the elements and transmit them tractable and powerful into the hands of men. They are the head and soul of a nation; without them there can be neither progress, nor riches, nor power. The country which possesses the most of them renders its neighbours tributary and subservient to itself. Other nations will buy its books, pictures, designs, colours, stuffs; they will require also its laws, regulations, plans; they will visit its monuments, depositories, schools—for all this is so much invention. Mind works equally in the arrangement of a chart or a poem, a picture or an art; while one genius combines parts of machinery, another arranges hemistichs and rhymes, lines and colours, black and white. The people which have no contriving powers are savage, and they remain so until the inventor civilises them. Cadmus, Triptolemus, Oannes, Moses, Mohammed, Leibnitz, were inventors. An idea is the property of him who first possesses it. It belongs to him, were it only by the natural right of the first occupant. He has the power to promulgate or to conceal it. It belongs to him with a juster title than the field or the forest, which may be inherited; for, if you had neither your field nor forest, another would enjoy it; you have not made them, but the inventor has made his discovery. Every invention or importation constitutes an addition to the common stock, since it will employ workmen, make things useful, revive commerce and industry, bring in foreign capitalists or prevent our own from going to seek other products elsewhere. The office of patents ought to be simply the body corporate of inventions. A patent there deposited is nothing else than fixing a determined date, which ought not to cost more than the inscription of the birth of a child. Inventors and importers, who place their industry under the protection which the law offers them, have then a right to the protection and the encouragement of every government which comprehends its own interests and those of the people whom it governs; it would be shameful to deprive them of it in countries where alien laws and confiscations are abolished. The smaller a country is the more ought it to offer facilities and attractions to inventors, in order to induce them to endow it with their industry. If they only find dislike and opposition on the part of the rulers, not only do they retire, but even the inhabitants themselves of that very country convey the product of their own industry where it meets with encouragement; for it must be allowed that the successful alone have a country, all other persons are cosmopolites.

GENERAL.

The Exhibition of Paintings by the late Sir J. E. Millais will be opened at the Royal Academy on Monday next.

A Site has been purchased in Luton for the erection of a theatre at a cost of 14,000*l*. The local authorities have approved of the plans.

The National Gallery and Tate Gallery will not be opened on Sundays during the winter, but it is likely the Sunday opening will henceforth be continued until the end of October.

Messrs. Mallows & Grocock having obtained first place in the competition for the Newark School of Art have been appointed architects for the building.

Mr. M. W. Carr has been appointed consulting engineer to the Agent-General in London for the Colony of Natal.

The Imperial Household Department of China has lately memorialised the Throne asking permission to build a light railway between Peking and the Imperial mausolea. It appears that every time a member of the Imperial family or the harem dies it costs the Department some 300,000 taels to 500,000 taels to transport the remains to the mausoleum, whilst in the case of a deceased emperor or empress dowager no less than 2,000,000 taels are usually expended for transport purposes, &c. Hence the idea of a railway is to save such exorbitant expenses, and it is believed that the Emperor will sanction the scheme.

INDEX.

Articles:—

"A. A." Lyric Club, 302
America, Government Competitions in, 94
Antonelliano, the Mole, 76
Antwerp Cathedral, High Altar, 217
Arch in Roman Architecture, the, 327
Archæology and Physical Science, 137
Archæology in Wales, 395
Architectural Association, 251, 275, 314, 372, 409
Architectural Association of Ireland, 7, 287
Architecture and Subsidiary Art, 247
Art in Churches, 395
Art in the Colonies, 340
Art in the Departmental Schools, 121
Art of the Indians of British Columbia, 148
Arts and Crafts in Geneva, 181
Athens, British School at, 53
Atmosphere in City Churches, 183
Augustine Celebration, the, 5, 22
Babylonia, Explorations at, 11
Barge of Tiberius, 231
Battenberg Memorials, 221
Bebington Church Restoration, 112
Bedford Castle, 187
Berks Archæological Society, 23
Bermudas, the, 160
Birmingham Baths, 167
Birmingham General Hospital, 240
Birmingham Telephone Exchange, 206
Bogey of the Studio, the, 404
Bough, Sam, 149
Brook Hospital, the, 87
Brussels Exhibition, 231
Brussels Exhibition, British Art at, 102
Burghele, Antiquities of, 70
Byzantine Architecture, 397
Cambrian Archæological Association, 151
Canterbury School, 163
Carved Communion Tables, 222
Cassiobury, 170
Chantrey Bequest, 85
Christ Church, Birmingham, 382
Christ's Hospital, Horsham, 55
Church Bells, 215
Churches on the East Coast, 190
Clergy and Artists' Association, 62
Colour Photography, 396
Columns, Strength of, 134
Departmental Museums, 102
Design in Lettering, 221, 238, 245, 267
Devon and Exeter Architectural Society, 318
Disinfecting Processes, 204
Druidical Remains at Blair Atholl, 334
Dundee Institute of Architecture, 206
Edinburgh Architectural Association, 55, 341, 415
Edinburgh Architectural Society, 317, 381, 415
Edinburgh Buildings, 183
Electric Currents and Building Materials, 310, 371

Articles—continued.

Electrical Energy, Distribution of, 389
Electricity, Street Lighting by, 37
Electricity Supply Meters, Variation of, 162
Elstow Church, 150
English Seals, 71
Entasis in Italy, the, 117
Essex Archæological Society, 270
Examinations in Architecture, 255
Fever Hospital Construction, 199
Fire in Museums, Protection against, 347
Fire Protection, 340
Flodden and Ford, 189
Folklore of the House, 159
Franks' Bequest, the, 55, 75
Furniture Exhibition, Bethnal Green, 126
Glasgow Archæological Society, 415
Glasgow Architectural Association, 199, 279, 318, 342, 396
Glasgow Ecclesiastical Society, 372
Glasgow Institute of Architects, 311
Glasgow Philosophical Society, 396
Glastonbury, Prehistoric Lake Village, 286
Government Laboratory, 239
Government Offices, Sites for, 111
Greek Rose, the, 44
Hellenic Society, the, 309
Historic Places, Preservation of, 45
Honours for Artists, 55
Indian Art Society, 404
Kilham, Graves at, 61
King's College, 231
Knox, John, Birthplace of, 157
Land, Value of, in England and Scotland, 27
Law in Taste, 359
Leeds and Yorkshire Architectural Society, 358, 391
Leeds Atmosphere, 205
Leeds, New Building Laws for, 303
Liskeard Church Tower, 261, 381, 414
Liverpool Architectural Society, 231
Louth Archæology, 45
Marine Salt in Plaster, 119
Masonry Arches, Stability of, 190
Matabeleland, Ruin in, 206
Megolithic Builders, 132
"Merlin and Nimue," Purchase of, 283
Mexican Federal Palace Competition, 86
Millais, Art of Sir J., 359
Municipal Electrical Association, 19
Municipal Engineering, 202
National Portrait Gallery, 415
Newcastle Infirmary Competition, 134
Non-inflammable Wood, 23
Northern Architectural Association, 350
Norwich, Archæology of, 285
"Old Mortality," 381
Oldest House in Glasgow, the, 133
Ordnance Survey, the, 159
Parthenon, the, 118, 198
Perth Architectural Association, 327

Articles—continued.

Peterborough Cathedral, 167
Photography and Exploration, 263
Pompeii, Pantheon of, 45
Professional Practice in America, 335
"Provan's Lordship," 183
Public Libraries, 54
Pulverbatch Castle, 165
Raphael, in Urbino, Statue of, 150
Reading New Post Office, 206
Renaissance Architecture, 228, 242
R.L.B.A., 9, 293, 325, 390
Roman Administration in England, 119
Roman Country House, the, 58
Roman Orders of Architecture, 317, 332
Royal Academy Prizes, 391
Royal Archæological Institute, 95, 141, 153
Royal Architectural Museum, 42
St. Albans Architectural and Archæological Society, 150, 169, 187
St. Botolph, Carlton-in-Cleveland, 271
St. Nicholas Chapel, Little Coggeshall, 382
St. Paul's, Bedford, 169
Sanitary Congress, 185
Science and Art Schools, 111
Sculpture at Glasgow Art Galleries, 286
Sheffield Society of Architects, 14, 327
Smoke Ducts in Ancient Houses, 283
Society of Antiquaries of Scotland, 396
Society of Arts, 309
Somersetshire Archæological Society, 108, 124
South Kensington, Cataloguing at, 378
Stained-Glass Windows, 23
State, the, and Technical Education, 42
Structural Temples, 171
Sussex Archæological Society, 7, 54
Technical Education in Architecture and the Building Trade, 73
Tewkesbury Abbey, 415
Tombs of Hungarian Kings, 255
Tonbridge, Kent, 219

Contract Reporter:—

Alexandra Theatre, Dec. 31
Alresford Parish Church, Oct. 1
American Tendering, Dec. 17
American v. Glasgow Tenders, Oct. 22
Ancient Churches, Restoration of, Sept. 20
Annan Engineering Works, Dec. 3
Artistic Interiors, Dec. 24
Artistic Ironwork, Oct. 29
Artistic Steel Work, Sept. 10
Asphalte Paving, Dec. 24
Association of Sanitary Inspectors, Aug. 20, Nov. 12, Nov. 19, Dec. 10
Back-to-Back Houses, Oct. 1
Bars in London Streets, July 2
Battersea Park Embankment, July 2

Contract Reporter—continued.

Bilston Waterworks and School, Aug. 27
Birkbeck Building Society, July 9
Birmingham Improvements, Aug. 27
Birmingham Master Builders' Association, Dec. 3
Birmingham Meat Market, Oct. 29
Birmingham New Baths, Aug. 13
Birmingham Society of Junior Engineers, Nov. 26
Blackpool Alhambra, Sept. 10
Bombay, Reconstruction of, Oct. 29
Bordighera and San Remo, July 2
Borough Road Polytechnic, Dec. 31
Bradford Church Restoration, Oct. 1
Brighton, Artisan Dwellings, Oct. 8
British Steel Industry, Oct. 22
British Trade Development, July 23
Builders' Benevolent Institution, July 30, Dec. 3
Building Construction and Public Health, Nov. 5
Building Construction Examinations, Oct. 22
Building in Rome, Oct. 22
Building Land Sale, a, July 2
Building Societies' Property, Aug. 27
Campbelltown Free Library, Sept. 3
Campsbourne School, Hornsey, Oct. 29
Can Buildings be Made Fireproof? Nov. 26, Dec. 3
Carpenters' Company Prizes, Aug. 13
Carr's Lane Chapel, Birmingham, July 16
Cement Paving Tiles, Oct. 15
Central London Railway, Nov. 5
Chat Moss, Sept. 10
Cheddleton Asylum, Fire at, July 9
Chelsea Polytechnic, Oct. 1
Christ's Hospital, New, Oct. 29
Church Building Society, Dec. 24
City and Guilds Institute, July 30
City Lunatic Asylum, Nov. 12
Cloughton's Flushing Cistern, Oct. 22
Collins's, Dec. 31
Conciliation Act, the, Aug. 6
Concrete Arch, a, Oct. 29
Cost of an Indian Earthquake, Nov. 12
County Council Estimating, Nov. 26
County Council Works Department, Oct. 22
Cripplegate Fire, the, Dec. 3, Dec. 10, Dec. 17, Dec. 24, Dec. 31
Cripplegate Improvement, Dec. 17
Crystal Palace School of Engineering, Aug. 20, Dec. 24
Dantzig Timber Trade, Oct. 29
Darlington, New Parochial Hall, July 2
Deptford, New Theatre, Dec. 24
Dilatory Workmen, Nov. 19
Doulton, Life-Work of the Late Sir H., Dec. 3
Dover, National Harbour, Sept. 10
Drainage Boards, Responsibilities of, Nov. 12
Dublin, New Theatre Royal, Dec. 10
Eastbourne Building Regulations, Oct. 1

Contract Reporter—continued.

Eastbourne, By-laws in, Nov. 12
 Eastbourne, Cheap Schools, Oct. 1
 Edinburgh and Leith, New Gasworks, Nov. 19
 Edinburgh Asylum, New, Nov. 5
 Edinburgh, Building Problem, Oct. 1
 Edinburgh Infirmary, New Pavilion, Nov. 5
 Edinburgh, New North Bridge, Sept. 24
 Engineers, Education of, Aug. 27
 Egypt, Contracts for Girder Bridges, July 16
 Egyptian Irrigation, Dec. 31
 Engineering Classes, Liverpool, July 16
 "Extraordinary" Traffic, July 30
 Extras on Contracts, July 30
 Fire, Prevention of the Spread of, Dec. 31
 Fissure in a Reservoir, Nov. 12
 Forestry in India, Sept. 3
 German Flats, Dec. 17
 Glasgow Cathedral, Nov. 19
 Glasgow Corporation and "Betterment," Aug. 27
 Glasgow, New Churches in, Dec. 31
 Glass Colouring by Penetration, Aug. 27
 Government Offices, Proposed, Dec. 31
 Government Property, Rating of, Aug. 20
 Great Central Railway, the, Aug. 13
 Greenwich Tunnel, Nov. 26
 Grove Academy, Broughty Ferry, July 23
 Hastings, New Sanatorium, Nov. 12
 Health Exhibition, Sept. 24, Oct. 1
 Highgate Archway, Rebuilding of, Aug. 27
 Home Granite and Foreign Stones, Nov. 12
 Hull Docks Scheme, Dec. 3
 Impeding Workmen, Nov. 12
 Institute of Civil Engineers, Oct. 1, Nov. 5
 Institute of Iron and Steel Works' Managers, Oct. 22
 Institute of Mechanical Engineers' Jubilee, July 30
 Institution of Junior Engineers, Nov. 12
 Irish Channel Tunnel, Aug. 20
 Irish Lunatic Asylum, an, Nov. 19
 Iron and Steel Construction, Aug. 20
 Iron and Steel Institute, July 2
 Jewish Settlement in Essex, Aug. 27, Sept. 10
 Killin Sewage Works, July 30
 Labourers' Cottages, Sept. 10
 Lambeth Baths, Opening, July 16
 Lancashire, Electric Lighting, Oct. 8
 Lancashire, Rental and Land Values, Oct. 1
 Landlords and Sanitary Inspectors, Sept. 24
 Landsides on Railways, Dec. 24
 Laundry Machinery Exhibition, Sept. 3
 Lead Pipes and Water Supply, Oct. 8
 Leeds Association of Engineers, Oct. 8
 Leith New Dock Works, July 9
 Liberator Estates, the, July 2
 Liverpool Docks, the, Oct. 15, Oct. 22
 Liverpool Electric Railways, Sept. 10
 Liverpool Electric Supply, Sept. 17
 Liverpool Engineering Society, July 2
 Liverpool, Royal Court Theatre, Aug. 20
 London Asylum Accommodation, Nov. 12
 London Board School Buildings, Aug. 20
 London Building Act, Sept. 3, Nov. 26
 London County Council and Contractors, Dec. 3
 London County Council Works Department, Dec. 17
 London, New Schemes for, Dec. 3
 London, Proposed Municipalities for, Dec. 31
 London School Board and the Auctioneers' Institute, Nov. 12
 London Works Committee, Nov. 12
 Manchester Sewage Culvert, Oct. 15, Dec. 3
 Manchester Sewage Disposal, Oct. 8
 Marchioness of Lorne as Architect, July 30
 Merchandise Marks Act, Sept. 24
 Metropolis, Control of the, Aug. 20
 Metropolitan Asylums Offices, Dec. 24
 Metropolitan Building Act, the, Sept. 3
 Metropolitan Music-hall, Dec. 24
 Metropolitan Water Supply, Nov. 19, Nov. 26
 Mungo Nasmyth, Dec. 17
 Municipal Engineers' Conference, July 16
 Municipal Engineers, History of, Nov. 26
 National Association of Master Builders, Sept. 17
 New Line to London, Nov. 19

Contract Reporter—continued.

Northern Polytechnic, the, July 23
 Norwegian Tenders, July 9
 Novel Irish Railway, Dec. 17
 Observation Tower, Great Yarmouth, July 23
 Paints for Iron and Steel, Nov. 5
 Park Hospital, the, July 16
 Patent Law, the, Sept. 17
 Patent Victoria Stone, Sept. 17
 Patents for Inventions, Nov. 5
 Pavement Lights in Birmingham, Dec. 10
 Penalties in Contracts, Sept. 3
 Petrifiers, Dec. 3
 Plumbers' Examination, Dec. 10
 Plumbers, National Registration of, Oct. 8
 Plumbers' Registration Bill, July 2
 Pneumatic Despatch Tubes, Nov. 5
 Poona, Condition of, Oct. 29
 Post Office Sites Bill, July 30
 Proposed Electric Railway, Dec. 31
 Public Health Act, Aug. 27
 Public Works in Sicily, July 9
 Pycombe Church, Aug. 13
 Railway Bridges and Abnormal Loads, Sept. 17
 Railways in Japan, July 23
 Richmond Old Deer Park, Oct. 15
 River Banks, Protection for, Oct. 22
 Riviera, Sanitation of Houses, Sept. 24
 Rock Out Tombs, July 30, Aug. 6, Aug. 13
 Rome, Tramways in, Oct. 8
 Rowton Houses, Dec. 24
 Royal Cambridge Music Hall, Dec. 31
 Russia, Building Industries, Oct. 1
 Russian Canal, a, Oct. 15
 Safety Windows and Fittings, Dec. 3
 Sanderson's Swing-front Camera, July 30
 Sanitary Congress, Sept. 10
 Sanitary Inspectors' Association, Oct. 8, Nov. 12
 Sanitary Inspectors' Conference, Oct. 29
 Sanitary Institute, Aug. 13, Sept. 24
 Sanitary Institute at Leeds, Aug. 20
 Scottish Church, a, July 16
 Scottish Churches, Repairing or Rebuilding, Aug. 20
 Seaford Bay, July 23
 Separation of Buildings, Sept. 24
 Sewage Purification, Developments in, Sept. 3
 Shoreditch Electric Lighting, July 2
 Slag Wool, Dec. 17
 Society of Engineers, July 23, Oct. 15, Dec. 10
 Speldhurst Church, Nov. 26
 Stewart Arc Lamp, Dec. 24
 St. Luke's Church, Formby, July 2
 St. Stephen's National Schools, Nov. 5
 Straightening a Church Spire, Oct. 8
 Studley Castle Estate, the, Oct. 15
 Surbiton Municipal Buildings, Dec. 10
 Swedish Granite, Oct. 29
 Talla Reservoir, the, July 2
 Technical Teachers, Training of, July 16
 Temporary Accommodation for Workmen, Sept. 17
 Todmorden Free Library, Dec. 3
 Uganda Railway, July 30
 Uniform Safe Loads for Building Floors, Nov. 19
 Wall-Papers, Arsenical Poisoning by, Oct. 1
 Water Supply and Epidemics, Dec. 24
 Water Supply in Rural Districts, Oct. 1
 West Australian Casket, the, July 2
 Whitworth Scholarships, Aug. 20
 Window Cleaning Accident, July 9
 Wireless Telegraphy, Sept. 17
 Wm. Wallace & Co., Oct. 15
 Wood Paving in London, Sept. 3
 Wooden Enclosures, Oct. 8
 Woods and Forests, Nov. 12
 Workington, St. John's Church, Sept. 24
 York County Hospital, Oct. 1

Correspondence :—

Accident to Drury Lane Stage, 224
 Aspect of Buildings, 288
 Cripplegate Fire, the, 352, 368
 Cutting-off Gas Supply, 384
 General Post Office, Lift Accident, 240
 Illumination of St. Paul's, 16
 Kingston Theatre, 304
 Liskeard Church Tower, 16, 32, 64, 80
 Nude in Greek Art, the, 96, 112, 123, 144, 160
 Paris International Fire Prevention Congress, 80
 Procedure at the R.I.B.A., 48
 Royal College of Art, 256
 Shoddy v. Fireproof Construction, 368

General :—

16, 32, 48, 64, 80, 96, 112, 128, 144, 160, 176, 192, 208, 224, 240, 256, 272, 288, 304, 320, 336, 352, 368, 384, 400, 416, 432

Illustrations in Text :

Abbey Church, Laach, 265
 Architectural Association, 275, 276
 Canterbury Cathedral, 3, 52, 56
 Chichester Cathedral, 313
 Erfurt Churches, 405
 Gernrode Abbey, 407
 Halberstadt, Dom, Exterior, 299
 Halberstadt, Dom, Interior, 235
 High Altar, Cathedral, Antwerp, 217
 Hôtel de Ville, Antwerp, 197
 House of the Plantin Family, Antwerp, 201
 Liskeard Church, 31
 McEwan Hall, Edinburgh, 377
 Mexican Federal Palace Competition, 86
 Naumburg Cathedral, 249, 346, 347
 Rubens, Statue of, Antwerp, 213
 St. Godehard, Church of, Hildesheim, 234
 St. James's Church, Goslar, 297
 St. Martin, Halberstadt, 281
 St. Mary-in-Meadows, Soest, 250
 Senams of Tripoli, 291, 292
 Sinzig Parish Church, 267
 Statuary for New Market, Sydney, 39
 Street Corner, Hildesheim, 233
 Tournai Cathedral, 345

Leading Articles :—

A Seventeenth-Century Amateur, 226
 Accumulator Traction on Rails and Ordinary Railways, 355, 405
 Antwerp, Hôtel de Ville, 196
 Architectural Assessorship in America, 290
 Arts, the, and Civilisation, 180
 Birmingham Baths, 167
 Birmingham Old Library, 279
 British Museum, 203
 "Broken Contract, The," 358
 Burckhardt, Jacob, 146
 Burton, Robert, as a Sanitarian, 342
 Canterbury Cathedral, 2, 18, 25, 35, 41, 52, 67, 121
 Cavalcaselle, G. B., 309
 Chichester Cathedral, 313
 City Fire, 338
 Conciliation and Strikes, 83
 Dickens and Building, 402
 Ecclesiologia Germanica, 233, 249, 256, 281, 297, 345
 Electric Cabs, 147
 Electric Lighting, Aids to the Extension of, 4
 Electric Tramways, 179, 195, 212, 244, 259, 307, 323
 Electric Wiring, 100
 Electrical Distribution Schemes, 50
 Electrical Energy, Wiring for the Supply of, 115
 Electrical Power Installations, Fire Risk of, 403
 Electricity, Dangers connected with the Supply of, 85
 Gallery of Apollo in the Louvre, 98
 Greek Colour Sense, the, 258
 Groined Vaults, 26
 Ireland, Public Works in, 274
 Lighting of Small Districts, 68
 Liskeard Church Tower, 218
 Lucon Cathedral, 211
 McEwan Hall, Edinburgh, 377
 New South Wales, Geology in, 339
 Pantheon, Paris, the, 93
 Pearson, J. L., 386
 Plantin, House of, at Antwerp, 201
 Raeburn, Sir Henry, R. A., 35
 Renaissance Architecture in England, 242
 Representation and Description, 181
 Rubens and Antwerp, 212
 Ruskin, French Criticism of, 194, 210
 Sanitation and Construction, 197
 Science and Art Department's Report, 114
 Sculpture, an Inventory of Ancient, 50
 Sculpture, Limits of, 13
 Society of Arts Examinations, 57
 South Kensington, Completion of, 329
 South Kensington, Forgeries at, 301

Leading Articles—continued.

South Kensington Loan Collection, 306
 South Kensington, Purchase System, 393
 Statuary, Production of, 20
 Sydney, Proposed New Houses of Parliament, 34
 Sydney, Statuary for the New Markets, 39
 Technical Education, Influence of Examinations on, 91
 Wallace Collection, the, 89, 105
 Warehouse and Factory Fire Dangers, 356

Legal :—

Bligh v. Rathangan River Drainage Board, Nov. 12 *
 Brown v. Ponting, 273
 Clarke v. London, Sept. 24 *
 Dicksee v. London School Board, 241
 Phipps v. McQueen, 1
 * Contract Reporter.

Notes and Comments :—

Académie des Beaux-Arts, 104
 Accidents to Workmen's Bill, 8
 Alterations in Tenders, 152
 American Architecture, 280
 American National Sculpture Society, 56
 American Tools, 136
 Architects' Estimates, 216
 Architectural Association Holidays, 120
 Architectural Competitions in America, 232
 Artists' Club in Paris, 24
 Arundel Society, 8
 Basalt, Experiments with, 136
 Books Forthcoming, 184
 Books on Chippendale and Sheraton, 200
 Bourget, Paul, 8
 Bow, Craft School, 248
 British Fire Protection Committee, 376
 Brouse, Fall of Cupola of Church, 120
 Brown University, Bequest to, 424
 Brussels Exhibition Awards, 72
 Building in Boston, U.S.A., 168
 Burges, Admiral, Monument of, 40
 Burnet, John, 24
 Busts of the Queen, 8
 Carnoustie Church Alterations, 280
 Casts in Museums, 232
 Chinese Builders, 216
 Church of Ireland Training College, 328
 City and Guilds of London Institute, 312
 Cour des Comptes, 296, 312, 344
 Couture, Thomas, 184
 D'Aumale, Death of Duc, 120
 Defective Drains, 344
 Detaille, Edouard, 72
 Deterioration of Paris Buildings, 344
 Disney Professorship, the, 424
 Doulton, Sir Henry, 328
 Ecole de Médecine, Paris, 8
 Egypt, Iron and Steel Bridges, 88
 Firemen at the British Museum, 296
 French Churches Conservation, 216
 French Medalists, 376
 French Public Building Restoration, 120
 French Tiles, 8
 Garnier, Charles, 200
 Glasgow Royal Infirmary, 408
 Goldsmiths in Paris, 184
 Harrison Capitol Competition, 360, 408
 Heage Parish Church, 264
 Housing of the Poor, 120
 Institute of Painters in Water-Colours, 264
 Iodine and Altered MSs., 104
 Joliet, M., 232
 Kilmallock Castle, 344
 Lion at Lucerne, the, 424
 Lion of St. Mark, the, 424
 Lianebelig Church, 392
 London and Paris Fire Combination, 328
 London County Council Statement, 56
 Manchester Art Gallery, 152
 Medieval Architecture, Paris, 40
 Metropolitan Water Supply, 376
 Minnesota Capitol, 200
 Mont St. Michel Railway, 296
 Morris Columns, Paris, 24
 Murillo's Picture at Copenhagen, 168
 Musée Carnavalet, 200
 Napoleon as Architect, 360
 Napoleon's Art Spoils, 392
 1900 Exhibition, 216, 312
 Nobel's Will, 184
 North Bridge Improvement, 264
 Old Stained-Glass, 360
 Opéra-Comique, Paris, 56

Notes and Comments—continued.

Ownership of Building Materials, 408
 Painters' Company Studentship, 350
 Paisley Building Law, 200
 Palais de l'Industrie, 56
 "Pan-American" Exhibition, 152
 Paris Art Exhibitions, 1898 and 1899, 328, 376
 Paris Heraldic Device, 408
 Paris, La Commission du Vieux 424
 Paris Observatoire, 248
 Paris, Premium on Good Building, 392
 Pavillon Marson, Louvre, 392
 Pearson, J. L., 424
 Perth Architectural Association, 376
 Peterborough Cathedral, 376
 Photographs and the British Museum, 392
 Photography and Geology, 152
 Pictures in France, 184
 Poore's, "The Dwelling-house," 280
 Public Health Act, 72
 Pulszky, Herr, 184
 Rabelais, 72
 Reid, Hugh, Bequest, 232
 Renan, Ernest, 88
 Rhind Lectures, 312
 Royal School of Art Needlework, 360
 Rue Jean Goujon Fire, 136, 152
 Ruskin's "Bible of Amiens," 328
 Russian Theatres, 232
 St. Andrew's, Bradford, 376
 St. Front, Périgueux, 168
 Sheffield Competitions, 408
 Shoppee, Charles John, 344
 "Standard Samples of Painters' Work," 248
 Steel in America, 376
 Stephens, E. B., 328
 Société Nationale des Beaux-Arts, 312
 Sorbonne, Demolition of the, 248
 South Kensington Museum, 24, 40
 Strasburg Library, 152
 Tall Buildings in America, 248
 Tate Gallery, the, 40
 Temple of Niké Apteros, 408
 Upton Lunatic Asylum, 344
 U.S.A. Supervising Architect, 120, 392
 Venice Exhibition, Awards, 168
 Vesta, Goddess of Fire, 280
 Wales and the National Flag, 104
 Whitworth Institute, Manchester, 88

Reviews:—

Asbestos and Asbestic, 98
 Canon, the: An Exposition of the Pagan Mystery perpetuated in the Caballa as the Rule of all the Arts, 354
 Ecclesiastical Architecture of Scotland, the, from the Earliest Christian Times to the Seventeenth Century, 370
 Hill of the Graces, the, 291
 Historic Ornament, 198
 History of Renaissance Architecture in England, 1500-1800, 242
 Lectures on Art, 82
 Library Construction, Architecture, Fittings and Furniture, 260
 Modern Architecture, 418
 Modern Opera-houses and Theatres, 66
 Windows, 386

Tesseræ:—

Æsthetic Qualities, 342
 Ancient Art, Study of, 15
 Ancient Camps, 271
 Ancient Ink, 399
 Apollodorus the Architect, 79
 Archbishops' Chapel, Ravenna, 103
 Architecture, Consistency in, 431
 Architecture, Expression in, 416
 Aristion Relief, Athens, 46
 Art and Race, 432
 Art, Magnitude in, 384
 Art, Patronage of, in England, 366
 Art, Unity of, 288

Tesseræ—continued.

Association of Ideas, 320
 Athens, the Walls of, 192
 Babylon, the Walls of, 400
 Bologna, Towers of, 46
 Bronze Casting, 223
 "Bucentaur," the, 30
 Buildings, Proportions of, 304
 Burning Glasses, 223
 Canova's "Theseus," 367
 Castle Howard, 382
 Charlatans in Painting, 318
 Chile, Buildings in, 288
 Christian Art in the East and West of Europe, 383
 Clients, Duties of, 47
 Cologne, a Legend of, 287
 Colour, Sensations of, 271
 Coloured Sculpture, 431
 Coloured Statuary, 63
 Column of Phocas, the, 103
 Columns as Piers, 135
 Composition in Painting, 127
 Cooley, Thomas, 303
 Correggio, 320
 Curved and Straight Lines, 128
 Da Vinci and Correggio, 95
 Dominicans, the, as Artists, 223
 Early Fresco Painting, 319
 Early Surveyor's Guide, an, 304
 Egyptian Obelisks, 319
 English Art Prior to 1760, 342
 English Records, 343
 English Village Churches, 102
 Etruscan Art, 208
 Exiled Art, 256
 Facial Angle, the, 319
 Fire, Protection against, 48
 Freedom in Architecture, 192
 Freemasons' Hall, 368
 French Pulpits, 416
 Gainsborough and Cozens, 383
 German Towers, 32
 Geometry, Instruments and, 63
 Giotto, 207
 Girtton, Thos., as a Colourist, 127
 Glover, John, 319
 Gothic and Renaissance Construction, 96
 Gothic Cathedrals and Subsidiary Buildings, 400
 Gothic Revival, the, 175
 Grecian Art, 384
 Greek and Christian Art, 208
 Greek Architecture, 176
 Greek Coins, 272
 Greek Influence, 135
 Greek Measures, 47
 Greek Vases, 62
 Hogarth and the Foundling Hospital, 366
 Holbein as a Costume Painter, 383
 Hollar, Wenceslaus, 400
 Idealism and Art, 399
 Illumination of Manuscripts, 79
 Indian Ornament, 431
 Innate Ideas of Beauty in Building, 399
 Inspired Workman, the, 399
 Interiors, Proportions of, 383
 Invention in Painting, 176, 343
 Italian Memorials, 256
 Italian Villas, 207
 Jones, Inigo, as a Designer, 191
 King John's Tomb, 14
 Landscape Art, 383
 Latin Inscriptions, 320
 Lawrence, Sir T., 224
 Masaccio's Financial Position, 126
 Medals, Impressions of, 223
 Mediæval Art, 367
 Mediæval Heraldry, 272
 Memorial Brasses, 135
 Messene, Fortifications of, 79
 Metal Mirrors, 272
 Mezzo-Rilievo, 30
 Milan Cathedral, Interior, 102
 Monoliths, Removal of, from Quarries, 270
 Monte Cavallo, Equestrian Groups, 15
 Mouldings, 304
 Murillo, 383
 Museums, Origin of, 320
 Nero and his Architect, 342
 Ninth-Century Churches in Rome, 103
 Normandy Churches, Peculiarities of, 62
 Nude in Greek Art, the, 63
 Optical Delusions, 46
 Ornamental Pavements in England, 79

Tesseræ—continued.

Painting, Breadth in, 336
 Paintings at Carlton House, 367
 Palladio, 208
 Panathenæic Frieze, the, 47
 Paris Houses, 288
 Patents for Inventions, 432
 Pavian Romanesque, 343
 Pointed and Semicircular Arches, 128
 Points of View, 103
 Portraiture with the Romans, 336
 Pre-Raphaelite Reaction, the, 175
 Primitive Irish Churches, 416
 Prinsep, James, 207
 Pugin, A. W., on his Contemporaries, 176
 Raeburn's, Sir H., Daily Life, 14
 Renaissance Architecture, 62, 303
 Roman Buildings, 46
 Roman Campagna of Antiquity, the, 416
 Roman Grouping, 62
 Roman Lararium, the, 48
 Roman Monuments, 335
 Romanesque and Gothic, 78
 Roofs, Slopes of, 336
 Salisbury, 47
 Salvator Rosa, 303
 Schinkel, Karl, 270
 Scottish Fortresses, 271
 Seal Engraving, 343
 Sistine, "Last Judgment," the, 342
 Specific Style in Art, 191
 St. Albans Abbey, Early Bricks in, 78
 Stained-Glass at Winchester, 46
 Stothard's Early Days, 15
 Street Lighting, 63
 Taste and Architecture, 239
 Temples, Classification of, 175
 Theodoric's Mausoleum, 431
 Theories of the Beautiful, 63
 Thirteenth-Century Plans, 79
 Thirteenth-Century Windows, 96
 Thorwaldsen and Scott, 176
 Titian, the Style of, 336
 Unity and Variety, 398
 Vanbrugh, Sir John, 256
 Verona Cathedral, 207
 Villa Livia, the, 175
 Waaggen's, Dr., Opinion of Bath, 127
 Water-Colour Landscapes, 128
 Wells in Roman Churches, 96
 Westminster Abbey, 15
 Windows, Proportions of, 270
 Wolsey and Architecture, 95
 Wood Carvings, Decay of, 127
 Wren and Freemasonry, 366
 Wren on Gothic Architecture, 30

The Week:—

Académie des Beaux-Arts, 65
 America and the Smoke Nuisance, 97
 American Contracts, 33
 American Tenders, 209
 Ancient Monuments, 305
 Barcelona Exhibition, 337
 Bebington Church Roof, 129
 Bouvard, M., 417
 Bow Windows, 193
 Brighton Underground Railway, 305
 British Archaeological Association, 113
 British Association in Canada, 113
 Brown v. Ponting, 273
 Building Act, 1894, 385
 Building By-laws, 81
 Burgess, J. B., 321
 Californian University Competition, 113
 Cardiff County Council, 81
 Cardiff Town Hall, 65
 Caristie, Augustin, 81
 Chichester Cathedral, 145
 Christian Art Exhibition, 193
 City Footways, 209
 Civil Servants and "Stores," 161
 Cottage Homes, 97
 Cross, W. P., 369
 "Dangerous Structures," 273
 Devises Castle, 65
 Dicksee v. London School Board, 241
 Drain and Sewer, 353
 "Drain-Testing," 177

The Week—continued.

Dreux-Brézé Case, the, 321
 Dublin Theatre Royal, 305
 Effigies in Paris Churches, 369
 Egyptian Exploration, 305
 Electrical Generating Works, 17
 Esplanades, &c., at Watering Places, 1
 Evans, Sir John, 113
 Fall of a Wall in Dublin, 369
 Finsbury Improvement, 337
 Fitchett's Court, 241
 Flintshire County Council, 161
 Gautier's Monument, 241
 Gilbert, Sir John [225
 Glasgow and the Public Health Act, 17
 Glasgow Institute of Architects, 257
 Glasgow International Exhibition, 353
 Glasgow New Art Galleries, 97
 Gloucester Cathedral, 209
 Government Offices, 417
 Heine's Statue, 385
 Housing of the Working Classes, 273
 Irish Institute of Architects, 401
 Iron and Steel Institute at Cardiff, 97
 Lady Wallace's Will, 81
 Licata, Proposed Harbour, 33
 Light Railways, 161
 Liskeard Parish Church, 225
 Liverpool, City Engineer, 353
 Liverpool Rates, 145
 London Building Act, 289
 Lodon County Council and Water Supply, 17
 London County Council v. Schiefer, 97
 London County Council Works Department, 1
 London School Board, 33, 303, 353
 Londonderry Lunatic Asylum, 401
 Mather, William, on Strikes, 177
 Melbourne Fire, 417
 Menelek, King, 113
 McEwan Hall, 369
 Mexican Antiquities, 289
 MSS. at the Fine Art Society, 289
 National Gallery, Millbank, 33
 National Home Reading Union, 145
 National Portrait Gallery Report, 257
 New Jersey Statuary, 65
 New North Bridge, 193
 Newport Bisteddof, 81
 New York Windows, 129
 1900 Exhibition, 273
 Objets d'Art, 337
 Oxford Archaeological Society, 417
 Palgrave, Francis Turner, 273
 Paris Trees, 145
 Penrhyn Quarry Dispute, 129
 Phipps v. McQueen, 1
 Pole Memorial, Canterbury, 225
 Pont Alexandre III., 129
 Public Record Office, 193
 Pugin, Augustus Welby, 401
 Quarry Bank, 193
 Reading Art Gallery, 257
 Rochester Bridge, 337
 Roman Chester, 49
 Rosslyn Chapel, 417
 Rothesay Roman Catholic Cathedral, 33
 Royal Academy Lectures, 225
 Rubery Lunatic Asylum, 241
 Sanitary Congress at Leeds, 177
 Sanitation, Lectures on, 161
 "Sea Defences," 289
 Sheffield Society of Architects, 241, 385
 Silchester Excavations, 129
 Society of Antiquaries, 353
 Society of Architects' Jubilee Address, 49
 Society of Arts, 385
 Society of Designers, 369
 Society of Engineers, 385
 Society of Painters in Water-Colours 353
 St. Clement's Jubilee Profits, 177
 St. Paul's Bicentenary Service, 369
 St. Paul's Masonic Service, 257
 Streets, Disturbance of, 257
 Sussex Archaeological Society, 17, 145
 Thoulin, Charles Emile-Louis, 417
 Tissot's Christ, 241
 "Town and Gown," 49
 Trade of the British Empire, 177
 Trees in Streets, 321
 Walker Art Gallery, 273
 Washington Pension Office, 209
 What is a Work of Art? 321
 Widnes Technical School, 273
 Wilkie, Sir David, Memorial, 161

INDEX OF ILLUSTRATIONS.

*** THE LITHOGRAPHED ILLUSTRATIONS WILL BE FOUND OPPOSITE TO THE PAGES QUOTED.

All Hallows, Lombard Street, 104
 Alliance Insurance Offices, 296, 344
 Althorpe Park, 344, 360, 392
 Alverstoke, Clapham Common, 168
 Astley Hall, 424
 Berks County Cricket Club Pavilion, 72
 Birmingham, Doctor's Residence, 280
 Birmingham, Lionel Street, 280
 Birmingham, Steelhouse Lane, 136
 Birmingham, Workmen's Hall, 390
 Brixton, Free Library, 153
 Canterbury Cathedral, 9, 24, 40, 56, 72,
 88, 104, 121, 136, 153, 168, 184, 200, 216,

232, 248, 264, 280, 296, 312, 328, 344,
 360, 377, 392
 Castle Keep, Reigate, 392
 Church of the Sacred Heart, Cramond, 136
 Cottesmore School, Hove, 232
 Deepdene, Frimley Green, 424
 Devizes Castle, 408
 Hammersmith Town Hall, 264
 Her Majesty's Theatre, 184, 200, 216, 232
 Hôtel Métropole, Morecambe, 296, 312
 Imperial Institute, 153, 184, 200, 216
 Institute of Civil Engineers, 296, 360
 Kingston-on-Thames Theatre, 264

Leinster Water Works, Residence, 424
 McEwan Hall, 377
 Minterne Church, 248
 National Gallery of British Art, Mill-
 bank, 88, 104, 121
 Oldham Brewery, 153
 Pawson & Leafs, 168
 Presbyterian Church, Edinburgh, 344
 Railton, H., Sketches by, 104
 Reigate, New Schools, 328
 Rotherhithe Town Hall, 248
 Salisbury Cathedral, 408, 424
 Sheffield Municipal Buildings, 24

Spanish Synagogue, 312
 Stanley Palace, Chester, 168
 St. Augustine's Lady Chapel, 408
 St. Gabriel's, Willesden, 328
 St. John's College, 328
 Surrey County Hall, 280
 Swimming Bath, Kennington Road, 328
 Sydney House of Representatives, 40, 56,
 72
 Tasman, Tufnell Park, 72
 Tower Bridge Hotel, 280
 Wellington Primitive Methodist Chapel,
 408

ARCHITECTS AND ARTISTS.

Anderson, Dr. R. Rowand, 376
 Barry, Charles, 360
 Bassett-Smith & Day, 328
 Brown & Barrow, 232
 Colcutt, T. E., 153, 184, 200, 216
 Crouch & Butler, 280
 Davis & Emmanuel, 312
 Essex, Nicol & Goodman, 136, 280, 312, 360

Everard, J. B., 424
 Fairley Graham, 136, 344
 Ford, H., 168
 Heathcote, Charles, 296, 344
 Hickton & Farmer, 408
 Howell, C. H., 280
 Martin, H. & E., 296
 Mountford, E. W., 24

Murray & Foster, 248
 Phipps, Charles J., 184, 200, 216, 232, 364
 Railton, Herbert, 104
 Richardson, J. H., 261
 Rüntz, Ernest, 392
 Smith, Sidney R. J., 88, 104, 121, 153
 Taylor, Charles T., 153
 Tenison & Thornton, 248, 328

Tiltman, A. Hessel,
 Treadwell & Martin, 424
 Truefitt & Watson, 72
 Vernon, W. L., 40, 56, 72
 Webb, G. W., 72
 Withall, L. A., 280
 Wren, Sir Christopher, 104

THE Architect and Contract Reporter.

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BOOTLE.—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000*l.* Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

CONTRACTS OPEN.

ABERDEEN.—July 6.—For additions to offices, Middletack, Rathen, and, erection of dwelling-house forcroft of Tophead, Rathen. Messrs. Wilsone & Duffus, advocates, 146 Union Street, Aberdeen.

ABERTILLERY.—July 12.—For erection of a school to accommodate 250 girls. Mr. George Rosser, architect, Victoria Buildings, Abertillery.

BATLEY.—July 8.—For erection of branch stores in Carlinghow Lane. Mr. Walter Crawshaw, architect, Branch Road, Batley.

BEDMINSTER.—July 9.—For building stables in North Street. Mr. A. Bullock, 160 East Street, Bedminster.

BEETHAM.—July 10.—For alterations to vicarage. Mr. John F. Curwen, architect, Highgate, Kendal.

BELFAST.—For erection of two terrace houses in Park Road. Messrs. Henry Bros., Talbot Street, Belfast.

BELFAST.—July 6.—For alterations to infirmary wards Nos. 3, 4 and 5 of the workhouse. Messrs. Young & Mackenzie, engineers, Donegall Square E., Belfast.

BELFAST.—July 7.—For erection of two semi-detached villas at Eglantine Avenue. Messrs. Young & Mackenzie, Donegall Square E., Belfast.

BOSCOMBE.—July 12.—For erection of bank premises. Mr. Geo. M. Silley, architect, 17 Craven Street, W.C.

BOURTON-ON-THE-WATER.—July 24.—For erection of hall and reading-room. Messrs. Prothero & Phillott, Cheltenham.

BRADFORD.—For erection of St. Aidan's Church. Messrs. Preston & Vaughan, architects, Diocesan Chambers, Manchester.

BRIGHTON.—July 9.—For alterations and redecorations to the Municipal School of Art, Grand Parade. Mr. Francis J. C. May, Town Hall, Brighton.

BRISTOL.—July 7.—For erection of factory, Temple Street. Mr. Henry Williams, architect, 24 Clare Street, Bristol.

BURNLEY.—July 10.—For excavation, fence walling, forming of footpath, and all other work required in widening Simonstone Lane between Whalley Road and Valley Terrace. Mr. S. Edmondson, 18 Nicholas Street, Burnley.

CARDIFF.—July 10.—For alterations to 52 Charles Street. Mr. Edwin Seward, Queen's Chambers, Cardiff.

CLEATOR MOOR.—For building boundary wall 6 feet high, enclosing additional burial ground at St. John's Churchyard, The Churchwardens, Cleator Moor.

CONWAY.—July 7.—For erection of market hall, armoury, and public hall. Mr. T. B. Farrington, borough engineer, Municipal Offices, Conway.

CORK.—July 8.—For rebuilding the Abiohill parish church. Mr. A. Hennesey, architect, 74 South Mall, Cork.

DALTON.—July 10.—For erection of a small mission church. Mr. E. A. Stockdale.

DRAUGHTON.—July 7.—For erection of a church. Mr. W. H. Read, Draughton, near Skipton.

DROMORE.—July 6.—For alterations in the fever hospital and other wards of the workhouse. Mr. M. Doudican, clerk of union, Board Room, Dromore West.

DUDLEY HILL.—July 6.—For erection of a three-storey warehouse, &c. Mr. T. Leadley, architect, 3 Coleridge Place, Bradford.

DURHAM.—For erection of Catholic schools at Westwood, near Ebchester. Mr. Charles Walker, architect, 26 Eldon Square, Newcastle.

ELGIN.—July 13.—For alterations and renewals to farm steading and additions to dwelling-house. Mr. Charles C. Doig, architect, Elgin.

ESSEX.—July 13.—For foundations, in part, of large lunatic asylum, Chadwell Heath, Ilford. Mr. Lewis Angell, borough engineer, Town Hall, Stratford, E.

FELIXSTOWE.—July 21.—For erection of a large shelter in the cliffs at Felixstowe, near the town hall. The Chairman, general purposes committee, Town Hall, Felixstowe.

FRIZINGHALL.—For erection of a pair of semi-detached villa residences. Messrs. Walker & Collinson, architects, Swan Arcade, Bradford.

GLASGOW.—July 5.—For erection of water-closets behind tenements in Ritchie Street. Mr. A. B. M'Donald, city engineer, City Chambers, Cochrane Street.

GOSFORTH.—July 5.—For alterations to the Brandling Arms. Mr. Hope, architect, 40 Westgate Road, Newcastle.

GRIMSBY.—For erection of new premises for the North-Eastern International Trading Company, Limited, Fish Docks. Mr. Herbert C. Scaping, architect, Court Chambers, Grimsby.

HAILSHAM.—July 7.—For repairs, painting and colouring at Union Workhouse. The Master, Union Workhouse, Hellingly.



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HALIFAX.—July 14.—For erection of mill, engine-house, boiler-house, offices, 40 yards chimney, and reservoir on the Blackwood House Estate. Messrs. Chas. F. L. Horsfall & Son, architects and surveyors, Lord Street Chambers, Halifax.

HAMPTON-ON-THAMES.—July 6.—For erection of a fire station in Thames Street. Mr. John Kemp, surveyor, Park House, Hampton-on-Thames.

HANLEY.—July 5.—For erection of a mixed junior school at Clarence Street. Messrs. R. Scrivener & Sons, architects, Howard Place, Hanley.

HARROW.—July 9.—For erection of bacon-curing and drying-rooms, &c., in extension of the present factory, at Harrow, for Messrs. J. Adamson & Co. Messrs. Johnstone Bros., architects and surveyors, 39 Lowther Street, Carlisle, Cumberland.

HEYWOOD.—For building two shops in Manchester Street. The Company's Office, 57 Church Street, Heywood.

HUNTLY.—July 8.—For erection of stable wing of offices at Adamston, Drumblade, and stable wing of offices at Candy, Cults. The Factor, Huntly.

HURST.—For erection of six dwellings, Queen Street, and three lock-up shops, Union Road. Mr. Joseph Heys, surveyor, 196 Curzon Road, Hartley.

ILFORD.—July 13.—For foundations, in part, of a large lunatic asylum at Chadwell Heath. Mr. Lewis Angell, borough engineer, Town Hall, Stratford, E.

ILKLEY-IN-WHARFEDALE.—For extension to the grammar school. Mr. C. H. Hargreaves, architect, Exchange Buildings, Bradford.

INVERNESS.—July 17.—For additions and alterations to Arisaig Hotel. Mr. Dun. Cameron, architect, Inverness.

IPSWICH.—July 7.—For erection of an addition to the borough asylum. Mr. E. Buckham, borough surveyor, Town Hall, Ipswich.

IRELAND.—July 5.—For erection of a town hall. Messrs. Anthony Scott & Son, architects, Drogheda and Navan.

ISLE OF MAN.—July 7.—For erection of municipal buildings, free library and fire station, in Ridgeway Street, Douglas. Mr. Thomas H. Nesbitt, town clerk, Town Hall, Douglas, Isle of Man.

LEEDS.—July 10.—For alterations and extension of the gasmeter inspector's office in Dewsbury Road. Mr. R. H. Townsley, general manager, Municipal Buildings, Leeds.

LEEDS.—July 10.—For erection of a meter-house at the New Wortley gasworks. Mr. R. H. Townsley, general manager, Gas Offices, Leeds.

LLANELLY.—July 6.—For construction of a goods shed at Llanelly Dock. Mr. G. K. Mills, secretary, Paddington Station, London.

LLWYNDU.—July 6.—For alterations and additions to Llwyndu, near Abergavenny. Mr. E. A. Johnson, architect, Abergavenny.

LONDON.—July 5.—For erection of six houses on Strand Road at Pennyburn. Mr. Wm. Barker, architect, 3 Richmond Street, Londonderry.

LONDON.—July 5.—For erection of brick and concrete walls and foundations for new workshops at Blackwall, for the Blackwall Galvanised Iron Company, Limited. The Company's Offices, 4 Corbet Court, Gracechurch Street, E.C.

LOWESTOFT.—July 20.—For erection of an annexe to the infirmary at Oulton Workhouse, near Lowestoft. Mr. Alfred Clarke, architect, 126 London Road, Lowestoft.

LUTON.—July 5.—For erection of school buildings in the Dunstable Road. Messrs. J. R. Brown & Son, Market Hill, Luton.

MERTHYR TYDFIL.—For erection of fifty artisans' dwellings at Penydarren Yard. Messrs. Johnson & Williams, architects, Merthyr Tydfil.

MICKLEHURST.—July 6.—For erection of a public-house. Mr. Tom Cook, architect, 39 Victoria Buildings, Victoria Street, Manchester.

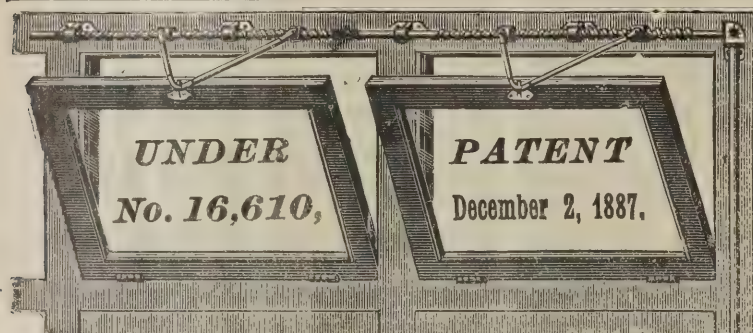
MIDDLESBROUGH.—June 30.—For erection of four semi-detached houses at south end of Linthorpe Avenue. Mr. J. Mitchell Bottomley, 28 Albert Road, Middlesbrough.

ODIHAM.—July 12.—For erection of schools in the Bury Fields. Messrs. Colson, Farrow & Nisbett, architects, 45 Jewry Street, Winchester.

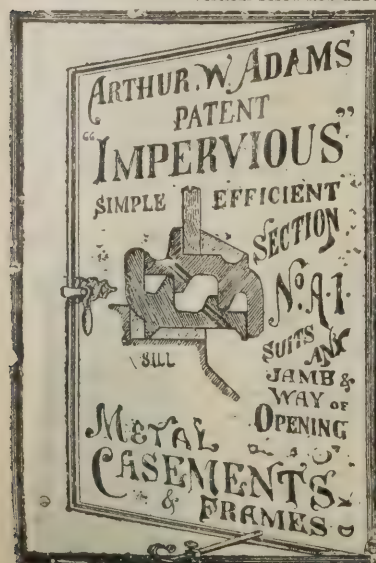
OTLEY.—July 5.—For erection of premises in the Market Place, for Messrs. Moss & Sons. Messrs. Fairbank & Wall, architects, 3 Manor Square, Otley.

PENYGGROES.—July 17.—For erection of Penygroes County School. Mr. E. Evans, architect, 8 Castle Street, Carnarvon.

PONTEFRAC.—July 4.—For erection of intended vagrant wards, laundry and machinery connected therewith, temporary lunacy wards and other extensions and alterations at the workhouse. Messrs. Greaves & Co., architects, Corn Market, Pontefract.



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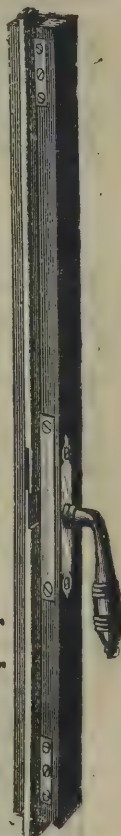
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RAWTENSTALL.—July 6.—For extension of Liberal Club Specifications may be seen at the Club.

RICHMOND.—July 2.—For constructing new entrance to gallery and other works at public baths, Kew Foot Road, and for painting and general repairs and works at free library. Borough Surveyor, Town Hall, Richmond.

ROCHDALE.—July 5.—For erection of proposed Board school at Belfield. Mr. T. Townend, jun., architect, District Bank Chambers, Rochdale.

ROOKSBRIDGE.—July 10.—For building Baptist chapel. Mr. E. W. House, Rooksbridge, near Axbridge.

ROTHERHAM.—July 7.—For erection of retort-house with iron roof; a bench of six arches complete, with retorts and mountings arranged on the inclined system, and with regenerators, firing and the usual charging appliances, elevating and conveying machinery, &c.; also boundary wall. Mr. H. H. Hickmott, town clerk, Council Hall, Rotherham.

SALISBURY.—For building a steam laundry at Fisherton House Asylum. Mr. F. Bath, architect, Crown Chambers, Salisbury.

SLEIGHTS.—For erection of a pair of semi-detached villas. Mr. John Milligan, architect, 77 Baxtergate, Whitby.

ST. GERMANS.—July 7.—For repairs to the interior of the workhouse at Torpoint. Mr. Fred. Wm. Cleverton, clerk, 4 Buckland Terrace, Plymouth.

TENDRING.—July 8.—For erection of a building to carry a water-tank at Harwich, for the Tendring Hundred Waterworks Company. Mr. J. W. Start, Harwich.

THORNBURY.—July 13.—For erection of four terrace houses in Leeds Old Road. Messrs. Fairbank & Wall, architects, Craven Bank Chambers, Bradford.

TOPPING FOLD.—For erection of four houses at Topping Fold. Mr. C. H. Openshaw, architect, Fleet Street, Bury.

TRING.—July 8.—For erection of a lych gate and toolhouse, fencing, making and gravelling footpaths, &c., at the Wilstone Cemetery. Mr. W. Huckvale, architect, Tring.

TREDEGAR.—July 5.—For repairs and painting at Briery Hill and Pontyogof Girls and Infants' Schools, Ebbw Vale. Mr. C. Danney, clerk, Tredegar.

UTLEY.—July 7.—For erection of a detached residence, with stabling, coachhouse and other outbuildings, on land adjoining Skipton Road and Ferncliffe Drive. Messrs. Barber, Hopkinson & Co., architects, Craven Bank Chambers, Keighley.

WAKEFIELD.—July 7.—For alterations, new shop front, &c., 32 and 34 Wood Street. Mr. Willie Wrigley, architect, 10 Wood Street, Wakefield.

WALES.—July 6.—For erection of a rectory at Llanhilleth. Mr. E. A. Johnson, architect, Abergavenny.

WALES.—July 5.—For erection of additional classrooms, caretaker's house, &c., for the governors of the Porth County School. Mr. J. Rees, architect, Pentre, Rhondda Valley.

WALES.—July 15.—For erection of infants' department at Palmerstown Road Board Schools, Cadoston, Barry, to accommodate 290 children, with outbuildings and boundary walls. Mr. W. H. Dashwood Caple, architect, 1 St. John's Square, Cardiff.

WALSALL.—July 19.—For erection of infants' school to accommodate 350 children at the Croft Street Schools, Birchills. Messrs. Bailey & McConnell, Bridge Street, Walsall.

WHITTINGTON.—July 5.—For erection of farm buildings and alteration and repairs at the sewage farm. Messrs. Marten & Fiddian, Church Street Chambers, Stourbridge.

WILSTONE.—July 8.—For erection of a lych gate and toolhouse, fencing, making and gravelling footpaths, &c., at cemetery. Mr. W. Huckvale, architect, Tring.

WALTHAMSTOW.—July 7.—For erection of house at Higham Hill. Mr. Geo. B. Jerram, architect, Bridge Chambers, Hoe Street, Walthamstow.

WOOLER.—July 7.—For erection of a pair of houses. Mr. Wm. Robson Hindmarsh, jun., architect, Alnwick.

WOODLESFORD.—July 6.—For erection of three cottages. Mr. Robert J. Smith, architect, 61 Albion Street, Leeds.

It is surprising that the picturesque old town, Market Harboro', with its central position, has not been invaded by the speculative builder long ere this. We are told that there is a great lack of really good houses in the neighbourhood, which, if built, would be quickly filled with residents from Leicester and other large manufacturing towns. A good deal of building has been done during the last few years, but there are any number of fine sites in the market and good business might be secured.

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For erection of stabling, coach-houses and farm buildings at Hammonds. Mr. C. H. BURSTOW, architect, Horsham.
E. WADEY, Parbrock, Billinghamurst (accepted) . £298 0 0

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For erection of Church day schools, Selly Oak. Messrs. JOSEPH LAVENDER & ALEXANDER ELLIS, architects, Selly Oak.
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Gough 2,435 0 0
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Kenyon & Moulding 2,692 0 0
Ginger & Cooper 2,620 0 0
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R. Ibbotson 2,580 0 0
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J. Parker 2,535 0 0
J. Whittaker & Son 2,520 0 0
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A. R. DEAN & Co., Birmingham (accepted).

BOSTON.

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S. Sherwin 1,475 0 0
W. WESTMORELAND, Kirton, Boston (accepted) . 1,233 0 0

BRADFORD.

For construction of Ivanhoe Road at Horton Grange Road. Messrs. SMITH & GOTTHARDT, surveyors, 15 Cheapside, Bradford.
W. BARRAUD, Bradford (accepted) £410 0 0

CARBROOK.

For alterations to hotel. Mr. J. P. EARLE, architect.
Chas. Roberts £230 0 0

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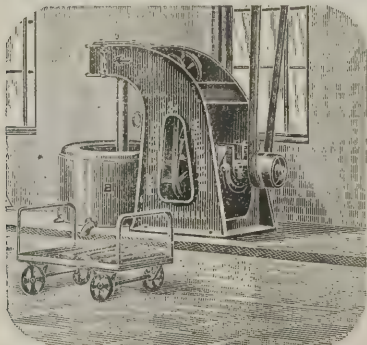
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For painting casual wards, Milkman Street. Messrs. LANSDELL & HARRISON, architects, 12 Compton Terrace, Highbury, N.
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For erection of proposed church and lecture-hall. Mr. C. O. FRANCIS, Leamington Chambers, 5 Richmond Street, Liverpool.

W. H. Ford	£1,177	15	0
J. H. Jackson	1,050	0	0
J. Munnerley	1,030	0	0
J. Lee & Son	950	4	9
MCLACHLAN & BATKIN, Birkenhead (accepted)	922	19	4

Seating, heating and lighting not included.

COTMANHAY.

For cleaning and painting the United Methodist Free Church.

A. Fyson	£70	0	0
W. Wheatley	61	1	4
S. G. BELL, Ilkeston (accepted)	54	15	0

CRAWLEY.

For erection of house and printing works, High Street. Mr. C. H. BURSTOW, architect, Horsham.

J. OCKENDEN & SON, Crawley (accepted)	£715	0	0
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DAWLISH.

For laying a concrete footpath at East Cliff Road. HAWKINS (accepted).

DEWSBURY.

For erection of two cottage homes in Healds Road. Messrs. HOLTOM & FOX, architects, Dewsbury.

Accepted tenders.

Crabtree & Denton, excavator, mason and brick-layer.	£825	0	0
H. Garthwaite, carpenter and joiner	300	0	0
F. Newsome, plumber	203	0	0
G. Hargreaves, slater	66	10	0
S. Cranshaw, plasterer	40	0	0
N. Ramsden, painter	33	19	0
Hirst & Son, electric wiring, &c.	28	10	0

DORCHESTER.

For alterations, additions, &c., Antelope Hotel, Dorchester. Mr. A. L. T. TILLEY, architect, 16 Cornhill, Dorchester.

R. Davis & Son, Dorchester	£2,030	0	0
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EAST SHEEN.

For laying-down roads and sewers of the Palewell Estate. Mr. F. H. HARVEY, surveyor, 183 Lavender Hill, Clapham Junction.

Swaker	£4,595	0	0
Jackson	4,590	0	0
Wilson	4,299	0	0
Langridge	4,098	0	0
Hudson	4,000	0	0
Parry	3,985	0	0
Wimpey	3,815	0	0
Killingback	3,795	0	0
Wheeler	3,600	0	0
W. H. WOODHAM, Blackheath Hill (accepted)	3,265	0	0

FENTON.

For construction of a brick culvert about 123 yards in length, with the manholes, &c. Mr. S. A. GOODALL, surveyor.

H. P. Embrey	£171	0	0
F. Barke	155	15	0
W. Williams	130	10	0
J. BAGNALL, Fenton (accepted)	112	0	0

FULHAM.

For painting, whitewashing and other works at the Fulham Infirmary.

G. Lifer	£2,445	0	0
W. Brown	2,382	0	0
Vigor & Co.	2,025	0	0
T. Nye	1,815	0	0
Wall & Co.	1,597	0	0
Bendon	1,558	0	0
McKenzie	1,473	0	0

Referred to the building committee.

GILLINGHAM.

For sewers to building estate at Gillingham, Kent, for Mr. Walter Green. Mr. ERNEST J. HAMMOND, surveyor, New Brompton, Kent.

Auger Bros.	£643	0	0
H. Weldon	477	7	2
J. C. TRUEMAN, Swanley (accepted)	414	0	0

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GREAT YARMOUTH.

For erection of a boys' school in Peter's Road. Messrs. BOTTLE & OLLEY, architects, Queen Street, Great Yarmouth.

T. Howes	£4,500	0	0
J. F. W. Bray	4,488	0	0
J. Leggett	4,459	13	0
Carter & Wright	4,100	0	0
A. E. Bond	4,035	0	0
J. Balls	4,032	0	0
G. W. Beech	3,998	0	0
W. Cook	3,852	0	0
R. Eastoe	3,697	0	0
F. Grimble	3,620	0	0
J. WARD, North Quay (accepted)	3,614	10	0

Plumber.

T. Spencer	280	5	9
J. Atherton	227	11	0
G. W. Gooda	226	9	6
G. Platt & Son	220	0	0
W. J. Rustiman	217	0	0
J. T. Goffin	209	17	6
R. A. EASTOE, Dene Side (accepted)	197	18	0

HORSHAM.

For whitewashing and colouring the ceilings and inside walls of the workhouse, infirmary and other buildings, and also such part of the outside of the workhouse as has been formerly done: also for painting of such parts of the outside of the workhouse, infirmary and premises where previously painted, and for touching up or repairing any inside painting where necessary. Mr. C. H. BURSTOW, architect, North Street, Horsham.

E. Passell	£111	0	0
J. Glagsher	109	0	0
H. MURRELL, Horsham (accepted)	95	5	0
W. Garner	91	10	0

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Carter & Aynsley	371	18	5
Applebee Bros.	369	0	9
J. Williams	365	15	7
W. Gauron	363	17	9
H. T. Sims	352	7	11
Tidmarsh & Sons	341	11	9
O. Westlake	336	10	0
Janes & Son	336	10	0
Atkinson & Co.	333	9	6
Wallis & Co., Limited	332	5	7

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For engineering works at the Grove Hospital, for the Metropolitan Asylums Board.

W. J. Fraser & Co.	£21,443	0	0
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Z. D. Berry & Sons	20,650	0	0
C. P. Kinnell & Co.	20,500	0	0
J. & F. May	19,826	0	0
J. F. Clarke & Sons	19,598	0	0

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Adams & Co.	£1,798	0	0
Neave & Son	1,772	0	0
B. Nowell & Co.	1,741	0	0
Watts	1,732	0	0
Killingback	1,723	0	0
R. Ballard, Limited	1,715	0	0
Pedrette & Co.	1,710	0	0
Parry	1,697	0	0
ROGERS & CO., Notting Hill (accepted)	1,663	0	0

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A. Scott & Son	£1,047	0 0
G. Foxley	986	0 0
E. MILLS, Westcombe Park (<i>accepted</i>)	945	0 0
J. McArthur & Co.	750	0 0
For alterations and additions at the Prince Arthur public-house, Brunswick Road, Poplar, E., for Mr. G. Hutcheson. Mr. FRED. A. ASHTON, architect, 177. Romford Road, Stratford, E.		
A. E. Symes	£2,175	0 0
W. Shurmur	2,170	0 0
W. Watson	2,145	0 0
J. & H. Cocks	2,095	0 0
S. Salt	1,893	0 0
Brown, Kruse & Co.	1,835	0 0
C. Simmons	1,773	0 0
W. J. Maddison	1,725	0 0

MARYPORT.

For erection of wash-houses, &c., and back-yards at Steer Cottages.		
T. Mandle	£216	0 0
W. Smith	215	10 0
H. Archer	182	15 0
J. Walker	175	0 0
J. HUNTER, Grasslot (<i>accepted</i>)	150	0 0
J. Ellis	95	11 6
R. Parlett, carpentering only	22	10 0

MIDDLESBROUGH.

For erection of twelve houses in Holt Street and ten houses in Lamport Street, Middlesbrough: Mr. WALTER G. ROBERTS, architect, 61 Albert Road, Middlesbrough.		
C. ZEALAND (<i>accepted</i>)	£1,980	0 0

For erection of two shops in Hartington Road, Middlesbrough. Mr. WALTER G. ROBERTS, architect, 61 Albert Road, Middlesbrough.		
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Accepted tenders.

W. Sturdy, brick, joiner, plasterer and slater	£134	0 0
Walton & Garthwaite, plumbing, glazing and gasfitting	27	6 4

MELKSHAM.

For erection of a Masonic hall. Mr. JOHN A. RANDELL, architect, Exchange Place, Devizes.		
H. Ash	£634	10 0
G. Brown	525	0 0
G. Bigwood	469	15 4
DAVIS, SON & CARPENTER (<i>accepted</i>)	450	14 0

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J. A. Dunmore	7,130	15 6
Wilkinson Bros.	6,920	14 0
Ballard, Limited	5,687	0 0
F. A. Jackson & Son	4,879	12 11
C. W. Killingback & Co.	4,681	0 0
J. Jackson	4,609	16 9
T. Adams	4,208	4 10
T. GLOAG, New Cross (<i>accepted</i>)	3,951	11 4
Surveyor's estimate	5,438	0 0

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For erection of furniture store at New Brompton, Kent, for the New Brompton Economical Industrial and Provident Society, Limited. Mr. ERNEST J. HAMMOND, architect, New Brompton, Kent.		
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C. E. Skinner	£391	0 0
F. Langley	295	0 0
H. Harris	290	0 0
G. Wren	275	0 0
T. Cornelius	250	0 0
H. E. Phillips	205	0 0

For erection of villa in Balmoral Road, New Brompton, Kent, for Mr. F. Pearson. Mr. ERNEST J. HAMMOND, architect, New Brompton, Kent.		
---	--	--

J. H. Park	£507	0 0
J. C. Trueman	460	0 0
H. Harris	395	0 0
F. A. Hammond	375	0 0
C. E. SKINNER (<i>accepted</i>)	335	0 0

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J. WHITE, Cromer (*accepted*) £435 0 0

NORTON.

For erection of two houses. Mr. J. P. EARLE, architect.
Jas. Sheppard £740 0 0

OULTON.

For restoration of church. Mr. HERBERT J. GREEN, architect, 31 Castle Meadow, Norwich.
T. H. Blyth, Foulsham £1,330 0 0
R. Chapman, Hanworth 1,316 0 0
Tuddenham & Sons, Aylsham 1,258 7 6
R. W. Riches, Postwick 1,038 8 10

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For erection of houses on the Phoenix Estate, for Mr. W. R. Quesed. Mr. A. E. PRIDMORE, architect, 2 Broad Street Buildings, E.C.
H. Leney £5,950 0 0
H. Heathfield 5,850 0 0
A. A. Webber 5,000 0 0
H. King 5,000 0 0
J. Edwards 24,404 0 0
P. Fraser 4,396 10 0
Beer & Gash 3,923 0 0
W. J. Davenport 3,895 0 0

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For erection of two shops in High Street. Mr. HAROLD BUSBRIDGE, architect.
Spreckley & Co. £2,926 0 0
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Thomas & Edge 2,217 0 0
Welch & Sons 2,077 0 0
Proctor 1,990 0 0
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For roads and sewers to same of building estate at Delce, Rochester, Kent, for Mr. G. B. Winch, Chatham. Mr. ERNEST J. HAMMOND, surveyor, New Brompton, Kent.
J. C. Trueman £474 0 0
AUGER BROS., Chatham (*accepted*) 447 0 0

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For erection of St. Joseph's Catholic church. Mr. A. E. PURDIE, architect. Mr. T. CAREW, surveyor.
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W. Bagalay & Sons 6,500 0 0
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C. Nightingale & Sons 6,092 0 0
J. Longley & Co. 5,889 0 0
Carrick 5,560 0 0
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F. G. MINTER, Westminster (*accepted*) 5,200 0 0

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For addition to Board schools, Runcorn. Messrs. F. & G. HOLMES, architects, Liverpool.
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Beckett, Hartford 4,847 14 6
W. Hall, Liverpool 4,767 0 0
J. Matthews, Nantwich 4,498 10 0
J. Sefton, Runcorn 4,428 0 0
W. Nickson, Runcorn 4,148 15 2

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For erection of thirty-six dwelling-houses at Denny. Mr. ROBERT M'LELLAND, architect, Motherwell Road, Bells-hill.

Accepted tenders.

D. & J. Cameron, Bellshill, mason £3,056 1 5
J. Peter, Kirkintilloch, joiner 1,509 18 6
A. Pringle, Chapelhall, plasterer 632 4 8
R. Inglis Denny, slater 299 14 10
J. Hunter & Sons, plumber 269 0 11
T. Watt, Coatbridge, blacksmith 149 0 0
J. Hunter & Sons, gasfitter 86 15 6
L. McLaren, lather 70 16 0
Marshall & Millar, glazier 42 9 6
Buchans & McIntyre, Glasgow, ironmonger 36 0 6

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For erection of six houses at Darnall Hill. Mr. J. P. EARLE, architect, Sheffield.
George Norman, jun. £1,250 0 0
For erection of three houses at Darnall Hill. Mr. J. P. EARLE, architect, Sheffield.
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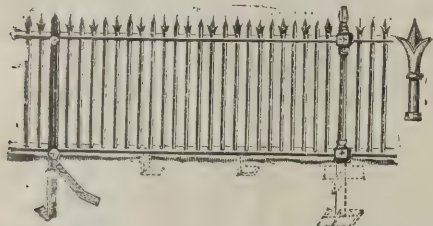
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J. Griffiths & Son	£820	0	0
T. Davies	776	0	0
J. E. Lloyd	770	0	0
E. Lewis	745	0	0
E. Jones	710	0	0
J. Lewis	700	0	0
D. C. Jones	692	0	0
J. P. WILLIAMS, Senghenydd (accepted)	692	0	0

SHERINGHAM.

For erection of a villa in Railway Road. Mr. E. J. HAMMOND, architect.

J. WHITE, Cromer (accepted)	£435	0	0
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SPILSBY.

For building of a 2 feet 6 inches in diameter culvert at Bonthorpe, on the road leading to Mumby from Willoughby Station. Mr. FRED. J. DIXON, district surveyor.

R. Seymour	£45	0	0
P. C. Hasnip	39	0	0
F. Moore	27	0	0
W. WALKER, Hundleby (accepted)	22	10	0

The 2-feet 6-inch pipes are not included.

STECHFORD.

For erection of premises at Stechford, near Birmingham, for the Birmingham Photographic Company, Limited. Mr. WM. F. EDWARDS, architect, 1 Newhall Street, Birmingham.

J. W. SMITH, Small Heath (accepted)	£3,879	0	0
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STREATHAM.

For laying-down a road and sewer on the Telford Park Estate. Mr. F. H. HARVEY, surveyor, 183 Lavender Hill, Clapham Junction.

Wilson	£1,920	0	0
Robertson & Grant	1,887	0	0
Porter	1,769	0	0
Lawrence	1,600	0	0
Jackson	1,555	0	0
Hudson	1,538	0	0
Cox	1,461	0	0
Langridge	1,333	0	0
Killingback	1,290	0	0
BENTHAM, Plumstead (accepted)	1,279	0	0

STRATTON.

For additions, &c., at Homestead, Stratton, Dorset. Mr. A. L. T. TILLEY, architect, 16 Cornhill, Dorchester.

A. Harvey, Charminster	£988	3	7
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TINSLEY.

For erection of eight houses. Mr. J. P. EARLE, architect.

Chas. Roberts	£3,780	0	0
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TOTLEY.

For erection of two houses. Mr. J. P. EARLE, architect.

Jas. Sheppard	£650	0	0
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UPPINGHAM.

For building a new culvert in the parish of Bisbrooke, also for taking-up, relaying and enlarging a glazed socket pipe drain with brick ends, in the parish of Ridlington. Mr. THOS. NORTON, surveyor, Thorpe-by-Water, Uppingham.

E. DORMAN, Uppingham (accepted).

VENTNOR.

For erection of new block for the Royal Hospital for Consumption and Diseases of the Chest. Mr. THEODORE R. SAUNDERS, architect, Ventnor, Isle of Wight. Quantities by Mr. THOMAS J. CARLESS, 39 Old Queen Street, Westminster.

T. Jenkins	£9,675	0	0
H. Ingram & Sons	9,400	0	0
Roe & Grace	9,335	0	0
J. G. & W. Jolliffe	8,974	10	0
A. SIMS, Ventnor (accepted)	8,889	0	0

WAKEFIELD.

For reseating, &c., Congregational chapel at Flanshaw. Mr. ABRAHAM HART, architect, 21 Barstow Square, Wakefield.

C. Squires	£245	0	0
W. Judge	240	0	0
J. W. Harrop, Ossett	189	18	6
C. Wilcox	184	13	0
W. & E. Whitehead, Ossett	144	0	0
ABSON & HESLING (accepted)	140	11	10
G. Stutt, Pocklington	134	19	0

Rest of Wakefield.

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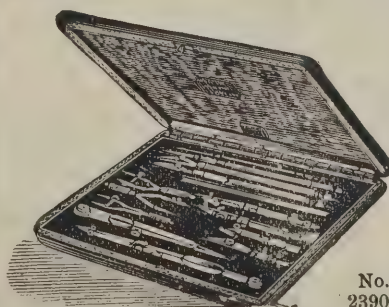
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WALES.

For painting Penuel Baptist chapel, Rhymney, and also for cementing the front side of the chapel.

Accepted tenders.

R. H. Luscombe, Dowlais, painting . . . £65 10 0
D. J. Davies, Rhymney, cementing . . . 54 19 0

For erection of Council offices at Hengoed. Mr. JAMES JONES, surveyor, Wood View, Hengoed.

Evans Bros. £1,200 0 0
W. Harries 1,050 0 0
E. Williams 950 0 0
C. Morgan 944 0 0
MAINWARING, Llanbradach *via* Cardiff (*accepted*) 925 15 0
Architect's estimate 975 0 0

WANSTEAD.

For painting the railings of the Cobbold Road site, for the external painting of Trumpington Road School. Mr. J. T. BRESSEY, architect, 70 and 71 Bishopsgate Street Within, E.C.

A. J. & H. Wolsey Bros. £286 3 0
Miller & Sheppard 283 3 0
Chapman & Sturton 195 13 0
J. V. Kiddle & Son 173 3 0
T. Osborn & Sons 167 3 0
A. Reed & Sons 148 13 6
H. R. Rons 130 3 0
Surveyor's estimate 135 15 0

WOOLACOMBE.

For erection of a gentleman's residence at Woolacombe. Mr. ALLEN T. HUSSELL, architect, Market Square, Ilfracombe.

T. H. Brown £3,000 0 0
Hubber & Son 2,941 0 0
Woolaway Bros. 2,815 12 4
W. ELLIS, Woolacombe (*accepted*) 2,550 0 0

MR. J. BATCHELER, who for many years represented Messrs. Merryweather & Sons, Limited, and the "Titan" sprinkler, has now become a partner in the firm of Haines & Co., 29 Minories, E.C., engineers' furnishers, and the sole agents for the "Nobro" portable fire-engine.

BUILDING AND BUILDERS.

THE foundation-stone of a new Roman Catholic school at Rivington Road, Newtown, a new working class district which has rapidly risen in St. Helens, was laid on the 28th ult. The schools, which will accommodate 360 children, will cost about 3,000*l*.

IT has now been definitely settled that the new post office, about to be erected to meet the increasing business of the postal department in Kirkcaldy, which has been growing very rapidly of late years, will be placed at the west end of Hunter Street, on the ground belonging to Mr. John Hunter, St. Brycedale.

THE foundation-stone of the new marine drive and promenade round the Castle Hill, Scarborough, to connect the two bays, was laid on the 25th ult. The Lord Mayor of York and the Mayors of Hull and Harrogate were present. The construction of the new marine drive and promenade, at a cost of about 80,000*l*., was undertaken some months ago, but the foundation-stone laying was deferred so that it might form the principal feature of the local celebration of the Diamond Jubilee. The new drive is to be 4,100 feet in length, and commences from the southern end of the Royal Albert Drive, and will join the drive in front of the South Bay, thus making one long, continuous marine drive of 3½ miles.

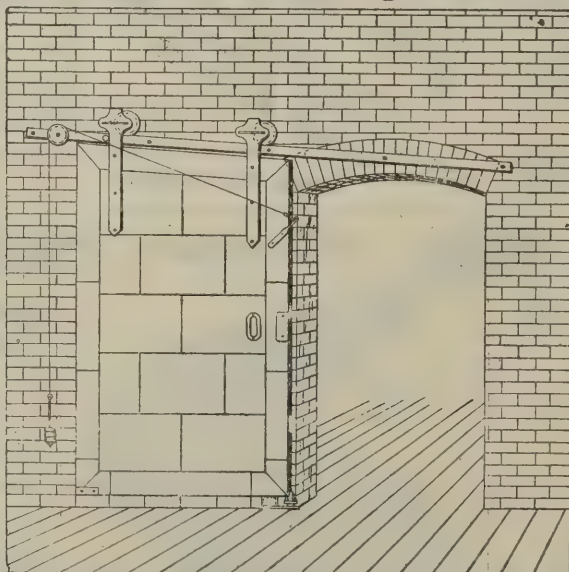
IMPROVED SERVICE TO BRUSSELS.—In connection with the Brussels Exhibition and the popular Belgian and Swiss tours, *via* Harwich and Antwerp, the Great Eastern Railway will shortly transfer two of their new steamers, which have hitherto run on the Hook of Holland service, to the Antwerp service. These or other vessels will be run from July 4 to September 12 inclusive, on Sundays as well as weekdays. Passengers will now be able to leave London on the Saturday night, and the North and Midlands in the afternoon, reach Brussels next morning by train running from alongside the steamer, and return on the Sunday evening, reaching town first thing Monday morning. The new steamers are ocean-going vessels of upwards of 1,740 tons, and 5,000 indicated horse-power, with comfortable sleeping accommodation for about 200 saloon passengers. The journey permits breakfast being comfortably taken in the River Scheldt, while in the opposite direction a *table d'hôte* dinner is served soon after the steamer leaves Antwerp.

ARMOURED DOORS

A STEEL SHEATHED WOODEN DOOR WHICH IS FIREPROOF.

ACCEPTED & RECOMMENDED by ALL INSURANCE CO.'S

WILL NOT BUCKLE
OR WARP LIKE
THE ORDINARY IRON
DOORS.



CAN BE FITTED
WITH AUTOMATIC
SELF-CLOSING
ATTACHMENT.

HAS STOOD THE MOST SEVERE TESTS IN THIS COUNTRY.

FIRE AT THE WORKS OF THE ANAGLYPTA CO., DARWEN, LANCASHIRE.

The door we fitted in these works, although subjected to a heat intense enough to melt brass taps and fittings near it, withstood the heat perfectly, and can now be inspected at our works in Manchester, fit for duty. The metal sheets have expanded without becoming detached, whilst the wood is simply charred to a depth of about ½ of an inch.

FULL PARTICULARS AND ESTIMATES FREE FROM

DOWSON, TAYLOR & COMPANY, Ltd.,
14 VICTORIA STREET, LONDON; AND BLACKFRIARS BRIDGE, MANCHESTER.

ILLUSTRATIONS.

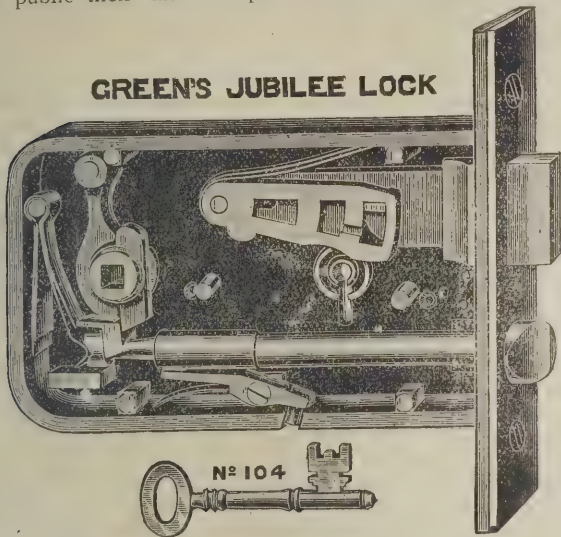
CATHEDRAL SERIES.—CANTERBURY: GENERAL VIEW FROM TOP OF GATEWAY.—SOUTH TRANSEPT CHOIR.—NAVE, LOOKING EAST.—TOWNS IN MARTYRDOM, ARCHBISHOP PECKHAM AND ARCHBISHOP WARHAM.

TRADE NOTES.

THE new intermediate girls' school, Abergavenny, is being warmed and ventilated throughout by means of Shorland's patent Manchester grates and patent Manchester stoves. Messrs. E. H. Shorland & Brother have just ventilated Baines School, Blackpool, by means of their ornamental patent exhaust roof ventilators and special inlet tubes.

MESSRS. GREEN & CO., of 236 Bradford Street, Birmingham, have taken advantage of the Jubilee time to bring before the public their latest improvement in Green's reversible

GREEN'S JUBILEE LOCK



cylinder bolt locks, that were formerly manufactured by Mr. John Green, the inventor. The cylinder bolt lock made by Mr. Green held, years ago, a very prominent position in the

market, and Messrs. J. Green & Co. now wish to introduce this lock again in its improved and perfected state. They claim for it that it is the very best mortice lock on the market for ordinary use, besides being one which they think should be specially popular with architects for public buildings where large suites are required to differ, and master keys to pass in sections with grand master to lock all. Their No. 104 lock is suitable for such purposes, and they are prepared to make them in different qualities with the improvement to the old numbers, viz. No. 0 and Defiance 01, 101, 102, 104, which are as well known on the foreign market as at home.

THE offices of *Timber* have been moved from 44 Bishopsgate Street Without, E.C., to new and more commodious premises at Middlesex Street, Bishopsgate Street Without.

MESSRS. BERRY & CAMPBELL, warming and ventilating engineers, 17 Ridge Road, Hornsey, London, N., have secured the order for heating the premises of the American Type Founders' Company (Mr. P. McCoy), Phoenix Works, Phoenix Place, W.C.

VARIETIES.

THE mansion-house of Caldra, in Berwickshire, the seat of Colonel Milne Home, was recently entirely destroyed by fire. Most of the furniture and plate were saved.

OWING to the rapid growth of the district, consequent upon the establishment and extension of the chemical works of Messrs. Brunner, Mond & Co., Limited, it has been found necessary to build, at a cost of 5,000*l.*, a new church at Winington, near Northwich. The new building was opened on the 28th ult., and will seat 320 persons.

THE extensive premises of the Original Brewery Company at Cheltenham were almost destroyed by fire on Sunday, the 27th ult., the damage being estimated at 100,000*l.* The fire is believed to have been due to the spontaneous combustion of some hops. It soon got a firm hold upon the immense plant, and it was with difficulty that the fire brigade saved the stabling and malshouses.

AN inquest was held at St. Bartholomew's Hospital on Friday last upon Michael Linaham, forty-eight, the labourer who met with his death while working on the Jubilee decorations at the offices of the *Daily Telegraph*. Deceased lost his

MELBOURNE INTERNATIONAL EXHIBITION, 1880-81, THE ONLY GOLD MEDAL, IN ADDITION TO FIRST-CLASS HONOURS;
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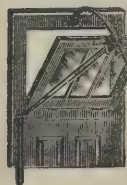


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SPECIALTIES:

Patent Window Openers, for Opening, Closing & Securely Fastening Fanlights, Casements, Skylights, &c.

CARTLAND'S PATENT WINDOW OPENER.



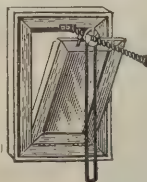
A2740 A2741
Brass. Iron.
5/6 12in. 3/6
6/- 14in. 4/-
6/9 16in. 4/6
7/6 18in. 5/-
10/- 24in. 6/-
each.

LILLY'S PATENT FANLIGHT OPENER.



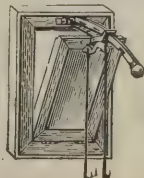
A2623
Brass. 3/9
A2624
Iron. 2/6
each.

PRESTON'S PATENT SCREW ADJUSTMENT.



A553
All Brass.
x 15, 8/6
x 18, 11/6
A553
Iron Screw.
x 15, 7/6
x 18, 10/-
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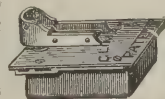


9052
Iron. Brass.
1/2 12in. 4/8
1/11 16in. 6/8
2/2 18in. 8/-
each.

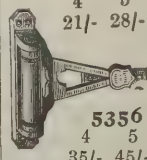
Original Patentees and Manufacturers of Cartland's Patent Helical, Climax, Adjustable, and Reliable Door Springs.



5753 Iron.
3 inch, 4/-
4 " 6/-
5 " 8/-
5754 Brass.
3 inch, 6/6
4 " 10/-
5 " 13/-
per pair.



2401
With 2in. Shoe,
16/6 each.



5355 Iron.
4 5 6in.
21/- 28/- 36/- doz.
5356 Brass.
4 5 6in.
35/- 45/- 55/- doz.

MACKIE'S PATENT "DEFIANCE" HYDRAULIC WATERTIGHT FLOOR SPRING AND CHECK.



Size of Plate,
12 x 8 in.
Size of Box,
10 1/2 x 6 x 3 1/2 in.

906
80/-
With top centre
and brass shoe any size.

This Floor Spring is suitable for any sized door, and can be regulated to suit any force required.

The box is watertight and weatherproof, a distinct advantage when fixed in Banks, Board Schools, Libraries, and similar places, where the floors are frequently washed down.

It is also sent complete with an outer box to fix into floor, to facilitate the spring being taken out when necessary.

Working Models of these and other Specialties may be seen at our newly-fitted London Showrooms, 57 HOLBORN VIADUCT, E.C. Architects and Buyers are respectfully invited to inspect same.

footing on a ladder and fell 20 feet, a miraculous circumstance being that no one else was hurt by his fall, although the pavement was crowded at the time. A verdict of accidental death was returned.

THE opening of the new Roman Catholic church of St. Chad at Kirbymoorside took place on the 15th ult. The church is situated near the railway station, and forms a handsome addition to the architectural features of the place. The church is built from the plans of Mr. Bernard Smith, of Gray's Inn Square, London, and when completed will seat about 120 persons. The wood-block flooring throughout was executed by Nightingale & Co., Grimsby Wood Pavement Works, Great Grimsby.

At Wilmslow Sessions the District Council applied for an extension of time in connection with their sewerage works. It was stated that important works had yet to be carried out on the southern side of the district. The northern scheme has just been completed at a cost of nearly 7,000*l.*, and 12,000*l.* has been expended in the southern district. The Mersey and Irwell joint committee had agreed to six months' extension. The Bench granted the extension.

THREE cottage homes, built by the Hunslet Board of Guardians for the accommodation of children hitherto inmates of the workhouse, were opened at Rothwell Haigh on the 24th ult. The cottages, which are built of brick, contain a sitting-room for the foster-parents, a day-room, kitchen and scullery on the ground-floor, and four bedrooms above. There is also an isolation-room in each. The buildings stand in 4 acres of ground, the unoccupied part of which will be turned into gardens and playgrounds. The total cost of the undertaking has been 8,500*l.* Mr. E. J. Dodgshun, of Leeds, was the architect.

THE town clerk of Leeds (Mr. John Harrison) has received from the Secretary of the Local Government Board an intimation of the Board's approval of the land at the Ivy House estate, which still remains in the hands of the Corporation, being utilised for the erection of houses for persons of the working class, who will be displaced by the execution of the Corporation scheme relating to this area. The Board approve the proposals of the Corporation for laying out certain new streets, 60 feet wide, to open out the area, and the arrangements into which, subject to such approval, the Corporation had entered with the Yorkshire Pure Ice and Cold Storage Com-

pany relating to the piece of vacant land lying between Harper Street and Cross York Street and abutting on York Street.

UNDER the Employers' Liability Act an action was brought by Albert Roffe, 117 Tower Hamlets Road, Forest Gate, to recover the sum of 30*l.* as damages for personal injuries sustained through the negligence of the foreman of the defendants, Fenchurch Street. Mr. Chester Jones appeared for the plaintiff and Mr. Lithiby for the defendants. The plaintiff's case was that he was in the service of the defendants and was working on a building at Forest Gate. When employed on a scaffold (the boards of which were, owing to the defendants' foreman's negligence, too far apart) he fell and caught his hand on a chisel, cutting it so badly that five stitches had to be put into it. He was unable to work for some weeks and he asked for compensation. The defendants' case was that the plaintiff ought to have seen that the scaffold was not wide enough and pushed the boards together. There was no negligence on the defendants' foreman's part and therefore no liability rested on the defendants. The jury found for the plaintiff and assessed the damages at 12*l.*

PITMAN'S Metropolitan School having altogether outgrown its old quarters in Chancery Lane, a new and commodious building has been erected for it at the Russell Square corner of Southampton Row. The new building has a frontage of 67 feet and a depth of 110 feet. It contains seven floors and a basement. The front is of red brick with Portland stone facings, and the principal entrance faces into Southampton Row. The building will be illuminated with the electric light, and heated and ventilated on a new American plan. The basement will contain the cloak-rooms and lavatory, one-half of the space being devoted to the ladies and the other half to the gentlemen. Communicating with the main corridor in the basement are two lifts to convey the students to classrooms on the upper floors. The ground floor contains a fine central hall, round which are placed the administrative offices of the schools, the principal and vice-principal's rooms, the secretary's office, the situation bureau, waiting rooms, &c. On the far side are situated a number of well-lighted classrooms for the male senior and junior shorthand sections, whilst the whole of the first floor is occupied by the speed shorthand practice rooms. Above this, again, are the ladies' shorthand department and the booking and business training instruction rooms. The third floor is devoted to the typewriting branch, whilst the fourth and fifth are given

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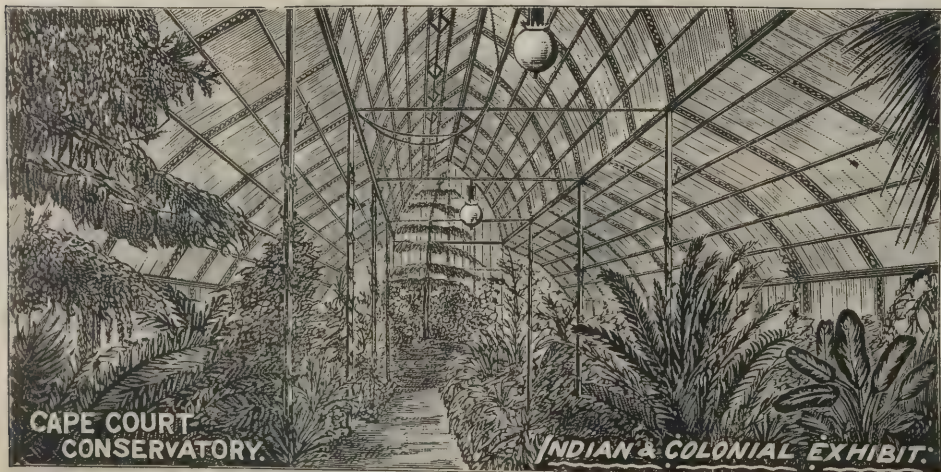
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CATALOGUES.

**ELECTRIC LIGHT FITTINGS,
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CANDELABRA, &c.**

REPRODUCTIONS OF

The FINEST EXAMPLES.

up to the class for Civil Service preparation and the study of foreign languages. The class-rooms are large, light and airy, and will accommodate 1,500 pupils. The architect of the building is Mr. G. D. Martin, of 3 Pall Mall East, who drew up the plans under the direction of Mr. Ernest Pitman. The contract for the erection of the school is in the hands of Messrs. Perry & Co., the total cost being estimated at 27,000*l*.

AMERICAN NOTES.

A DIFFICULT feat was recently accomplished at Manchester, N.Y., in the moving of a brick chimney nearly 1,000 feet without injury. The chimney is 85 feet high with double 8-inch brick walls 3 or 4 inches apart, and nominally bonded together by three or four bricks on each side every 8 or 10 feet in height. The chimney is 7 feet square outside at the base, tapers slightly and is estimated to weigh about 200,000 pounds. Holes were cut through the lower part of the chimney from side to side and through them large square horizontal timbers were inserted to project 8 or 10 feet on each side. On top of these timbers other large horizontal timbers of the same length were laid at right angles to the first, one on each side of the chimney, close to the wall. A double rectangular cross-platform was thus formed, the ends of the pairs of beams were connected by cross-timbers and from each of these a pair of inclined braces were put up and secured to a timber collar encircling the chimney about 12 or 14 feet above the bottom timbers. This framework constituted a cradle that practically extended the base of the chimney to a diameter of over 20 feet. Cross-beams were placed under the lower sills of the cradle and supported on timber shoes, which were planed on the bottom and greased to slide on skids 50 feet long, from which the whole weight of the chimney was supported after the remaining lower brickwork had been cut away. The skids were supported on ordinary timber-crib blocking, as much as 5½ feet high in some places where the ground was very rough. Grades of 3½ feet ascending and 5 feet (per 100) descending were encountered and safely overcome. The chimney was moved by a single horse working a 30-gear capstan that operated a 5-part (¾-inch) chain tackle. The chimney was revolved 90 degrees about its vertical axis and was loaded, moved and set on its new foundation in nine days by six men. Messrs. W. H. & C. P. Topping, Bridgehampton, N.Y., were the contractors.

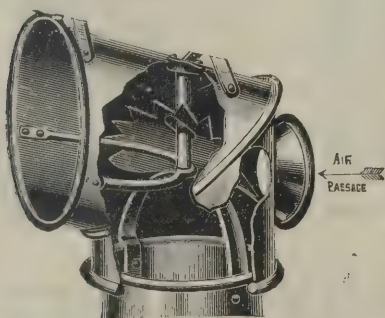
THE Department of Public Works of New York City is about to carry out a test of the preserving qualities of various kinds of paint which will be of the greatest interest to all engineers and builders, and should provide them with some much-needed data. The experiments are to be made on a massive steel viaduct which carries One Hundred and Fifty-fifth Street across the elevated tracks of the Manhattan Railway Company. The test is to be carried out in a thoroughly scientific and practical manner, and great care will be taken to shut out any disturbing element which might affect the value of the results. A tight board roof will be built beneath the viaduct to shield it from the smoke of the locomotives. The first operation will be to clean off all the old paint and rust by means of the sand-blast, and this will be done until the surface of the metal presents a clean and bright appearance. The paint will be put on within three hours from the time the cleaning is finished. The various manufacturers will be invited to tender bids and provide specimens of their paints, and these samples will be used in painting the structure. The precautions which are being taken will insure that the different varieties of paints will have the same opportunities to show their good qualities, and the results will be watched with close attention by those who are responsible for the erection and preservation of all classes of structural steel and ironwork.

THE LIVERPOOL ENGINEERING SOCIETY IN MANCHESTER.

THE members of the Liverpool Engineering Society on June 26 were invited to visit the Manchester Cold Storage Works. A goodly number responded to the invitation, and arrived at the Exchange station from Lime Street at noon. Here carriages were in waiting, and under the guidance of Mr. M. C. Bannister the party was driven to the stores, and, after a thorough inspection, entertained at luncheon at one of the leading city restaurants. In the unavoidable absence of the president and vice-president of the Society, Mr. W. G. Mills, a past president, occupied the chair. Mr. Morgan, the oldest member of the Liverpool Society of Engineers, expressed his thanks to Mr. Bannister for what he had done for them that day, and also in Liverpool in connection with cold air stores. It was gratifying to know that there was now no rivalry between the two cities, and that such cordial relations existed between them.

SOHO COWL AND VENTILATOR (NICKLIN & MILWARD'S PATENT).

This COWL has been used as a Ventilator, both on Workshops and Offices, with most satisfactory results, and has proved a conspicuous success as a House Cowl, possessing as it does great suctional power, perfectly noiseless action, and great durability, being made of steel.



The COWL has proved a perfect cure in the case of most troublesome chimneys.

TESTIMONIALS.

"I consider your cowl far above any other cowl in the market, and have much pleasure in recommending it to any one suffering from smoky chimneys."
"Forward the 10-inch cowl on order at once; we have fixed the others, and find they give every satisfaction."
"Your cowl has proved a complete success, no matter which way the wind blows. Please forward me another one at once."

The Smethwick Ventilating Co.,
DESPATCH WORKS, SMETHWICK,
Near BIRMINGHAM.

1d. THE ILLUSTRATED CARPENTER & BUILDER. 1d.

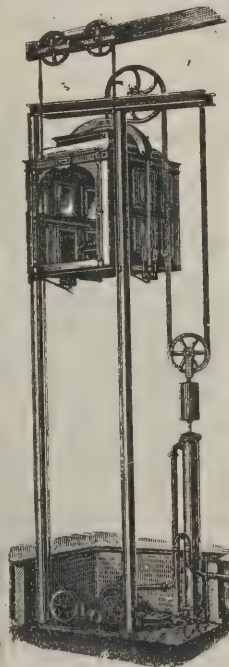
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BORDIGHERA AND SAN REMO.

IN his last report Mr. Vice-Consul Daly says:—Speaking generally 1896 may be regarded as having been a year of prosperity for Bordighera. The foreign visitors, upon whom the wealth of the place mainly depends, were more numerous than ever. In May the works in connection with a regular water supply were completed. The supply appears ample, and the water is of good quality.

During the year an English firm of electrical engineers secured concessions for lighting Ventimiglia and Bordighera by electricity, and both those communes now have the electric light. The concession for Bordighera is only applicable to house lighting, as the municipality has an unexpired contract with the Tuscan Gas Company for street lighting. Incandescent lamps of 8-candle power are charged 20 lire a year, or the light is supplied by meter at the rate of 1.25 lire per Board of Trade unit. The engineers above referred to have also obtained powers for the establishment of a system of electric tramways, and it is hoped the scheme will have been carried out before the end of 1897.

The railway in course of construction from Turin to the Mediterranean Coast *via* the Col di Tenda has progressed but little during the past year. Considerable engineering difficulties have been encountered, the tunnel having entered, at its northern end, enormous subterranean reservoirs, which necessitated the construction of canals.

The English electrical engineers who obtained a concession for electric lighting surprised me by stating that, except to a small extent, it did not suit them to obtain their plant from England—not because of slight extra expense, English electrical machinery being superior to that of continental manufacture, but because English manufacturers have no branches in Northern Italy, whereas at Turin and Milan branches are to be found of Belgian, German, or Swiss firms, where every information could be found and prompt delivery of goods guaranteed.

Mr. Vice-Consul Congreve, in his report on San Remo, writes:—

The year was dull and uneventful. Foreign visitors, both English and German, again showed a decrease both in number and in duration of stay.

This is by some people attributable to the dearness of San Remo compared with its French neighbours and competitors, Cannes, Nice and Mentone, and by others to the now prevailing

fashion of going further abroad, to Egypt, India, the Canary Islands, &c. The expensiveness of the place must be to some extent admitted. Villas have not increased in price during the last twenty years, rather the reverse, but wages are high and, owing to heavy duties, many articles of consumption are dearer here than in France.

Hotels are costly, but they are good, furnished with lifts, electric lights and other improvements, and considering the shortness of the season, it would hardly be possible to keep them open on their present scale with lower tariffs.

Still, though for the moment the current tends to other parts, I think it will return. The opening up of new resorts on the French Riviera, such as Beaulieu, St. Raphael and Valescure, has, no doubt, made some difference of late, the other side of the frontier having the advantage of sparing trouble and delay at Ventimiglia; still, the liberty enjoyed by foreign residents in Italy contrasts very favourably with restrictions in France.

The chief work of importance has been the installation of the electric light by a co-operative society with a capital of 100,000 lire, in shares of 100 lire each, the holders being chiefly hotel-keepers and English and other foreign owners of villas. 2,000 lamps have already been set up. The work has been confided to the Aliotti Company, of Basle, some of the machinery being supplied by the firm of Tosi, of Legnano. The town itself is still lighted by gas, the municipality being bound by a contract with the Tuscan Gas Company.

PLUMBERS' REGISTRATION BILL.

THE London Polytechnic Council, consisting of representatives of the City Parochial Foundation, the City and Guilds of London Institute and the Technical Education Board of the London County Council, has unanimously passed a resolution declaring that the objects of the proposed Bill for the registration of plumbers command support, but that the measure requires considerable amendment, including the substitution of some more representative body for the Plumbers' Company to carry out the objects of the Bill. The executive committee of the National Association for the Promotion of Technical and Secondary Education has unanimously adopted a resolution generally approving the principle of registration, and expressing the desirability that the General Council under the Bill should be required to place on the register workmen who have passed

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the examination of competent public authorities approved by the Local Government Board, and that the executive body to carry out the Act should be a committee of members of the General Council.

ST. LUKE'S CHURCH, FORMBY.

ON Tuesday last the Bishop of Liverpool consecrated additions to the structure of St. Luke's Church, Formby, which make the building a complete edifice, suitable for the requirements of the parish. Erected in 1852 "in remembrance of the intention of the late Miles Formby, M.A.," the church was an incomplete building, consisting of a nave only. A chancel and transepts have now been added, thus forming a handsome church, which will be a credit to the diocese. The church stands on the site of a Mediaeval church which has long passed away, but of which some interesting archaeological remains still exist, and many old stones lying about the site belonged to the old church, including the old font, and have been collected by Mr. Jonathan Formby, barrister, and now form a pretty feature grouped together at the west end of the church. The additions have been made to give accommodation for the vestry, organ, choir and communion, all of which were formerly in the nave. The new chancel has carved oak stalls and vicar's reading-desk, with stained-glass windows by Mr. Rowlands, of Slater Street, Liverpool, the subject being "Christ Stilling the Tempest," a subject very appropriate, considering the centuries this site has bordered the tempestuous storms of the Atlantic. In the carved oak reredos immediately under this window the texts are added, "He maketh the storm a calm, so that the waves thereof are still," and "Come unto Me, all ye that labour and are heavy laden, and I will give you rest." The south transept is for the purposes of the organ and a vestry for the choir. The organ has been considerably improved by Messrs. Hardy, of Stockport, and the front effectually decorated by Mr. James Smith, of Wavertree. The northern transept is devoted to vestry purposes for the vicar. To complete the improvements the congregation have provided for the renovation of the old portion of the church, including the restoration of the west wall, which had seriously suffered from the severe weather of this stormy coast. A new window has been added to this end, and improved ventilation provided for the church. The architectural work has been entrusted to Mr. Wm. Parslow, the sole contractor being Councillor James

Taylor, of Blundellsands. The masonry has been carried out by his brother, Mr. T. Taylor; Messrs. Paterson & Sons, of Liverpool, have executed the joiners' work; Messrs. Clark & Taylor, the plumbing and decorations; Mr. Littleton, the slating and plastering; and the heating of the church has been carried out by Messrs. J. R. Cooper & Sons, of Liverpool.

The cost of the additions of chancel and vestries amounts to about 1,230*l.*, and the renovating and decorating of the west end will be covered by an expenditure of about 200*l.*

IRON AND STEEL INSTITUTE.

THE autumn meeting of the members of the Institute will be held at Cardiff on Tuesday, August 3, and three following days, and, from the detailed programme just issued, it promises to be very successful. The popular president (Mr. Edward Martin, the manager of the Great South Wales Dowlais Ironworks) will be supported by a local reception committee, consisting of the Marquis of Bute, Lord Windsor, Sir William Lewis and others, who have provided entertainments for the members, among whom will be some of the most distinguished continental and American metallurgists. As becomes a great exporting centre, prominence is given to improvements in the loading and unloading of ships, Sir William Lewis reading a paper on "Improvements in Shipping Appliances in the Bristol Channel," Mr. Thomas Wrightson on the new application of travelling belts in the shipment of coal, and Mr. Harry Riches on some mechanical appliances at Penarth Docks. Among the other contributors of a more technical character are Mr. De Beauneville (Philadelphia), Mr. E. D. Campbell (Michigan), Professor Pouthière (Louvain), Mr. Sainter (Wigan), Mr. Hammond (Penarth).

THE TALLA RESERVOIR.

MESSRS. JAMES YOUNG & SONS, since they got the contract, have lost no time in making a start upon the important works of the Talla Reservoir. Already about 250 men are on the ground, and there will be another hundred or so in a few weeks as soon as hut accommodation can be provided for them. The contractors are now engaged upon the construction of the

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huts They are being built of wood, with a felt roofing, upon the south side of the stream below the reservoir. Each is 112 feet in length by 24 feet in width, and accommodates eighty men. They are divided into two halves, with the hutkeeper's house in the centre—an official who is responsible to the contractors for the keeping of the apartments clean and tidy. Kitchens with hot plates have also been erected, in which the men can cook their food and get hot water for their tea. On the north side there is in course of building a bakery, stables, offices for the clerks and engineers, and wooden cottages for the managers and inspectors. The huts are on a sunny slope, which will be kept dry by the railway cutting some distance further up the hill side. In the same vicinity there will be a small church erected, and also the club-house and recreation hall, to which the men are looking forward with interest, as at present there is no place in which they can pass their time after work except in the open air. The men are chiefly engaged in excavating for the puddle trench, which will go 70 feet below the bed of the stream, and is 22 feet in width. To enable them to get down with safety and without any risk of flooding, the contractors are pushing on the construction of a tunnel on the south side of the stream, into which, when it is completed, the whole body of the water will be turned. The inlet will be about 150 yards up from the puddle trench, and the outlet will be below the tail of the embankment. Other men are engaged in stripping off the vegetation and upper soil from what will be the bottom of the reservoir; and with labourers moving about in orderly lines with wheelbarrows, others digging in the earth, and railway trucks constantly in motion tipping the soil which is to go to form the embankment, the valley presents, even at the beginning of operations, a very animated appearance.

NEW PAROCHIAL HALL FOR DARLINGTON.

THE foundation-stone of the new Parochial Hall in connection with the parish of St. Cuthbert's, Darlington, was laid by Mrs. Mortimer, wife of the vicar of Darlington, on the 16th ult. The new hall is an oblong building, two storeys in height, with frontage to Victoria Road. In the basement there are a classroom, covered cloister, heating chamber, &c. The hall is on the upper floor, and can be divided into three classrooms by means of patent swivel sliding partitions, one of the classrooms being raised so as to form a platform. There are two entrances and

lobbies from Victoria Road, one for the general body of the hall, and one for front seats and platform. A small ante-room is provided off the platform. Over the rear of the hall there is a small gallery, reached by an open staircase, which also gives access to the basement classroom. At the rear of the building there is ground space for the use of a quoit club or for drilling purposes. The building will be erected with ordinary clamp kiln bricks, relieved by terra-cotta dressings. The roof will be covered with red Staffordshire tiles, and finished with pointed spirelet, which encloses the air-pump ventilator. The main hall will have stained wood panelled dado. The heating will be by open fireplaces and hot water. The contracts for the work have been let to Messrs. R. Kitching & Son, T. Metcalf, R. Smith, J. & G. Wharton, and J. Robinson & Son, all of Darlington. The architects are Messrs. Clark & Moscrop, F.R.I.B.A., of Darlington.

A BUILDING LAND SALE.

ON Monday last ninety-four plots of freehold building land, forming part of the Tankerton Estate, Whitstable, were offered for sale by auction, the auctioneer being Mr. F. G. Wheatley. A large party of intending buyers and others was conveyed down to Whitstable by special train from Holborn Viaduct (L. C. and D. Ry.), and on arrival at the estate there was served a very substantial luncheon, to which full justice was done. After the toast of "The Queen" had been proposed and duly honoured, Mr. Wheatley said that this was the fifty-second sale which he had held on the Tankerton Estate, and after dilating upon the many advantages appertaining thereto, as well as the favourable terms offered to buyers, he proceeded to offer the several lots in succession, and the prices realised were from 26l. to 27l. each for land in Herne Bay Road with a frontage of 30 feet; 18l. for a plot of 24-feet frontage in Ellis Road, and 20l. for 25-feet frontages in Queen's Road. The two fine plots with a frontage of 60 feet in Tower Gardens went for 200l. each, and shop plots in Pier Avenue, with a frontage of 20 feet, realised 25l. 10s. each; while other plots in Wynn Road, with a frontage of 18 feet, were sold for 16l. each, but in Tankerton Road a plot of the same frontage was sold for 27l.

Among the company present on the occasion was Mr. Wilkinson, secretary of the Tankerton Estates, Limited, and Mr. Petter the accountant.

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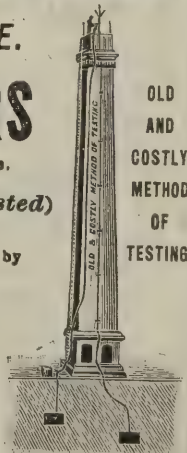
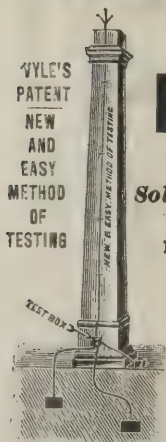
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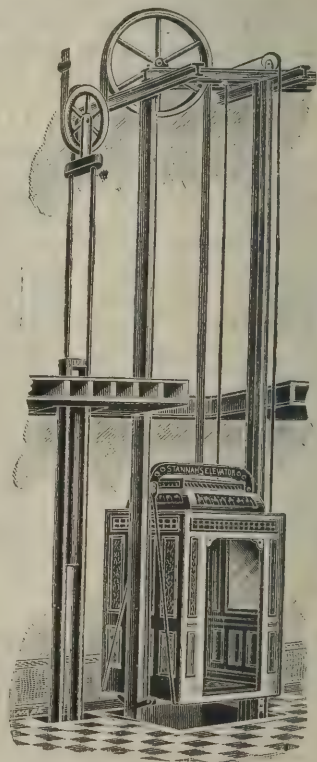
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THE LIBERATOR ESTATES.

MORE than ordinary interest attaches to the several estates forming part of the assets of the ill-fated Liberator Building Society, which are announced for sale by Messrs. Douglas, Young & Co., at Winchester House, on Wednesday next, the 7th inst. The most important of these is the Gidea Hall Estate at Romford, comprising the fine old mansion (with whose name is associated one of the most learned and gifted families of a past era) and six modern detached houses, besides nearly 500 acres of freehold land, with which is included the Manor, or reputed Manor, of Gidea Hall, with the rights and appurtenances. Then there is the Clapham Park Estate, comprising over 43 acres of building land, besides three mansions known respectively as Lincoln House, Clarence House and the Woodlands. Next comes the Chingford Rise Estate, adjoining Chingford Railway Station, which comprises twenty-seven detached and semi-detached villas, besides nearly 100 acres of building land, with a total frontage of over 20,000 feet. In addition there is the Norbury Park Estate, on the main road to Croydon, adjoining Norbury Station (L. B. and S. C. Railway), comprising 68 acres of freehold building land, which will afford sites, it is computed, for about 300 residences. And lastly, there is the Tilbury Docks Estate, comprising 310 freehold and 39 leasehold houses and shops, besides 26 acres of freehold building land, for the most part laid out with roads formed ready for building.

BATTERSEA PARK EMBANKMENT.

A PROPOSAL will shortly come before the London County Council for the construction of a suitable embankment along the whole river frontage of Battersea Park. The existing river wall is of a very slight nature, and a large proportion of it is in an extremely bad condition. The parks and open spaces committee of the Council, who are making the present proposal, state that the present wall may be described as a mere skin of concrete blocks, generally 9 inches in thickness and in some cases less. For some years past it has been the practice to patch the worst places from time to time at an annual outlay of some 400*l.* or 500*l.* The result, however, has not been satisfactory, and the deterioration which has arisen in past years has not been overtaken, so that the wall is steadily growing worse.

The Council's engineer reported in 1895 that the cost of putting the wall in a proper state of repair, if undertaken at that time, would be about 6,000*l.*, and that even then there would be a subsequent annual charge of about 200*l.* for its maintenance. Under these circumstances the committee are firmly of opinion that the best and most economical course would be to reconstruct the wall in a substantial manner. The length of the river front of the park is about 1,300 yards, or about $\frac{3}{4}$ of a mile, and the engineer is of opinion that a granite-faced wall with a granite parapet can be constructed there for the sum of 43,500*l.* In view of the large recurring charge for maintaining the existing wall and of the economy that would ultimately be effected by the substitution for it of a permanent granite embankment, and also taking into account the enhancement of the appearance of the park, the committee strongly recommend the Council to adopt their scheme. It is proposed that the cost of the improvement shall be charged to capital account, the repayment being spread over the full term of the stock, out of the proceeds of the issue of which the cost would be defrayed.

BARS IN LONDON STREETS.

IN furtherance of their desire to remove the remaining bars and gates which obstruct the street traffic of London, the highways committee of the London County Council have been considering what course they should pursue. In a report which they will shortly present to the Council they state that they have had before them a list, compiled from information received from the various vestries and district boards, of existing obstructions to the free use of streets and places in London. By far the largest proportion of the 217 places specified in the list were blind turnings, and as the opening up of those, even if deemed advisable, would involve the removal of buildings, they do not think the Council should take any action in regard to them. From a report by the engineer of the result of an inspection made under their instructions as to other places mentioned in the list, it appeared—(a) That at nine places the obstructions could be removed, but that no great advantage would ensue; (b) that at seven places the obstructions might be removed for strictly local considerations, and in the opinion of the committee the matter could be left to the respective local authorities to deal with; (c) that at nine places the removal of the obstructions would, owing to various causes, be inadvisable.

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and might prove a source of danger, whilst two of the places obstructed were adapted and used for foot traffic only. The committee therefore, upon full consideration of the circumstances, have come to the conclusion that as regards six places only it is expedient that powers should be sought by the Council for the removal of the obstruction. They accordingly recommend that powers should be sought in the next Session of Parliament for the removal of the bar in Brunswick Square, Camberwell, the toll-gate in College Road, Camberwell, the gate in Duncan Terrace, Islington, the gate in Nelson Square, Blackfriars Road, the gates in Montague Place, Tooley Street, and the walls in Cæsar Street, Shoreditch.

THE WESTERN AUSTRALIAN CASKET.

THE casket which is to contain the address to Her Majesty the Queen from the Houses of Parliament of Western Australia on the occasion of the Jubilee celebrations has arrived in London, and will be on view for a few days at Messrs. Gillow & Co.'s premises. The address was designed and illuminated by Mr. A. G. Stach, of the Engineering Surveys branch of the Public Works Department. The illumination takes the form of floral designs, the subjects being the wild flowers of the colony.

The base of the casket is formed of a slab of kauri, highly polished and inlaid on the top with pear wood, having an enriched border of jarrah. The inscription plate attached to the base is in the form of a gold shield and is engraved as follows:—"From the Parliament of the colony of Western Australia to Her Majesty Victoria, Queen and Empress, in commemoration of her reign of sixty years. 1897." The supports of the casket itself are large blocks of rich quartz in the rough, containing altogether about 40 ounces of gold. On these rich quartz supports rest, amongst silver rushes, four swans, sitting diagonally to the square lines of the casket, with conventionally enriched wings, carried on by an enriched curving leaf covering the angles of the box. The swans are of large size, and are of cast copper and tin alloy.

The lower portion of the body of the casket which rests between the upstretched wings of the swans is of highly-polished jamwood, so called from the curious odour of raspberry jam attaching to it, and the upper portion is of figured banksia wood, carved with flutes, and topped with a border of curly jarrah under the closing line of the lid, the line itself being

guarded by a narrow-chased gold ribbon. The jamwood lower portion is covered with gold latticing up to about the central half height of the box, and around the lower margin runs a copper ribbon with small gold nuggets inserted at short intervals throughout.

On the front face of the casket is a large chased gold plate surrounded by foliated gold fretwork, forming a rich panel, enclosing three pearl-shell medallions, on the centre shield-shaped one of which is engraved a view of the pearl-fishing industry, those on either side of circular form depicting scenes of the agricultural and pastoral industries. On the reverse side a corresponding gold plate and panel encloses three other pearl-shell medallions, the central one depicting a timber-cutting scene in the forests, while those on either side represent scenes illustrating viticulture and mining.

In the centre of the front is the lock, framed in a gold plate surrounded with the monogram V.R.I., and surmounted with a gold crown mounted on its four ribs with pearls. The key is of solid gold, handsomely mounted and handled. The handles at each side have copper fastenings and are themselves of jamwood, with gold mountings. The woodwork of the lid is mainly composed of jarrah carved in nilling in bold relief, the border round the closing edge being of sandalwood enriched with carvings of the curious nuts of the banksia. The centre portion of the top is an oval panel of polished pear wood, enclosed by an enriched border of carved sandal wood. On the front face of the lid, over the lock, are mounted the Royal arms, and on the reverse face the arms of Australia, both richly embossed in pure gold, with the shields and quarterings in enamel. Round the closing line of the lid runs a copper ribbon with nuggets similar to that at the bottom of the body.

On the top of the casket is mounted, on gold supporting claws, a large and very rich specimen of white quartz, with coarse gold showing all over and through and underneath, having also attached to it an exceedingly rich smaller specimen showing crystals of both gold and quartz. These specimens contain altogether over 20 ozs. of gold, and are surmounted by a small golden emu. The inside of the box and lid is lined with corded blue silk, on which will be laid the illuminated address.

The value of the casket is about 500*l.*, a very large proportion of which is represented by the very rich quartz specimens in the supports and on the top, and the nuggets in the borderings; while the gold inscription plate, the embossed Royal and Australian arms, the gold panels in the front and

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back, the pearls on the crown over the lock, and the goldsmith's work in the general enrichments are responsible for most of the remainder, the intrinsic value of the box itself being but small.

The whole of the woods named in the above description are those of the colony, and much care has been taken to obtain thoroughly seasoned and representative blocks of them from which to cut out the portions for the various parts of the box. The copper and tin from which the swans are cast represent the copper mines at Northampton, in the neighbourhood of Geraldton, and the tin-fields in the south-west and north-west portions of the colony. The pearl-shell medallions in the front and back gold panels, and the pearls on the crown over the lock come from the pearl-fields of the north-west. The gold used throughout is from the various rich fields of the colony, including Kimberley, Pilbarra, Murchison, Lawlers, Menzies and neighbourhood, Kalgoorlie, Coolgardie and Dundas. The rich quartz specimens forming the supports of the casket came from the Mainland Consols, Lake Austin, on the Murchison gold-field, and the beautiful white and crystal quartz specimens surmounting the whole casket from the Welcome mine, near Mount Magnet.

The casket was generally designed and its construction superintended by Mr. E. H. Hamilton, of the Architectural Division of the Public Works Department, assisted by suggestions from Mr. H. C. Prinsep, Under-Secretary for Mines, Mr. H. W. Gibbs, of the Lands and Survey Department, and several other officers of the public service, whose artistic faculties and attainments were called upon. Mr. Prinsep kindly took upon himself, aided by the Minister of Mines, to procure the rich quartz specimens.

The woodwork of the box was framed and carved locally, under Mr. Hamilton's direction, chiefly by Messrs. Cohen & Madeley. The goldsmith's work was entrusted to Mr. Jerger, who from the first has given unwearied energy and talent to its artistic completion with very excellent results, well aided by Messrs. Donovan & Overland in the manufacturing goldsmith's work, and by special workmen, fortunately obtained by Mr. Jerger at the right moment. The heavy gold work throughout has been very artistically finished, especially considering the very short time available, His Excellency the Governor, after a closely critical examination, expressing the opinion that the workmanship would compare not unfavourably with that of English firms. The embossing work in the Royal and Australian arms is especially fine, while the rich gold panel-plates in the back and front of the casket are also very fine productions of

the goldsmith's art. The engravings of the various scenes illustrative of the principal industries of the colony upon the six pearl-shell medallions has been very finely and artistically executed. The whole of the work of and in the casket has been carried out in Perth, and it is a genuine product of the colony, both in materials and workmanship, throughout, and should hold its own well among the very numerous presents which will be made to Her Majesty from all parts of the empire in commemoration of the record reign.

SHOREDITCH ELECTRIC LIGHTING.

ON Monday the new system of electric lighting adopted by the Shoreditch Vestry was inaugurated by Lord Kelvin. His lordship said that it was worthy of the Victorian era as an example of the combination of scientific forethought, mechanical skill and courage, which had nothing of gambling in it, but simply brought into practice recognised engineering possibilities. Shoreditch might be proud of what she had done. Dust destructors had been tried for some years in order to get quit of refuse at a lower cost than was required for spreading it on the ground or carrying it out to sea, but little had been done in the way of using the heat of these dust crematories for raising steam. Shoreditch was the pioneer vestry in this respect. But this was only the small beginning of what would be a much greater thing. All the dust would soon be used in this way, and neighbouring vestries might come to Shoreditch and offer 2s. a ton if it would take their refuse and make light and power from it. Corporations were now waking up to the possible prospect of using electricity for the transmission of power, and it was almost certain that in Shoreditch, which possessed the centre of gravity of the cabinet-making industry, electric motors would be substituted for gas engines, and much of the work would be done by energy obtained from dust and transmitted by electricity. With regard to electric light, at the price at which the vestry were going to supply it, he believed it would be less costly than gas at 2s. 10d. a thousand feet, and he would advise all the people of Shoreditch to give it a trial.

About five years ago the vestry obtained a provisional order for the supply of electricity, and then the idea was conceived of combining the destruction of household refuse with the production of electric energy—in other words, of utilising the heat liberated by the burning of the dust for raising steam with

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which to drive electric machinery. The practicability of the proposal having been favourably reported on by the experts consulted, the vestry proceeded to look for a site upon which to erect the necessary plant. A good deal of delay was caused by the difficulty of finding one at a moderate price. At length, however, one was obtained in Pitfield Street, which, with additional purchases in Coronet Street, was large enough to accommodate not only the dust-destructors and electric-lighting station, but also public baths and washhouses and the free library. Discussion of details between the various bodies concerned caused further delays, with the result that the electric-lighting station is only now in working order.

The main interest of the installation lies in the fact that the dust is being burnt to raise steam. Dust destructors are common enough, but their heat has not hitherto been utilised on any considerable scale. In the present case there are twelve destructor cells, each having a grate area of 25 square feet and heating six water-tube boilers working at a pressure of 200 lbs. to the square inch. The chimney is 150 feet high and 7 feet in internal diameter at the top, and in addition there are three electrically-driven fans, which each deliver 8,000 cubic feet of air a minute with a maximum ash-pit pressure of 3 inches of water. An interesting feature is the employment of Mr. Druitt Halpin's system of feed thermal storage. As it is necessary to keep the destructors burning continuously, steam is generated during all the twenty-four hours. But as power is required on a large scale during only a portion of that time, in order to reduce waste a plan of heat storage has been introduced, by which during the day steam is mixed in a vessel with cold water in such proportions that at evening the cylinder is full of water at the temperature and pressure of the steam required by the engines. The boilers are fed with this heated water and are said to be enabled in consequence to produce one-third more steam than they would if working with water direct from the mains. As to the amount of refuse consumed it is expected that the most efficient rate will be between eight and twelve tons a day. The electrical plant at present consists of three generators working at 1,100 volts, and three low-tension dynamos at 165 volts. All are driven by Willans's three-crank engines, coupled direct. The current supplied is continuous, the choice being determined by the large employment of electric motors that is anticipated in the district, and the distribution is on the continuous current motor transformer (Oxford) system. At present the vestry pays 3s. 2d. a ton for the disposal of its refuse, and it calculates that by burning it it

will save about 2s. a ton. In consequence it is prepared to supply electricity at 6d. a unit for the first two hours and 4d. an hour afterwards, while during the hours of daylight the price charged will be 2d. a unit. A contract has been concluded with a syndicate which will supply electricity at 6d. per unit at all hours by means of the penny-in-the-slot system, and will also supply fittings free of charge to the consumer; while another syndicate will supply free fittings to consumers who are ready to pay 4d. per unit more than the vestry's actual charges. Orders have already been received to nearly the full capacity of the present plant.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

14360. John Gunnings, for "Holder for stair-rods, curtain-rods and the like."

14378. Eliah Box, for "Improved mode of securing pipes in sockets."

14388. Karl Dams, for "Improved couch for use in connection with steam baths."

14414. Jabez Barnes, for "An improvement in cornice-pole ends."

14419. Robert Catton and Samuel Gater, for "Improved construction of sliding window-sashes."

14431. Edmund Charles Herne, for "Improvements in sash-fasteners."

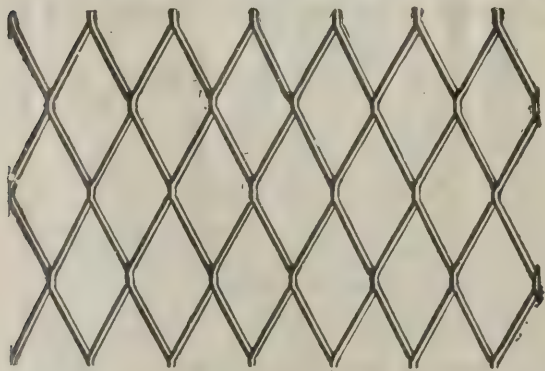
14515. Henry Harris Lake, for "Improvements in apparatus for heating buildings and structures."

14600. Harold John Richardson, for "Improvements in ventilators."

14616. Thomas Clifford Nixon, for "An improved pipe-coupling."

TO INVENTORS.—Patents for Inventions, Trade-marks and Designs secured; every assistance given to inventors. Specialists in Building matters. Information free.—Messrs. RAYNER & Co., Patent Agents, 37 Chancery Lane, London, W.C.

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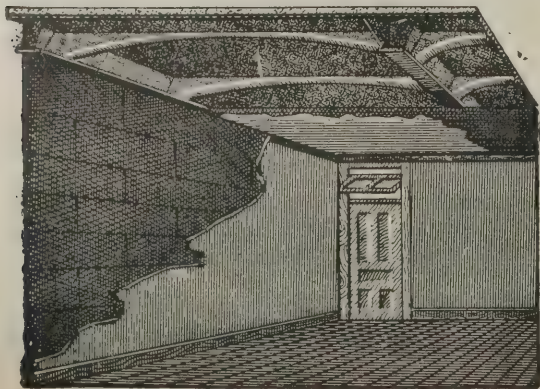
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The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

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Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

For Advertisement Scale, see page xiii.

COMPETITION OPEN.

BOOTLE.—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000l. Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

CONTRACTS OPEN.

ABERDARE.—July 14.—For erection of 35 houses and drainage at Cae Smith, Abernant. Messrs. Watkins & Davies, architects, 4 Canon Street, Aberdare.

ABERTILLERY.—July 12.—For erection of a school to accommodate 250 girls. Mr. George Rosser, architect, Victoria Buildings, Abercarn.

ARNSIDE.—For erection of two semi-detached villas. Mr. John Stalker, architect, 57 Highgate, Kendal.

AYCLIFF.—July 14.—For erection of schools. Mr. F. H. Livesey, architect, Market Place, Bishop Auckland.

BARNSTAPLE.—July 15.—For the following works for the Lynton and Barnstaple Railway Company:—(1) Station building at Chelfham; (2) station building at Bratton Fleming; (3) engine-shed at Lynton terminus; (4) water supply, appliances, &c., at (a) Barnstaple station and yard, (b) Chelfham, Blackmore Gate and Bratton Fleming stations, (c) Martinhoe

Cross and Lynton stations, (d) water columns and tanks. Mr. Frank W. Chanter, engineer, Bridge Chambers, Barnstaple.

BATLEY.—July 12.—For erection of twelve houses, out-buildings and boundary walls in Talbot Street. Mr. J. H. Brearley, architect, Hanover Street, Batley.

BELFAST.—July 13.—For erecting lavatory and water-closet accommodation at female infirm wards. Mr. James C. Neeson, clerk of union, Clerk's Office, Union Workhouse.

BIGRIGG.—July 14.—For erection of a farmhouse at Springfield. Mr. S. D. Stanley-Dodgson, Somerset House, Whitehaven.

BISHOP AUCKLAND.—July 17.—For building a new police station at Birtley, for the Durham County Standing Joint Committee, and widening Newton Cap Bridge over the Wear at Bishop Auckland. Mr. William Crozier, Shire Hall, Durham.

BOSCOMBE.—July 12.—For erection of bank premises. Mr. Geo. M. Silley, architect, 17 Craven Street, W.C.

BOURTON-ON-THE-WATER.—July 24.—For erection of hall and reading-room. Messrs. Prothero & Phillott, Cheltenham.

BOZEAT.—July 15.—For erection of a working-men's club. Mr. Wm. Bettles, secretary.

BRADFORD.—For erection of twelve through houses in Barkerend Road. Mr. G. C. Gamble, architect, Parkinson's Chambers, Market Street.

BRADFORD.—July 12.—For erection of school at Sandy Lane. Messrs. Peterson & Lawson, architects, 1 Bank Street, Bradford.

BRIDLINGTON.—July 13.—For erection of three houses. Mr. J. Earnshaw, architect, Bridlington Quay.

BRISTOL.—July 13.—For erection of seven workmen's dwellings, Bragg's Lane, St. Jude's. Mr. Thomas Henry Yabbicom, city engineer, 51 Prince Street, Bristol.

BRITON FERRY.—For erection of a house. Mr. J. C. Rees, architect, St. Thomas's Chambers, Church Place, Neath.

BURNLEY.—July 14.—For alterations at the workhouse. Mr. S. Keighley, Nicholas Street, Burnley.

CARDIFF.—July 13.—For converting 44 Cowbridge Road into business premises. Mr. W. H. Dashwood Caple, architect 1 St. John's Square, Cardiff.

CARDIFF.—July 15.—For erection of Baptist schools, Albany Road. Messrs. Habershon & Fawckner, architects, 4 Pearl Street, Cardiff.

CARLISLE.—July 14.—For erection of seven dwelling-houses in Nelson Street. Messrs. Johnstone Bros., architects and surveyors, 32 Lowther Street, Carlisle.

CARLISLE.—July 24.—For providing additional water-closet accommodation to wards Nos. 1 and 2 at Garlands Asylum. Mr. Geo. Dale Oliver, county architect, 5 Lowther Street, Carlisle.

CARLISLE.—July 12.—For construction of a bowling-green, with banks, footpaths, gutters, &c., at Fusehill Street; also for erection of a pavilion, urinals, boundary wall, &c. Mr. Henry C. Marks, city engineer and surveyor, 36 Fisher Street.

CASTLETON.—For erection of a Wesleyan chapel at Castleton. Mr. Herbert W. Lockwood, architect, Palatine Chambers, Pinstone Street, Sheffield.

CATFORD.—For erection of eight terrace houses on the land situated on the west side of Beechfield Road. Messrs. Phillips & Norfolk, architects, Catford Bridge, S.E.

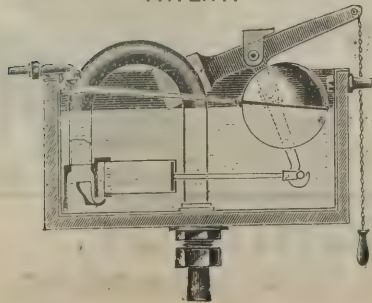
CATFORD.—For erection of three terrace houses, two shops and stable on land situate in Bradgate and Silvermere Roads. Messrs. Phillips & Norfolk, architects, Catford Bridge, S.E.

CHELTENHAM.—July 28.—For erection of a kursaal and municipal offices on the Winter Garden site. Mr. E. R. Robson, architect, 9 Bridge Street, Westminster.

CHESTER.—July 19.—For restoration after fire at the town hall and works connected therewith. Messrs. Thomas M. Lockwood & Sons, architects, 80 Foregate Street, Chester.

ARCHITECTS PLEASE NOTE.

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CLACTON-ON-SEA.—For erection of a block of shops, residences and stables, corner of Wellesley and Carnarvon Roads. Mr. James W. Martin, architect, Station Chambers, Clacton-on-Sea.

CLOWN.—July 19.—For erection of six houses. Mr. B. Davies, Crown Inn, Clown.

COLNE.—For erection of master's house and accommodation for twenty-four boarders in connection with Earl's Colne Grammar School, Essex. Mr. Henry A. Cheers, architect, Twickenham.

COVENTRY.—July 14.—For repairs, painting, whitewashing, &c., at the Coventry and Warwickshire Hospital, Stoney Stanton Road. Mr. Herbert W. Chattaway, architect, Trinity Churchyard, Coventry.

COVENTRY.—July 16.—For additions to Union Street Schools. Messrs. George & Isaac Steane, architects, Coventry.

CREWE.—July 19.—For erection of shedding and other works in connection with the annual exhibition of the Cheshire Agricultural Society to be held on August 28. Mr. Thos. A. Beckett, secretary, St. Werburgh's Chambers, Chester.

CUPAR-FIFE.—July 14.—For renovating the mansion-house of Rungally. Mr. David Storrar, architect, Cupar-Fife.

CUPAR-FIFE.—July 12.—For erection of a cottage at West End. Mr. David Storrar, architect, Cupar-Fife.

DERBY.—For taking off slating and for making slight alterations to, and boarding and reslating roofs of old foundry at Vulcan Ironworks. Mr. Ernest R. Ridgway, architect, Long Eaton.

DEVIZES.—July 20.—For construction of engine-house, boiler-house, with coal store and chimney-stack, Wilts County Asylum. Messrs. Massey & Allpress, 25 Queen Anne's Gate, Westminster, S.W.

DORCHESTER.—July 14.—For erection of six terrace houses on the Victoria Park Estate. Mr. J. Feacey, South Walks, Dorchester.

ELGIN.—July 13.—For alterations and renewals to farm steading and additions to dwelling-house. Mr. Charles C. Doig, architect, Elgin.

ESSEX.—July 13.—For foundations, in part, of large lunatic asylum, Chadwell Heath, Ilford. Mr. Lewis Angell, borough engineer, Town Hall, Stratford, E.

FELIXSTOWE.—July 21.—For erection of a large shelter in the cliffs at Felixstowe, near the town hall. The Chairman, general purposes committee, Town Hall, Felixstowe.

FORD.—July 15.—For erection of dwelling-house and dog-kennels. Messrs. J. Stevenson & Son, architects, Berwick-upon-Tweed.

GOOLE.—July 26.—For extension of Boothferry Road Schools, for the Goole School Board. Mr. W. B. Andrews, architect, 24 Boothferry Road, Goole.

GREAT CORBY.—July 12.—For erection of a Jubilee cottage, for the trustees of the Great Corby reading-room. Mr. A. W. Johnston, architect, 81 Castle Street.

GREAT HORTON.—July 16.—For erection of a branch store and two through houses in St. Margaret's Road. Messrs. John Drake & Son, architects, Queensbury.

GRIMSBY.—For erection of a store on the Fish Dock. Mr. E. de Lacy Read, secretary, Fish Docks.

GUILDFORD.—July 12.—For erection of a brick chimney shaft at the sewage outfall works. Mr. C. G. Mason, borough surveyor, Tuns Gate, Guildford.

HALIFAX.—July 12.—For outside pointing of Booth Town School, for the Halifax School Board. Mr. W. H. Ostler, 22 Union Street.

HALIFAX.—July 14.—For erection of mill, engine-house, boiler-house, offices, 40 yards chimney, and reservoir on the Blackwood House Estate. Messrs. Chas. F. L. Horsfall & Son, architects and surveyors, Lord Street Chambers, Halifax.

HALIFAX.—July 28.—For erection of fireproof stables for eighty horses, large coach-houses, offices, manager's residence, &c., in Fenton Road, King Cross. Messrs. Richard Horsfall & Son, architects, 15 George Street, Halifax.

HALIFAX.—July 12.—For building stable, &c., at the Robin Hood Inn, Pecket Well. Mr. W. H. D. Horsfall, architect, 9 Harrison Road, Halifax.

HARROGATE.—For erection of stables, &c., to the Victoria Hotel. Mr. Albert E. Kirk, architect, 13 Bond Street, Leeds.

HARROW.—July 13.—For erection of a cookery-room at the Harrow Weald Old Schools. Messrs. Houston & Houston, architects, 5 York Buildings, Adelphi, W.C.

HERTFORD.—July 17.—For rebuilding of Nash Mills county bridge. Mr. Urban A. Smith, county surveyor, 41 Parliament Street, S.W.

HORLEY.—July 16.—For building schoolroom and out-offices, and for alteration of the present buildings. Mr. H. Hopkins, Southam Road, Banbury.

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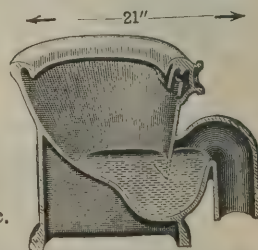
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VOLUME LVI. OF THE ARCHITECT.

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HORNBY CASTLE.—July 12.—For erection of farm buildings and covered fold yard, &c., at Street House Farm. The Estate Office, Hornby Castle.

HORSHAM.—July 13.—For erection of a new house and shops at New Street. Mr. C. H. Burstow, architect, 5 Cook Street, Liverpool.

HYDE.—For alterations to St. Paul's Catholic schools. Mr. Edmund Kirby, architect, 5 Cook Street, Liverpool.

ILFORD.—July 13.—For foundations, in part, of a large lunatic asylum at Chadwell Heath. Mr. Lewis Angell, borough engineer, Town Hall, Stratford, E.

INVERNESS.—July 17.—For additions and alterations to Arisaig Hotel. Mr. Dun. Cameron, architect, Inverness.

IRELAND.—For building business premises and residence at Dundrum, co. Down. Mr. J. J. McDonnell, architect, 27 Chichester Street, Belfast.

KIDDERMINSTER.—July 15.—For alterations and additions to the girls and infants' departments of the Coventry Street Schools and the girls' department of the Hume Street Schools. Mr. J. T. Meredith, architect, Bank Buildings.

KENDAL.—July 13.—For additions and alterations at Audland Park, Old Hutton. Mr. G. L. Hoggarth, architect, Kendal.

KILLMARSH.—For erection of six houses. Mr. Wm. Hy. Wagstaff, architect, Chesterfield.

KNUTSFORD.—July 13.—For taking-down of the present footbridge over Waterless Brook, Tabley, and the building of either (1) an iron girder bridge or (2) a stone bridge. Mr. J. M'D. McKenzie, surveyor, 7 Market Street, Altrincham.

LANCASTER.—July 20.—For erection of four shops. Mr. J. Parkinson, architect, 67 Church Street, Lancaster.

LEEDS.—July 15.—For erection of eight houses at Haigh Park Chemical Works, Rothwell Haigh. Mr. E. Barton Johnson, architect, Ilkley.

LOWESTOFT.—July 20.—For erection of an annexe to the infirmary at Oulton Workhouse, near Lowestoft. Mr. Alfred Clarke, architect, 126 London Road, Lowestoft.

MANCHESTER.—July 26.—For erection of sixty dwelling-houses at Lodge Street, Junction Street and Malton Street, Miles Platting. City Surveyor, Town Hall, Manchester.

MILTONDUFF.—July 15.—For erection of duty free warehouse. Mr. Charles C. Doig, architect, Elgin.

MINEHEAD.—July 19.—For erection of a constable's quarters and two cells. Mr. Rolfe, 14 George Street, Bath.

MORPETH.—July 17.—For erection of general bathrooms and outside corridors at the County Lunatic Asylum. Mr. John Cresswell, county architect, Moot Hall, Newcastle-on-Tyne.

NEW WORTLEY.—For erection of four houses. Plans, &c., may be seen at the Crown Hotel, New Wortley.

ODIHAM.—July 12.—For erection of schools in the Bury Fields. Messrs. Colson, Farrow & Nisbett, architects, 45 Jewry Street, Winchester.

OSWALDTWISTLE.—July 14.—For restoration of the parish church. Mr. B. Walmsley, 30 Rhyddings Street, Oswaldtwistle.

OVER KELLET (LANCS.).—July 22.—For erection of house. Mr. J. Parkinson, architect, 67 Church Street, Lancaster.

PENYNGROES.—July 17.—For erection of Penyngroes County School. Mr. E. Evans, architect, 8 Castle Street, Carnarvon.

PENYNGROES.—July 17.—For erection of county school. Mr. E. Evans, architect, 8 Castle Street, Carnarvon.

PIRBRIGHT.—July 14.—For erection of thirteen cottages and forge at Pirbright. Mr. William I. Chambers, architect, Savoy House, Strand, W.C.

RADSTOCK.—July 19.—For enlarging Radstock working-men's hall. Mr. W. J. Wilcox, architect, 1 Belmont, Bath.

RAVENSTHORPE.—July 14.—For erection of an addition to Netherfield Mills, Ravensthorpe. Messrs. C. H. Marriott & Son, land surveyors and architects, West Park Street, Dewsbury.

READING.—For repairs to four houses. Messrs. Heron & Heron, 135 Victoria Street, Westminster, S.W.

ROCHDALE.—For erection of Congregational schools, Rochdale Road, Shaw. Mr. Fredk. W. Dixon, architect, Trevelyan Building, Manchester.

ROSS.—July 26.—For additions and alterations to mission-room, St. Mary's Church. Rev. E. H. W. Ingram, The Rectory, Ross.

ROTHERHAM.—July 13.—For renovation and alterations to Christ Church, Parkgate. Mr. J. Platts, architect and surveyor, Old Bank Buildings, Rotherham.

SCOTLAND.—July 13.—For erection of a villa at Letham, in the parish of Monimail. Mr. David Storrar, architect, Cupar-Fife.

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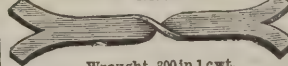
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SCOTSTONHILL.—July 13.—For rebuilding steading. Messrs. A. & R. Reid & Wittet, architects, Elgin.

SHAP.—July 13.—For alterations at Threaplands. Mr. G. L. Hoggarth, architect and sanitary engineer, Kendal.

SHILDON.—July 14.—For additions to Primitive Methodist schools. Mr. J. W. Taylor, architect, 31 Westgate Road, Newcastle-on-Tyne.

SOUTHALL.—July 12.—For erection of public offices and a caretaker's house, High Street. Mr. Thomas Newell, architect, High Street, Southall.

SUFFOLK.—July 23.—For erection of a teacher's residence in connection with the Swilland Schools, for the Swilland School Board. Mr. John S. Corder, architect, Wimbourne House, Ipswich.

SURBITON.—For removal of a building, consisting of twenty rooms, hall, staircase and passages, known as Hill House, situate at the corner of Ewell and Berrylands Roads, Surbiton Hill. Mr. Saml. Mather, Surveyor's Office, Victoria Road, Surbiton.

THORNABY-ON-TEES.—July 17.—For completion of the tower (without spire) of St. Paul's Church. Messrs. T. H. & F. Healey, architects, 42 Tyrrel Street, Bradford.

THORNE.—July 16.—For erection of a house. Mr. H. B. Thorp, architect and surveyor, Goole.

THORNBURY.—July 13.—For erection of four terrace houses in Leeds Old Road. Messrs. Fairbank & Wall, architects, Craven Bank Chambers, Bradford.

TODMORDEN.—July 12.—For erection of a new exhaustor-house at the gasworks, Millwood. The Borough Engineer and Surveyor, Town Hall.

WALES.—July 15.—For erection of infants' department at Palmerstown Road Board Schools, Cadoxton, Barry, to accommodate 290 children, with outbuildings and boundary walls. Mr. W. H. Dashwood Caple, architect, 1 St. John's Square, Cardiff.

WALES.—July 14.—For building a vicarage at Henllys, near Newport, Mon. Mr. E. M. Bruce-Vaughan, architect.

WALES.—For erection of eight workmen's cottages at Mount Pleasant, Abertillery, Mon. Messrs. Lansdowne & Griggs, architects, Metropolitan Bank Chambers, Newport, Mon.

WALSALL.—July 19.—For erection of infants' school to accommodate 350 children at the Croft Street Schools, Birchills. Messrs. Bailey & McConnal, Bridge Street, Walsall.

WHITSTABLE.—July 20.—For construction of a gasholder tank, 62 feet by 16 feet 6 inches. Mr. H. E. Jones, C.E., Gasworks, Harford Street, Stepney.

WIMBLEDON.—July 19.—For erection of stabling, out-offices and dwellings at lower storeyard, Queen's Road. Mr. C. H. Cooper, surveyor, Council Offices, Broadway, Wimbledon.

WINCHMORE HILL, N.—July 23.—For alterations to latrines, provision of urinals, &c., at the Northern Fever Hospital. Chief Office of the Board, Norfolk House, Norfolk Street, Strand, W.C.

WOKING.—For erection of Conservative club premises on a site in the Commercial Road. Mr. F. W. Austin, secretary, 20 Cheapside, E.C.

TENDERS.

BIRMINGHAM.

For widening and making two roads, known as Avenue Road, King's Heath, and Quarry Lane, Northfield, also for the taking-down and rebuilding of California Bridge. Mr. AMBROSE W. CROSS, surveyor, 23 Valentine Road, King's Heath.

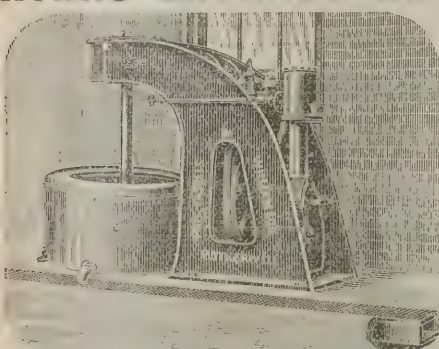
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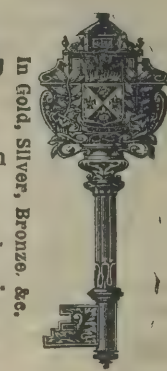
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H. Holloway	506	9	0
Currall, Lewis & Martin	483	5	0
JONES & FITZMAURICE, Browning Street, Birmingham (accepted)	479	12	0

BIRSTALL.

For alterations to two shops in Market Place. Mr. JOHN H. BREARLEY, architect, Hanover Street, Batley.

Accepted tenders.

H. Crosland, Staincliffe, mason	£150	0	0
J. Clegg, joiner	110	0	0
J. North, plumber	50	0	0
R. Barraclough, plasterer	30	0	0
J. Rhodes, slater	22	0	0
W. Frith, painter	20	0	0

BOLSOVER.

For rebuilding, restoration and enlargement of the parish church of St. Mary, Bolsover, near Chesterfield, Derbyshire. Messrs. PINKS & WATSON, 45 Parliament Street, Westminster, quantity surveyors. Mr. LOUIS AMBLER, architect.

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Foster & Dicksee	8,650	0	0
J. SHILLITOE & SON, Bury St. Edmunds (accepted)	8,300	0	0

CASTLEFORD.

For erection of three terrace houses at Normanton Common. Mr. GEORGE F. PENNINGTON, architect and surveyor, Bridge Street, Castleford.

SMITH & PARKER (accepted) £690 0 0

BRACKNELL.

For erection of police-station. Mr. JOSEPH MORRIS, county surveyor, Reading. Quantities supplied.

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W. Watson	1,280	0	0
C. Woodbridge	1,198	0	0
G. H. Tucker	1,194	0	0
F. Newberry	1,173	0	0
H. Clark	1,149	0	0
E. C. Hughes	1,118	16	10
G. Wernham	1,118	5	10
East & Hyde	1,087	6	0
Seward	1,026	0	0
W. J. MAY, Bracknell (accepted)	997	10	0

BRAY.

For steelwork to bridge. Mr. JOSEPH MORRIS, county surveyor, Reading. Quantities supplied.

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Baker	901	6	0
Budd & Power	889	0	0
Picken	785	0	0
G. Wade	749	0	0
Gardiner & Hazell	635	0	0
Searle	597	17	6
MCKENZIE, Mortimer Road, Kensal Rise (accepted)	517	0	6

COCKERMOUTH.

For building bridge and lowering the bed of the stream at Blackbeck, near Pardshaw. Mr. J. B. WILSON, C.E., surveyor, Court House Buildings, Cockermouth.

No. 1.—Lowering Stream.

R. Coupar	£80	11	0
T. Woodward	76	4	2
Wren & Lindsey	56	7	6
J. GREEN, Pardshaw (accepted)	47	1	2

No. 2.—Bridge.

Wren & Lindsey	54	10	0
J. GREEN (accepted)	47	2	0

CROMER.

For the addition of a cookery classroom to the new Board schools, for the Cromer School Board. Messrs. BOTTLE & OLLEY, architects, Great Yarmouth.

J. WHITE, Cromer (accepted)	£375	0	0
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DARTFORD.

For laying surface-water drains in, making-up and paving the Kent, Essex and Westgate Roads, and Highfield Road North. Mr. GEO. W. COBHAM, surveyor.

Kent Road Maintenance Company, Limited	£2,438	0	0
J. Mowlem & Co.	2,237	0	0
A. T. Catley	2,200	0	0
T. ADAMS, Wood Green (accepted)	2,118	0	0

DEVONPORT.

For supply of machinery and fittings for a laundry, for the Guardians of Stoke Damerel.

BENHAM & SONS, LIMITED, London, W. (accepted)	£198	15	0
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DEWSBURY.

For erection of six terrace houses, outbuildings and boundary-walls in Savile Road, Savile Town. Mr. JNO. H. BREARLEY, architect, Hanover Street, Batley.

Accepted tenders.

E. Mercer, Ossett, mason	£1,600	0	0
G. Bailey, Earlsheaton, joiner	680	0	0
F. Bottomley, Dewsbury, plumber	280	0	0
Kitchingman & Raye, Batley, plasterer	199	0	0
W. H. Thompson, Batley, slater	145	0	0
W. H. Thompson, painter	78	0	0

DOVER.

For erection of a car-shed at Buckland. Mr. HENRY E. STILGOE, borough engineer, Town Hall, Dover.

R. W. Paramor	£1,723	0	0
T. T. Denne	1,543	0	0
G. F. Keeler	1,495	0	0
G. MUNRO, Dover (accepted)	1,440	17	6
Engineer's estimate	1,600	0	0

DURHAM.

For construction of 232 lineal yards of 6-inch pipe sewers, with inspection, flushing and ventilation shafts in connection therewith, at Quarrington Hill. Mr. GEORGE GREGSON, surveyor.

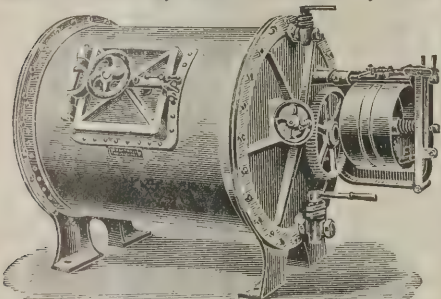
D. Champney	£55	0	0
J. Carrick	53	7	7
H. Nicholson	53	0	0
J. HESLOP, Pitlington (accepted)	51	17	0
Surveyor's estimate	55	0	0

EARLSHEATON.

For erection of two houses and outbuildings. Mr. JOHN HY. BREARLEY, architect, Hanover Street, Batley.

Accepted tenders.

R. Wainwright, mason	£220	0	0
A. Marshall, joiner	60	0	0
G. Fawcett, slater	23	0	0
Kitchingman & Raye, plasterer	12	0	0
G. Fawcett, painter	12	0	0
B. Scott, plumber	10	0	0

MACINTOSH, MEIKLE & CO., LIM.

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56 BATHWELL ST. GLASGOW.

ELGIN.

For laying about 2,400 yards of cast-iron piping, the formation of a concrete reservoir and other works. Mr. ALEXANDER HOGG, surveyor, 24 Academy Street, Elgin.

W. Lyon	£744 7 0
J. Nicol	691 19 11
J. Pirie	634 5 2
W. Munro	598 15 0
J. H. CLARK, Elgin (accepted)	587 12 0

For construction of about three-quarters of a mile of new public road and three bridges, leading from near Cardow to near the Speyside Railway at Burnmouth, Knockando. Mr. ALEXANDER HOGG, surveyor, 24 Academy Street, Elgin.

Accepted tenders.

Road :—J. Shanks 1,141*l.* 19*s.* 6*d.*

Bridges :—J. Gregor, masonry 799*l.* 5*s.* ; W. McKennon & Co., ironwork 129*l.*

FULHAM.

For making-up and paving portion of Little Vale Place, also Stanwick Road. Mr. CHARLES BOTTERILL, surveyor.

Stanwick Road (Section II.)—Roadway.

Wimpey & Co.	£199 0 0
Greenham	192 0 0
Nowell & Co.	190 0 0
E. Parry	177 10 0
Mears	170 0 0
Lawrence & Thacker	155 0 0
Ball	144 0 0

York stone.

E. Parry	60 10 0
Nowell & Co.	58 0 0

Imperial stone.

Imperial Stone Co.	45 0 0
--------------------	--------

Little Vale Place—Roadway.

Wimpey & Co.	112 0 0
Nowell & Co.	105 0 0
Greenham	104 0 0
E. Parry	100 0 0
Ball	69 0 0
Mears	93 0 0

FULHAM—continued.*York stone.*

E. Parry	£35 15 0
Nowell & Co.	33 0 0

Imperial stone.

Imperial Stone Co.	29 0 0
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GATESHEAD-ON-TYNE.

For erection of mission church and vicarage in Westminster Street, Saltwell Lane. Mr. EUGENE E. CLEPHAN, architect, St. Nicholas Chambers, Newcastle-on-Tyne.

Mission church.

W. C. Tyrie	£3,264 0 0
Haswell & Waugh	3,136 0 0
Middlemas Bros.	3,072 2 0
A. Pringle	3,055 2 0
I. Bewley	2,558 13 10
J. Ross	2,545 5 10
T. & R. Lamb	2,524 17 5
Turner Bros.	2,448 0 6

Parsonage.

W. C. Tyrie	3,504 0 0
Haswell & Waugh	3,144 0 0
A. Pringle	2,745 0 0
J. W. Lowery	2,687 0 0
Middlemas Bros.	2,663 0 0
J. Ross	2,451 6 1
T. & R. Lamb	2,420 5 10
I. Bewley	2,351 19 0
Turner Bros.	2,255 14 2

GOOLE.

For a wood fence round the gasholders and premises of the Council, for the Goole Urban District Council.

Kelsey & Sons	£220 0 0
E. Plowes	167 0 0
J. Walker	158 0 0
J. WATSON (accepted)	149 10 0
R. Elliott	145 10 0

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GREAT YARMOUTH.

For new boys' school, St. Peter's Road, for the Great Yarmouth School Board. Messrs. BOTTLE & OLLEY, architects, Great Yarmouth.

Builders.

T. Howes	£4,500	0	0
J. T. W. Bray	4,488	0	0
J. Leggett	4,459	13	0
Carter & Wright	4,100	0	0
A. E. Bond	4,035	0	0
J. Balls	4,032	0	0
G. W. Beech	3,998	0	0
W. Cork	3,852	0	0
R. Eastoe	3,697	0	0
F. Grimble	3,620	0	0
J. WARD (accepted)	3,614	10	0

Plumbers.

T. Spencer	280	5	9
J. Atherton	227	10	0
G. W. Gooda	226	9	6
G. Platt & Son	220	0	0
W. J. Rushmer	217	0	0
J. T. Goffin	209	17	6
R. A. EASTOE (accepted)	197	18	0

For alterations to girls' department, St. George's School, for the Great Yarmouth School Board. Messrs. BOTTLE & OLLEY, architects, Great Yarmouth.

Builders.

J. Ward	£244	3	6
J. Balls	241	0	0
F. Grimble	240	0	0
R. Eastoe	236	0	0
J. Rand	229	6	0
A. E. Bond	229	0	0
J. S. READ (accepted)	224	0	0

Plumbers.

T. Spencer	46	9	6
G. Platt & Son	42	0	0
R. H. Tooley	42	0	0
G. W. Gooda	40	16	0
T. T. Goffin	39	10	0
R. A. Eastoe	36	18	0
J. ATHERTON (accepted)	35	10	0

HARROW.

For erection of vicarage at Harrow. Mr. F. E. JONES, architect. Quantities by Mr. R. T. WREATHALL.

H. Batchelor	£2,680	0	0
H. Bailey	2,585	0	0
Faulkner & Son	2,487	0	0
F. T. Chinchin	2,395	0	0
T. Turner	2,287	0	0
G. & J. Waterman	2,260	0	0

HENDON.

For construction of 2,110 yards lineal 12-inch pipe sewer, 875 yards of 9-inch pipe sewer, &c., in Mill Hill sewerage contract No. 3, for the Urban District Council of Hendon. Mr. S. SLATER GRIMLEY, engineer.

Contract No. 1.—London Stoneware Pipes.

H. Lee	£6,855	5	0
T. Adam	6,521	0	9
J. Dickson	6,284	3	10
J. Jackson	6,251	14	0
R. Ballard	6,200	1	8
M. Kitteringham	5,827	8	4
Wilkinson Bros.	5,406	0	0

Contract No. 2.—Wakefield's patent pipes.

H. Lee	6,522	0	0
T. Adam	6,336	3	3
J. Dickson	6,112	2	7
J. Jackson	6,069	4	10
R. Ballard, Limited	6,022	17	6
M. Kitteringham	5,668	1	8
Wilkinson Bros.	5,282	0	0

Contract No. 3.—Approved country pipes.

T. Adam	6,262	11	7
H. Lee	6,247	0	0
J. Jackson	5,947	8	2
J. Dickson	5,941	14	0
R. Ballard, Limited	5,878	17	6
M. Kitteringham	5,628	13	9
Wilkinson Bros.	5,250	0	0

* Recommended by the works committee for acceptance.

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HAVERFORDWEST.

For alterations and additions to the Pembrokehire and Haverfordwest Infirmary. Mr. D. EDWARD THOMAS, architect, Victoria Place, Haverfordwest.

W. Thomas	£1,343	0	0
T. Davies & Son	1,268	0	0
J. LEWIS, Cartlett, Haverfordwest (accepted)	1,055	0	0

KEIGHLEY.

For erection of additions to Park Works. Mr. JOHN HAGGAS, architect, North Street, Keighley.

Accepted tenders.

T. Moore, mason's work.	
J. Hartley, joiner's work.	
Thornton & Benns, slater's work.	
E. Sharp, plasterer's work.	
W. Sugden, plumber's work.	
J. Barrett, ironfounder's work.	
W. H. Heywood & Co., patent glazing.	
Total, £1,600.	

KINGSWEAR.

For additions to The Redoubt, consisting of a new room and conservatories. Mr. W. F. TOLLIT, architect, Gate House, Totnes.

R. T. Pillar	£502	0	0
J. E. SHORT, Kingswear (accepted)	493	0	0

LITHERLAND.

For widening, macadamising, asphaltting footwalks, &c., of the east side of Linacre Road from the Bootle boundary to a point near Blisworth Street. Mr. W. B. GARTON, surveyor, Sefton Road, Litherland.

W. F. Chadwick	£496	7	2
P. Balmer	449	0	0
T. Horrocks	439	5	6
J. KEATING & SONS, Liverpool (accepted)	414	6	0
Surveyor's estimate	468	17	2

For completion of Violet Road. Mr. W. B. GARTON, surveyor.

P. Balmer	£1,037	0	0
W. F. Chadwick	988	12	9
T. Horrocks	941	10	5
J. Keating & Sons	913	5	5
S. ASHCROFT, Bootle (accepted)	898	10	9
Surveyor's estimate	967	0	0

LANCHESTER.

For taking down and rebuilding two of the wing walls of the Ford Bridge. Mr. WM. CUMMING, surveyor, Lanchester.
D. CHAMPNEY, Lanchester, co. Durham (accepted) £116 17 10

LONDON SCHOOL BOARD.

For painting the following schools:—

Kenmont Gardens.

Marchant & Hirst	£396	0	0
W. Brown	298	0	0
F. T. Chinchin	273	15	0
T. Cruwys	260	10	0
E. T. FOLLEY (accepted)	237	0	0

Oxford Gardens.

H. C. Clifton	350	0	0
F. Chidley	325	4	0
W. Brown	258	0	0
G. Neal	255	0	0
G. H. Sealey	255	0	0
W. R. & A. Hide	247	0	0
F. T. Chinchin	243	10	0
E. T. FOLLEY (accepted)	197	0	0

Edinburgh Road.

F. G. Minter	154	0	0
C. Neal	130	0	0
F. T. Chinchin	120	0	0
E. T. FOLLEY (accepted)	97	0	0

Hanbury Street.

Gibb & Co.	165	0	0
MUNDAY & SONS (accepted)	146	0	0

Single Street.

A. W. Derby	332	0	0
J. Kybett	317	0	0
Gibb & Co.	307	0	0
MUNDAY & SONS (accepted)	304	0	0
J. T. Robey	299	0	0
S. H. Corfield	295	0	0

Poole's Park.

G. Kirby	597	10	0
Stevens Bros.	533	10	0
F. BRITTON (accepted)	322	12	8

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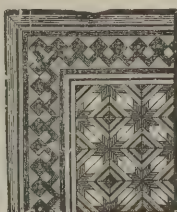


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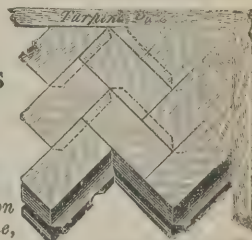
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One inch thick, from 4/10½ per yard super.
Also in Pitch Pine, Teak, Deal, &c.

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LONDON SCHOOL BOARD—continued.

<i>Lillie Road.</i>		
T. Cruwys	£632	0 0
E. Flood	543	0 0
W. Hammond	519	0 0
F. G. Minter	491	0 0
C. GURLING (accepted)	440	0 0
<i>Walton Road.</i>		
W. Hammond	165	0 0
E. Flood	140	0 0
Lathey Bros.	136	10 0
G. Foxley	108	0 0
C. GURLING (accepted)	97	7 0
<i>Gillespie Road.</i>		
G. Kirby	596	10 0
Stevens Bros.	528	0 0
McCormick & Sons	474	0 0
W. H. Stephens	467	10 0
F. BRITTON (accepted)	398	17 10
<i>St. Leonard's Road.</i>		
Marsh, Tucker & Co.	425	0 0
S. H. Jackson	397	0 0
Munday & Sons	395	0 0
Gibb & Co.	394	0 0
Beaumont & Son.	386	0 0
A. W. Derby	371	0 0
J. T. ROBEY (accepted)	365	0 0
<i>Station Road.</i>		
Grover & Son	482	0 0
T. Cruwys	474	0 0
McCormick & Son	444	0 0
Stevens Bros.	433	0 0
F. Britton	408	3 0
W. H. STEPHENS (accepted)	333	0 0
<i>Graystoke Place.</i>		
T. Cruwys	183	0 0
Marchant & Hirst	182	0 0
A. M. Sparks	175	0 0
W. Hornett	155	0 0
B. E. Nightingale	137	0 0
G. Foxley	126	15 0
JOHNSON & Co. (accepted)	108	10 0

LONDON SCHOOL BOARD—continued.

<i>Hugh Myddelton.</i>		
McCormick & Sons	£991	0 0
Stevens Bros.	989	0 0
T. Nicholson	980	0 0
Marchant & Hirst	945	0 0
A. M. Sparks	890	0 0
T. Cruwys	866	0 0
W. Hornett	830	0 0
W. & H. Castle	821	0 0
J. Kybett	816	0 0
W. Chappell	795	0 0
JOHNSON & Co. (accepted)	732	0 0
<i>Great Wild Street.</i>		
T. Nicholson	365	0 0
W. Chappell	275	10 0
W. & H. Castle	273	0 0
W. Hornett	262	0 0
A. M. Sparks	257	0 0
T. CRUWYS (accepted)	250	0 0
B. E. Nightingale	250	0 0
Johnson & Co.	238	10 0
<i>Star Lane.</i>		
F. G. Minter	109	0 0
C. Gurling	105	0 0
W. HAMMOND (accepted)	97	0 0
<i>Fleet Road.</i>		
Chase & Son	665	0 0
McCormick & Son	585	0 0
T. Cruwys	549	0 0
MARCHANT & HIRST (accepted)	463	0 0
E. T. Folley	417	0 0
<i>Canonbury Road.</i>		
Grover & Son	417	0 0
Stevens Bros.	413	0 0
McCormick & Sons	394	0 0
F. Britton	349	10 0
MARCHANT & HIRST (accepted)	279	0 0
<i>Ancona Road.</i>		
C. Foreman	623	0 0
J. H. Hodgin	440	10 0
G. Proctor	420	0 0
G. SUMMERS (accepted)	316	10 0

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ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: CLOISTERS, LOOKING SOUTH-EAST, SHOWING PART OF TOWER.—NORTH CHOIR AISLE, LOOKING WEST.

SHEFFIELD MUNICIPAL BUILDINGS.—GRAND STAIRCASE.

LONDON SCHOOL BOARD—continued.

<i>Chisenhale Road.</i>	
A. W. Derby	£519 0 0
W. Shurmur	358 0 0
G. BARKER (accepted)	319 10 0
S. H. Corfield	292 0 0
<i>Matthias Road.</i>	
McCormick & Sons	479 0 0
Grover & Son	455 12 6
J. Morrison	359 10 0
F. Britton	343 11 9
G. BARKER (accepted)	338 0 0
<i>Duke Street.</i>	
JONES & GROVES (accepted)	227 19 0
G. Summers	183 0 0
J. Musgrove	165 2 6
<i>Randall Place.</i>	
C. Foreman	379 0 0
W. Banks	293 16 6
W. Holding & Son	248 0 0
W. Summers	238 0 0
JONES & GROVES (accepted)	212 9 0
<i>Childeric Road.</i>	
H. Leney	396 0 0
G. Summers	221 18 0
S. MUSGROVE (accepted)	253 9 0
<i>Grove Street.</i>	
Jones & Groves	439 8 0
W. Banks	359 18 6
G. Summers	213 17 6
S. MUSGROVE (accepted)	258 12 0

LONDON SCHOOL BOARD—continued.

<i>Wilmott Street.</i>	
A. W. Derby	£530 0 0
G. Barker	463 0 0
Gibb & Co.	420 0 0
J. KYBETT (accepted)	372 0 0
<i>Ruby Street.</i>	
H. J. Williams	300 0 0
RICE & SON (accepted)	249 0 0
G. Summers	146 2 6
<i>Saffron Hill.</i>	
Willmott & Sons	271 10 0
T. Cruwys	223 0 0
A. M. Sparks	215 0 0
W. Hornett	185 0 0
Johnson & Co.	179 0 0
W. CHAPPELL (accepted)	173 0 0
<i>Faunce Street.</i>	
B. E. Nightingale	422 0 0
J. F. Ford	337 0 0
E. TRIGGS (accepted)	315 0 0
<i>Garratt Lane.</i>	
E. Hood	473 0 0
C. Gurling	354 0 0
Heineman & Brown	335 0 0
J. GARRETT & SON (accepted)	327 0 0
<i>Mantua Street.</i>	
E. Hood	592 0 0
C. Gurling	524 0 0
F. R. Blaxton	523 10 0
E. P. Bulled & Co.	469 0 0
R. E. Williams & Sons	400 0 0
J. GARRETT & SON (accepted)	346 0 0
<i>South Lambeth Road.</i>	
T. Hooper	516 10 0
D. Charteris	355 0 0
Rice & Son	344 0 0
Holloway Bros.	338 0 0
J. Garrett & Son	324 0 0
Lathey Bros.	315 0 0
E. Triggs	286 0 0
G. FOXLEY (accepted)	271 0 0

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FIG. 2.—Taken with Sanderson's Camera, with a reserve of rising front in hand.

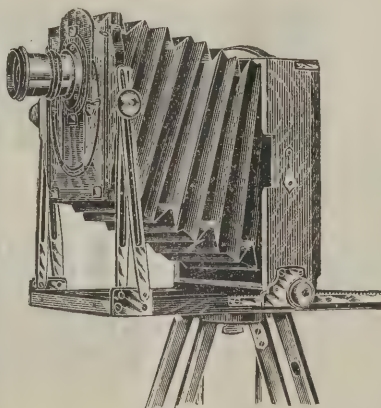


FIG. 3.—Taken with ordinary camera after straining movements to the utmost.

TOWER & GATEWAY, CHRIST COLLEGE, CAMBRIDGE.

Taken under Test conditions. A difficult subject, owing to its height and narrowness of the street.

Fig. 2 was taken with SANDERSON'S PATENT CAMERA, the Tripod remaining perfectly level, there being no necessity to tilt it, as is usual with other cameras. No difficulty was experienced in properly composing the subject owing to the great range of the Patent Rising and Swing Front, which reduces the adjustments to a minimum, and does away with the necessity of the orthodox Swing Back.

To accomplish the above it was necessary to raise the lens (a 6 in. Zeiss on a 10x8 plate) above its covering power, but by bringing SANDERSON'S PATENT SWING FRONT into play, which enables the axis of the lens to be directed to the bottom of the plate, perfect covering power and illumination was immediately obtained, as in Fig. 2.

Fig. 3 represents the best possible result that could be obtained with the same lens on a first-class modern camera, furnished with the usual Swing Back, Rising and Swing Front, &c., these movements having been strained to their utmost limits, and the Tripod tilted to a dangerous degree.

FOLLOWING TEST.
mense value one would be to you.
temper, and plates.

FAILURE. With all the old Troubles.

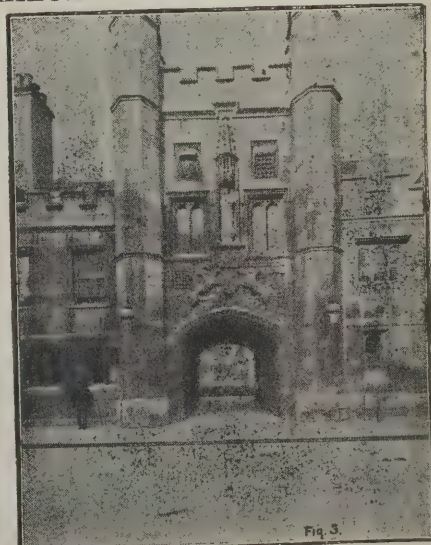


FIG. 3.—Taken with ordinary camera after straining movements to the utmost.

The above results point to the perfection of SANDERSON'S PATENT CAMERA for work of this description more forcibly than any arguments for or against its principles.

A Descriptive Pamphlet may be obtained on application to the Sole Licensees and Manufacturers—

GEO. HOUGHTON & SON, 89 HIGH HOLBORN, LONDON.

LONDON SCHOOL BOARD—continued.

Malmesbury Road.

A. E. Symes	£355	0	0
G. Munday & Sons	309	10	0
G. Wales	309	10	0
J. T. Robey	302	0	0
J. Kybett	282	0	0
S. H. CORFIELD (accepted)	268	0	0

Smeed Road.

A. W. Derby	480	0	0
A. E. Symes	350	0	0
D. Gibb & Co.	335	0	0
G. Munday & Sons	302	0	0
J. T. Robey	275	0	0
S. H. CORFIELD (accepted)	265	0	0

Union Street.

J. H. Hodgkin	240	0	0
C. Foreman	232	0	0
C. PROCTOR (accepted)	230	0	0

Rutland Street.

G. Munday	250	0	0
J. T. Robey	250	0	0
D. GIBB & CO. (accepted)	233	0	0

Victoria.

W. R. & A. Hide	295	15	0
W. BROWN (accepted)	282	10	0

Plumstead Road.

C. Foreman	360	0	0
E. Proctor	350	0	0
J. H. HODGIN (accepted)	340	0	0
G. Summers	326	0	0

Honeywell Road.

Bullard & Co.	599	0	0
F. G. Minter	577	0	0
E. Flood	569	0	0
Rice & Son	412	0	0
Garrett & Son	395	0	0
HEINEMAN & BROWN (accepted)	391	13	0

Medburn Street (J. M. School).

G. Chase & Son	235	0	0
W. Hornett	150	0	0
T. CRUWYS (accepted)	143	0	0

LONDON SCHOOL BOARD—continued.

Alton Street.

A. W. Derby	£185	0	0
G. Munday & Sons	175	10	0
J. T. Robey	165	0	0
Gibb & Co.	160	0	0
G. WALES (accepted)	159	10	0

Essex Street.

Gibb & Co.	285	0	0
A. E. Symes	280	0	0
E. TRIGGS (accepted)	245	0	0
A. W. Derby	240	0	0

Whitfield Street.

F. Newton	311	0	0
W. Chappell	240	0	0
T. Cruwys	217	0	0
W. Hornett	215	0	0
G. FOXLEY (accepted)	189	0	0

Princeton Street.

F. Newton	620	0	0
G. S. S. Williams & Son	439	10	0
Marchant & Hirst	369	0	0
Willmott & Sons	363	16	0
W. & H. Castle	338	0	0
W. HORNETT (accepted)	330	0	0
Johnson & Co.	293	0	0

Hackford Road.—Cleaning and painting.

Star & Son	662	9	0
Harding & Son	620	12	0
F. R. Blaxton	595	10	0
Rice & Son	535	0	0
Garrett & Son	420	0	0
HOLLIDAY & GREENWOOD (accepted)	409	0	0

For cleaning and painting, Haselrigge Road.

F. R. Blaxton	570	17	0
E. P. Bulled & Co.	540	0	0
Holloway Bros.	510	0	0
Rice & Son	409	0	0
E. Triggs	402	0	0
F. C. Minter	400	0	0
J. Garratt & Son	391	0	0
Heineman & Brown	380	0	0
E. FLOOD (accepted)	324	17	0



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LONDON.

For erection of new Co-operative Stores, Plaistow, E. Mr. BERESFORD PITE, architect.

Three storeys.

Adkins & Green	£2,400	0	0
Shurmur	2,394	0	0
Watson	2,380	0	0
Beale	2,363	0	0
Barrett & Power	2,343	0	0
Gregar & Son	2,333	0	0
Read & Son	2,306	0	0
Co-operative Builders	2,296	0	0
Maddison	2,270	0	0
Thomerson & Son	2,219	0	0
Harris & Wardrop	2,144	0	0

Two storeys.

Adkins & Green	2,005	0	0
Shurmur	1,917	0	0
Watson	1,890	0	0
Beale	1,850	0	0
Barrett & Power	1,817	0	0
Gregar & Son	1,880	0	0
Read & Son	1,791	0	0
Co-operative Builders	1,806	0	0
Maddison	1,770	0	0
Thomerson & Son	1,724	0	0
Harris & Wardrop	1,724	0	0

For construction of new roads at Islington Cemetery, East Finchley, for the vestry of St. Mary, Islington. Mr. J. PATTEN BARBER, engineer, Vestry Hall, Upper Street, Islington, N.

W. J. Botterill	£1,564	0	0
W. Griffiths	1,183	4	7
F. A. Jackson & Son	951	0	0
Wilkinson Bros.	934	0	0
T. Adams	891	0	0
G. Bell	829	0	0
E. Nicholls	812	6	6
R. Ballard & Co.	757	0	0
C. W. KILLINGBACK & CO. (accepted)	749	0	0
J. Ford	701	0	0

LOWESTOFT.

For new farm buildings, Blundeston Hall, for Colonel Woods. Messrs. BOTTLE & OLLEY, architects, Great Yarmouth. S. Y. BROCK & SON, Harleston (accepted).

NORTH WALSHAM.

For additions to boys' department of the North Walsham School Board. Messrs. BOTTLE & OLLEY, architects, Great Yarmouth.
J. White, Cromer. £595 10 0
W. Wilson, North Walsham 497 10 0
J. BATCHELOR, Stalham (accepted) 438 10 0

PAIGNTON.

For brick-lining a water-tower at Oldway. Mr. WILLIAM J. WYATT, surveyor.
R. Harris £176 0 0
T. Brown 147 0 0
E. P. Bovey 135 0 0
W. Larkins 121 5 0
MINGO & BOONE, Magdalen Street, Exeter (accepted) 110 0 0

PRESCOT.

For painting and decorating the chapel at the Whiston Workhouse, also for cleaning, painting and decorating the Board-room and offices. Mr. J. GANDY, architect, St. Helens.
J. SCARISBRICK, Prescott Lane (accepted) £94 0 0

SCOTLAND.

For erection of shops and other buildings at Stenhousemuir. Mr. JAMES STRANG, architect, 102 High Street, Falkirk.

Accepted tenders.

J. J. & P. McLachlan, mason and brickwork.
Simpson & Young, carpenter and joiner.
G. Brunton, plumber and gasfitter.
Drummond & Crowe, slater.
J. Millar, plasterer.
W. Dickson, revolving shutters.
Total, £2,000.

SOUTHWARK.

For sewer ironwork to March '25, 1900, for the Vestry of St. George-the-Martyr.
G. WALLER & CO. Queen Victoria Street, E.C. (accepted).

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SEVENOAKS.

For levelling, metalling, kerbing, tar-paving, channelling and making-good Mount Harry Road East, and laying about 2,150 feet run of 9-inch stoneware pipe sewers, with man-holes, lampholes, gullies, &c. Mr. JABEZ MANN, surveyor.

T. Adams	£1,976	0	0
J. Jackson	1,942	14	6
S. Hudson	1,895	15	6
E. Iles, Mitcham Common, Surrey*	1,644	9	9
Surveyor's estimate	1,781	0	0

* Accepted according to schedule of prices.

SOUTHAMPTON.

For supply and erection of water-tube boilers, mechanical stokers, coal conveyer, pumps, steam and water mains, water-tank, water purifier, fuel economiser and ironwork. Messrs. KINCAID, WALLER & MANVILLE, engineers, 29 Great George Street, Westminster.

Yates & Thom	£8,340	0	0
Babcock & Wilcox	7,748	0	0
C. S. MALLETT & Co., London (accepted)	7,353	15	0

STITHIANS.

For restoration of the school, for the School Board.
W. H. GRAY (accepted) £90 0 0

WALES.

For erection of a Congregational chapel at Brynamman.

E. Thomas	£1,909	0	0
D. Rees	1,760	0	0
J. Williams	1,665	0	0
Howells & Jones	1,650	0	0
Thomas & Evans	1,630	0	0
J. & T. HOWELLS, Cwmgarw Road, Brynamman, Carmarthenshire (accepted)	1,550	0	0
J. Morris	1,437	0	0

For erection of a school in the town of Llandilo. Mr. HENRY HERBERT, architect, Brynmarlais, Ammanford, R.S.O.

B. Howell & Son	£2,197	18	0
B. Davies	2,106	17	3
L. Davies	2,103	3	8
B. Jenkins	1,995	0	0
Thomas & Stephens	1,970	0	0
Thomas & Evans	1,945	0	0
D. EVANS, Llandilo (accepted)	1,751	0	0

WALES—continued..

For erecting a schoolroom, &c., at Pentre Broughton. Messrs. DAVIES & MOSS, architects, 11 Regent Street, Wrexham.

S. Moss	£762	0	0
T. Williams	704	9	6
R. Williams	684	0	0
W. H. WYCHERLY & Co., Broughton, Wrexham (accepted)	630	0	0

For erecting two dwelling houses on the Rhosddu Estate.
Mr. THOS. H. HOGG, architect, 35 Cunliffe Street, Rhosddu.

T. Jones	£378	0	0
R. Evans	325	0	0
F. JONES, Gwersyllt, near Wrexham (accepted)	322	0	0

For erection of a Welsh Congregational chapel at Senghenith.

J. P. Williams	£1,968	0	0
Newman & James	1,900	0	0
J. Lewis	1,900	0	0
J. HOWALLS, Glannant (accepted)	1,800	0	0

TRADE NOTES.

MESSRS. E. H. SHORLAND & BROTHER, of Manchester, have just supplied some more of their patent Manchester stoves to the Lunatic Asylum, Ballinasloe, those previously supplied having proved very satisfactory.

A VERY handsome five-light window, illustrative of scenes from the Old and New Testaments, has just been erected in Clifton Church, near Tamworth. The five lights show the Birth, Baptism, Crucifixion, Resurrection and Ascension of Our Saviour, and in the tracery above are pictures of subjects from the Old Testament. The work was entrusted to Messrs. Jones & Willis, of Birmingham and London.

MESSRS. FREDERIC WHITFIELD & Co., of Birmingham, have just completed an important strong room, which has been made for erection in a mansion. Its size is 8 feet 6 inches high by 7 feet 6 inches wide by 17 feet 6 inches long. The whole of the outer walls are constructed of two wrought-iron plates, intersected with specially hardened drill-proof steel between, riveted and screwed together and strengthened with massive joint and angle bars. The whole of the interior is lined with 4-inch chambers, containing the best-known steam-generating

SPARROW & SON,

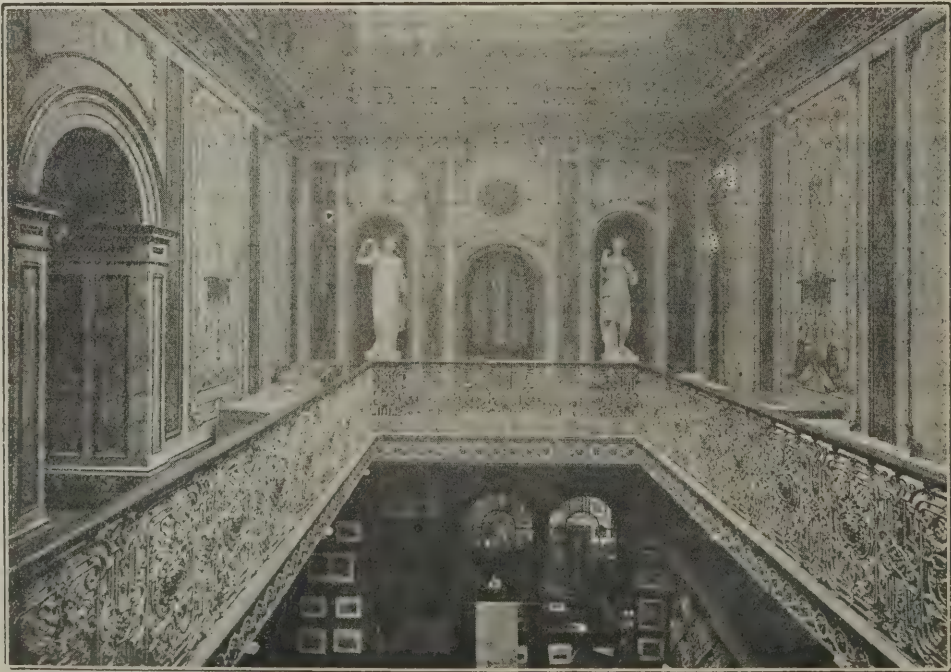
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ESTIMATES
GIVEN

"Amongst the showrooms of our trade throughout the country, few (if any) excel in spaciousness and dignity those of Messrs. Sparrow & Son, of Nottingham." — *Journal of Decorative Art*, August, 1896.

fire-resisting composition. The opening of this vault is secured by one of Messrs. Whitfield's extra strong bullion vault doors, which is of enormous strength, fitted with lobby and ventilating grille complete. The door is fitted with six massive bolts each at back and front, and two each at top and bottom, the bolt work being secured by three special patent locks, which, we understand, are absolutely unpickable, special provision having been made against the use of explosives. The total weight of this structure is over 28 tons.

VARIETIES.

THE town-hall of Ayr, stated to accommodate 2,000 persons, together with the town-hall organ, were destroyed by fire on the 1st inst. The flames spread to a block of dwelling-houses occupied by firemen and other servants of the Corporation. The damage to the town hall is estimated at from 15,000*l.* to 20,000*l.*

THE Central Ward Liberal Club, Stamford Street, Leeds, was found to be on fire early on the 5th inst., and was completely gutted before the flames were extinguished. The origin of the fire is unknown. Fortunately there was no loss of life and no one was injured.

THE statute labour committee of Glasgow Corporation last week inspected the progress of the work of reconstructing Glasgow Bridge. It was found that of the forty-two large cylinders twenty-one have now been sunk to their full depth, as have also the twelve small cylinders. Three of the larger size are in process of being sunk.

THE Old Bell Hotel, Holborn, the last of the famous galleried coaching-houses in London in which stage plays were performed, and the parlour of which was the meeting place of many of the celebrated wits, poets and *litterateurs* of the past, was put up to auction at the Mart, Tokenhouse Yard, as a building site of 7,200 feet. The highest bidding for the eighty years' lease, with the license, was 11,603*l.*, at which premium price it was sold to Mr. Fitch, the well-known surveyor, of Furnival's Inn. The rent will be a peppercorn for the first year and 750*l.* per annum for seventy-nine years.

A DESTRUCTIVE fire occurred at Kirkcaldy Harbour on Sunday, the 4th inst., resulting in the almost total demolition of the offices and sheds tenanted by the Kirkcaldy, Leith and Glasgow Steam Packet Company, Limited, and the property of

the Kirkcaldy Harbour Commissioners. The dockhead in the neighbourhood of the pinnacle offices was stocked with a large consignment of bales of cork for Messrs. M. B. Nairn & Co., and it was there that the fire originated. It is believed that the fire was caused by a lighted match being thrown amongst the cork by some lads who were sitting on the bales smoking cigarettes.

SOME workmen, while digging in the foundations of an ancient monastery in the Rue de Béarn, Paris, recently discovered two leaden coffins, dated 1630. The coffins contained two skeletons, the skull of one of which was found to be filled with white crystals. This was proved to be the exceedingly rare substance bi-calcinate of phosphorus, which has only once before been found under similar circumstances, namely, in 1807, when an ancient coffin was opened and the skull found to be filled with it. The skull of the second body contained only a few crystals of the same chemical.

THE sewerage committee of Aberdeen Town Council had under consideration last week a new sewerage scheme, estimated to cost 160,000*l.* The burgh surveyor expressed the opinion that so extensive an undertaking would not require to be carried out for some time, but he urged the necessity of at once proceeding with works estimated to cost 75,700*l.* The committee decided to recommend that in the meantime only part of the scheme should be undertaken at a cost of upwards of 40,000*l.* This will mean an additional 1*d.* per 1*l.* on the rate.

THE unfinished temple of the New and Latter House of Israel, at Chatham, otherwise known as Jezreel's Tower, has been offered for sale by auction, the "faithful having been unable to complete the huge structure, or to pay the last instalments due to the builder." The auctioneer described the building as a "very imposing, castle-like crenelated structure, 124 feet square by about 100 feet in height, with an elevated tower at each corner, but minus the central dome, with which it was originally intended to finish it off." Over 40,000*l.* had been spent upon the building, which has a central hall that will seat 5,000 persons, but as the highest bid was 5,500*l.* the lot was withdrawn.

WHILE demolishing part of an old villa in Roseneath Terrace, Edinburgh, to make way for the erection of a tenement, some workmen unearthed a number of skeletons. The find consisted of three skulls and other bones, and it is thought that some more remains were carted away amongst the *débris*. The thinner parts of the bones were largely decayed, but otherwise

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LIBERAL DISCOUNTS ACCORDING TO ARRANGEMENTS.



ESTABLISHED OVER HALF A CENTURY.

they were in a good state of preservation, and considering the history of the locality it is believed they are of an early date. The collection was discovered 3 feet underground below the stone floor of a small back-house attached to the dwelling, which was at one time occupied by a minister and more recently by a lawyer.

THE marble group representing Charity which until recently surmounted the drinking fountain at the Royal Exchange, adjacent to Peabody's statue, will shortly be replaced by a bronze replica, which has been successfully cast by Messrs. Hollinshead & Burton at their Thames Ditton foundry.

A DESTRUCTIVE fire occurred on the 7th inst. at Derby, the extensive timber yard of Messrs. Roe & Son being completely gutted. The flames also spread to a large number of the tenement houses in the immediate neighbourhood, the inhabitants being compelled to leave hurriedly. It was estimated that 500 persons had been rendered homeless, their houses having either been destroyed or seriously threatened, and the poor people had to be accommodated for the night in neighbouring schools.

THE formal opening of Port-Henry Harbour, Peterhead, took place on the 5th inst. by the Harbour Trustees' boat *Flying Scud* severing a blue ribbon and entering the harbour with Provost Smith and members of the public bodies on board. The area of the harbour, as additionally excavated, will be nearly six acres, and the work has been carried out by Mr. Nott, the contractor, at a cost of 32,000*l.*, including 12,000*l.* for forming a quay wall in South Bay. The quantity of rock excavated has been 160,000 tons, and the whole has been carried out within a year, all to the satisfaction of the engineer and the trustees.

THE annual exhibition of drawings, needlework, designing in paper and colour, modelling in clay and cardboard, woodwork, cookery, laundrywork and kindergarten executed in the various schools of the School Board for London will be held at the "Hugh Myddelton" School, St. James's Walk, Clerkenwell Green, E.C., from Friday, July 16, to Wednesday, July 21 (Sunday excluded), from 12 o'clock noon to 8.30 P.M. The exhibition will be opened by the Most Hon. the Marquess of Londonderry, K.G. (Chairman of the Board). Practical demonstration lessons in cookery, laundrywork and needlework will be given each day. Admission to the exhibition and demonstration lessons will be entirely free, and it is hoped that the public will largely avail themselves of this opportunity of seeing specimens of the work being done in their schools.

ON July 2 an extensive portion of the chemical works of Messrs. W. R. Earp, Halton Road, Runcorn, fell with a crash. The premises, which were extended some six months ago, consist of five bays. In the two bays which are now in ruins twelve 14-inch girders, measuring 23 feet and weighing a ton each, were introduced, and it is supposed that the pillars upon which these were placed gave way, thus causing the collapse. The works were in full operation at the time, and several men received slight injuries. The reconstruction of the premises will necessitate considerable expenditure, and in addition to this much damage was caused to manufactured and raw material.

In the course of some excavations made by workmen employed in demolishing old buildings in Northgate Street, Chester, the base of a Roman column was uncovered. The relic is the largest specimen of its kind yet found in Chester. It is composed of a square base of red sandstone, which is no doubt Chester rock, the sides being 4 feet 3 inches in length and the height 1 foot 4 inches. Surmounting this is a moulded circular column 2 feet 10 inches in diameter, with a height of 1 foot 8 inches, this of course being the proper proportion. The spot where the discovery was made is just under the foundations of what was known as the Old Lightcake shop, a curious and very ancient little establishment which was some 4 or 5 feet below the level of the street.

A DESTRUCTIVE fire broke out between 4 and 5 A.M. on the 2nd inst. in the extensive premises of Messrs. J. F. & G. Harris, timber merchants, Victoria Wharf Saw Mills, Palmer's Road, Bethnal Green. The fire originated from an unknown cause in a building used as joiners' workshops and soon spread in every direction. At half-past five o'clock the fire was at its height, its progress being watched by a vast concourse of people. At this period of the fire four buildings, used as workshops and saw mills, covering an area measuring about 30 yards by 35 yards, were burning furiously and were eventually destroyed, the flames shooting to a great height. A very large stack of timber in the yard next caught alight and was speedily reduced to ashes. The stables were also involved in the general ruin and a horse was burned to death. Messrs. Harris write to inform us that the fire has destroyed a portion only of their machinery and buildings and has in no way interfered with their stock, and the business will be carried on as usual.

THE widening of Upper Thames Street is now, says the *City Press*, on the point of completion, the last claim having

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been settled. The work of widening this now much-used thoroughfare was commenced over forty years ago, and bit by bit and house by house the scheme has been carried into effect. The first portion of the improvement having been more or less completed, there remained several projecting properties which marred the street line, and were responsible also for occasional "blocks" in the heavy and increasing traffic which passes along the street all day long. These projecting properties have been acquired by the Commission of Sewers, and in the course of a month Upper Thames Street will have a clear street line from Peter's Hill to Queen Victoria Street, and, in addition, it will be paved with Australian hard wood. The cost of the improvement, from start to finish, has been exceedingly heavy. It is difficult to estimate the amount, but, heavy as it has been, the public-spirited policy of the Commission has been more than justified.

ELECTRIC NOTES.

CONSIDERABLE damage to gas and water pipes by electrolysis, due to the escape of the electric current used to propel trolley cars, has been noted in Brooklyn, U.S.A. An illustration of the action of electricity was shown in a gas pipe 2 feet below the rail, the pipe having been found with a gap an inch wide in it, and the edges eaten down to the thickness of a sheet of paper.

THE installation of the electric light at Onchan, near Douglas, Isle of Man, in celebration of the Queen's long reign, is fast approaching completion, and will be formally opened on the 12th inst. For a consideration of 175% the Isle of Man Tramway Company are placing in the village and lighting, cleaning and repairing free for ever the five powerful lamps necessary.

A FRESH scheme for the electric-lighting of Victoria Embankment and Westminster and Waterloo bridges has been formulated by the highways committee of the County Council. From reports prepared by the Council's engineer and chemist it appears that the substitution of incandescent burners for those at present in use is inadvisable. Exclusive of that which it is not proposed to light, the first cost of the installation on the embankment and bridges is estimated at 22,000%, and the committee recommend that the Council should establish buildings and plant for the purpose on a piece of ground adjacent to Charing Cross Station. It is proposed to set up ninety arc

lamps of the Jandus pattern, fifty-four on the Embankment, ten on Waterloo Bridge and eleven on Westminster Bridge and its approaches. The cost of maintenance, assuming that half the lamps are extinguished at midnight, will be 1,900% a year, but this will be increased to about 2,700% by capital charges and rates and taxes. The cost of the present system is about 1,300%, including repairs, but exclusive of capital charges of any kind.

THE departmental committee on dangerous trades has issued an interim report upon the dangers connected with electrical generating works. The risks attendant upon these are described at some length. The peculiar danger is the liability to shock, which is often fatal if, by accident, anyone comes into contact with the conductors when charged to a high pressure. The contact need neither be very perfect nor direct; provided two parts of the body are made to touch conducting materials which themselves differ in pressure by 1,000 volts or more, or even by much less if the contact with the flesh is very good, a dangerous—and possibly fatal—shock will result. High-pressure overhead wires, even if insulated over their entire length, can never be considered as entirely free from risk. As illustrating the dangers incidental to the use of electricity it has been stated that, in addition to minor accidents, of which we hear little or nothing, fourteen deaths have been reported since 1892. The committee make a series of recommendations for the furtherance of safety in these works, and suggest that all persons engaged in them shall be instructed in methods of artificial respiration to be applied in case of accidents. They further recommend that a specially qualified person be appointed to advise the Secretary of State or the chief factory inspector on matters requiring technical knowledge of electricity.

BUILDING AND BUILDERS.

THE foundation-stone of a building which is to serve the dual purpose of a technical school and public free library at Hyde was laid on the 3rd inst. The cost is to be about 12,000%.

THE plans committee of the Aberdeen Town Council have sanctioned the erection of new buildings of the total value of 38,000%. These include no fewer than thirty blocks of new dwelling-houses.

THE Mersey Docks and Harbour Board are contemplating considerable improvements at Mann Island. The board own



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the warehouses and other property in the locality. The buildings on the island are among the oldest in Liverpool, and not at all adapted for modern business.

At a meeting of the Birmingham baths and parks committee, under the presidency of Councillor Johnson, it was resolved to recommend the City Council to approve the plans for the erection of a new suite of baths at Green Lane, Small Heath, and to authorise the committee to accept tenders and proceed with the work forthwith.

THE foundation-stone of a new ragged school at Blackburn was recently laid by Earl Compton, M.P., president of the Ragged School Union. The building is estimated to cost 2,600*l.*, and is rendered necessary by the structural unfitness of the old premises, where 500 scholars attended daily instruction by thirty-five voluntary teachers.

THE old tower of the parish church of Cadoxton-juxta-Neath is about being restored, under the superintendence of Mr. C. B. Fowler, of Cardiff. The cost is estimated at 300*l.*, and it is proposed to commemorate the Diamond Jubilee by adding three bells, making a peal of six, at an additional cost of 200*l.* The tower is one of much interest, and is in Early Fourteenth Century style. It is proposed to "restore" only the portions which are perished and dangerous, preserving all the sound parts, and keeping the details of the lost features as near as possible to the originals.

PUBLIC WORKS IN SICILY.

THE British Consul at Palermo in his last report writes:—The waterworks are now practically completed, and the supply which is laid on in most of the principal streets is satisfactory and the quality good. The supply of good drinking water throughout the town is a very great boon, and ought to cause a marked improvement in the health of the population. The supply in the past was very far from satisfactory, and was without doubt the cause of much sickness.

A system of drainage throughout the newer parts of the town is now being carried out. This is much needed, the cesspools now in use being most undesirable.

The papers referring to the proposed dry dock and dock-yard have been signed and the plans and specifications drawn up, but no actual steps for commencing the work appear to have been taken.

The Massimo Theatre, referred to in previous reports, is at last completed, and has been opened. It was commenced nearly twenty-five years ago, and is said to have cost about 400,000*l.*

The other proposed important work in other parts of the island of Sicily are:—Proposed water-supply for the town of Girgenti, for which tenders were invited in December last. The supply is to be drawn from the sources of the Poltano, a distance of 23 miles from the city, at an elevation of 1,650 feet above the sea. The terms are that the contractor shall, on completion and approval of the works, receive the sum of 350,000 lire, and have the profits from the sale of water for a term of sixty years, the municipality having the right to 500 cubic metres of water a day for the public service.

Girgenti, which has a population of about 25,000, is situated about 4 miles from the sea, on the south coast of the island, the elevation being about 1,080 feet above sea-level.

A more important affair is the proposed formation of a harbour at Licata. The promoters claim that the harbour will, when constructed, draw most of the mail steamer traffic for Australia and the East away from the other European ports such as Marseilles, Naples and Brindisi, it being in the most direct line between the Straits of Gibraltar and Port Said. Very different opinions are expressed here as to the probable success of the scheme, and capitalists and others should make full inquiries before investing.

NORWEGIAN TENDERS.

THE Secretary of State for Foreign Affairs has received despatches from Her Majesty's consul-general at Christiania reporting that tenders are invited for the following:—By the Norwegian State Railways Administration, for the delivery of seventy-five narrow-gauge open trucks, the delivery of 100 covered goods vans, the delivery of 132 tons of stranded galvanised fencing wire, No. 5, and 96,400 iron fencing posts. Tenders for any of the above should be sent in by the 21st inst. By the Christiania Gas Works, for the delivery of cast-iron gas pipes of various sizes, the latest date for sending in tenders for which is the 12th inst. By the Kongsberg Arms Fabrik, for the delivery of 280,000 kilogrammes of steam coals and 1,200 kilogrammes of gas coke, tenders for which must be sent in by the 10th inst. Such further particulars as have been received with regard to these contracts may be seen at the commercial

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department of the Foreign Office any day between the hours of 11 A.M. and 6 P.M.

BIRKBECK BUILDING SOCIETY.

THE forty-sixth annual meeting of the Birkbeck Building Society was held at the offices, 29 and 30 Southampton Buildings, Chancery Lane.

The report adopted states that during the financial year just closed the total receipts have reached the large sum of 18,967,010*l.*, exceeding by more than 1,500,000*l.* the total receipts of all the other incorporated and unincorporated building societies in the United Kingdom—numbering 2,625—as shown by the Chief Registrar's return, presented to Parliament on April 23 last.

The receipts from subscriptions have amounted to 240,082*l.*, and from deposits to 14,678,767*l.* The withdrawals have been 13,880,483*l.*, showing a balance over the preceding year of 1,038,366*l.*, or a total increase since 1892 (a period of five years) of 3,438,741*l.*, after allowing for the large amounts withdrawn during the panic in that year. The total liabilities on subscriptions and deposits now exceeds nine millions (9,113,454*l.*).

The balance of assets in excess of liabilities amounts to upwards of four hundred thousand pounds—400,186*l.* 16*s.* 4*d.* The total assets are 9,513,641*l.*

During the past year the sum of 4,317,502*l.* has been invested in the purchase of Government and other stocks, and securities to the amount of 3,625,952*l.* have been disposed of, the difference bringing up the investments in convertible securities and ground rents, including 702,348*l.* cash at bankers, to 8,620,913*l.* Upwards of two millions of these funds—2,158,589*l.*—are inscribed in the books of the Governor and Company of the Bank of England, the amount invested in Consols and other British Government securities being 1,515,353*l.*

The fifteenth triennial bonus has been apportioned this year, in accordance with the rules. The sum, with the bonus previously set aside, but not yet payable, will absorb 61,179*l.* 10*s.* This amount is provisionally credited to all members holding investing shares, but the bonus is only payable providing the instalments have been regularly made, and then not until the shares have been ten years in existence.

A further sum of 25,000*l.* has been added to the Permanent Guarantee Fund, which now stands at 200,000*l.*, the whole amount being invested in Consols.

FIRE AT CHEDDLETON ASYLUM.

AT about half-past one o'clock on Sunday, the 4th inst., a cycle messenger brought the information to the Leek fire station that a fire was raging at the new asylum at Cheddleton (about three miles distant), which is being built by Messrs. Brown & Son, of Salford, for the Staffordshire County Council, at a cost of about 200,000*l.* Owing to various delays, the brigade did not reach the spot until about three o'clock, when the fire had practically done its worst. It seems that at 1.15 Mr. H. T. Pebworth, clerk of the works, heard a sound that he judged to be rain, but there was also a peculiar hissing sound that induced him to get out of bed and look out. He saw at once that the west end of the dining-hall and theatre (a splendidly timbered room 140 feet by 60 feet) was on fire. Rousing the contractors' foremen and other persons in authority, Mr. Pebworth applied the existing fire-extinguishing appliances to save the adjacent buildings, pending the arrival of the engines and brigade from Leek. Half an hour before their arrival the roof fell in, forcing out the east gable and doing considerable damage to several buildings near the spot. How the fire began is a complete mystery. The fire room in which it broke out was nearing completion, and no fire had been in it for several weeks. Breaking out in the west end, with a brisk wind behind it, the progress of the flames was so exceedingly rapid that the building was doomed from the outset. The damage is estimated at 10,000*l.* The asylum has been in course of erection for upwards of two years, and the disaster has rendered nearly 500 men idle for the present.

THE NEW DOCK WORKS AT LEITH.

CONSIDERABLE progress has been made with the erection of the new wet dock at Leith. Since the beginning of the year four or five steam navvies have been engaged in excavating the area for the new dock, and early in February the contractor, Mr. John Best, commenced the construction of the dock wall by putting in the concrete base on which it rests. Several weeks later the erection of the masonry was begun, and one part has now been raised to a height of about 28 feet. The whole of the foundation of the north wall has now been laid. The wall is about 20 feet thick at the base and diminishes in thickness till it reaches the top, where it is 8 feet. The coping of the wall is 40 feet above the bottom of the dock. Steam navvies are also at work excavating the new entrance

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lock from the east pier, which is to be 70 feet wide and is to be fitted with iron gates worked by hydraulic machinery. Another steam navy is employed digging a "road" to form the passage between the new dock and the Albert Dock. The swing bridge across this lock has now been placed in position in order to give communication to the west side of the Albert Dock while the passage is being constructed. The bridge is 130 feet long, 27 feet wide, and weighs about 350 tons, and is to be fitted and worked by hydraulic machinery. On the bridge there are two lines of rails and a footpath on each side. The deepening of the entrance channel is also proceeding satisfactorily, a powerful dredger being engaged in this work, one-third of which has been completed. In the course of the dredging operations some very hard material has been found, consisting of a species of shale, and the same material was also discovered in several parts in excavating for the walls of the new dock.

WINDOW-CLEANING ACCIDENT.

DR. G. D. THOMAS held an inquiry at St. Pancras Coroner's Court on the 5th inst. with reference to the death of David Beckley, aged thirty-seven, who lodged at 71 Dalberg Road, Brixton. The deceased, who was in the service of a window-cleaning company, was on the previous Thursday engaged in cleaning the outside of a third-floor front window at Mr. Anstruther's Catholic Repository, Southampton Road, Havestock Hill. While thus occupied he fell, presumably through standing on the window-sill. After alighting on the window-blind of the shop he rebounded and dropped head foremost on the footpath, fracturing his skull and dying immediately.

The manager of the company by whom Beckley was employed said that every conceivable appliance for the protection of their workmen was provided, but these appliances the men sometimes neglected to use. It was contrary to rule for the deceased to stand on a window-ledge without having a life-belt around him, properly secured.

The coroner pointed out that there was a provision in the Town Police Clauses Act which prohibited, under a heavy penalty, any person suffering a window-cleaner to stand on a window sill or ledge, and also rendered the cleaner himself liable to a fine. This provision, for some inexplicable reason, was not applicable to London, but only to the country.

The jury found a verdict of accidental death, adding the subjoined rider:—"The jury are of opinion that when men are

employed in cleaning such windows as that the deceased was required to clean they should take a life-belt with them in case of necessity for its use. Further, the jury desire to call the attention of the Home Secretary and the London County Council to the necessity of a legislative enactment relating to window-cleaning in the metropolis similar to the provision contained in the Town Police Clauses Act."

The coroner said he would forward the jury's recommendation to Sir Matthew White Ridley and the London County Council as desired.

PATENTS.

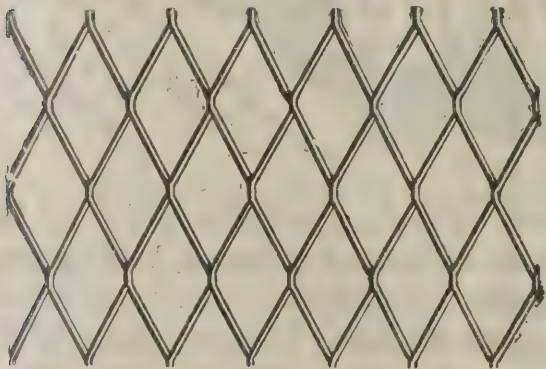
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

- 14985. Benjamin Foster, for "Improvements in window-sash fasteners."
- 14992. James Backhouse, for "Improvements in or relating to exhibition buildings."
- 15006. Andrew John Oleson, for "Improvements in door-locks."
- 15021. Peter Webber, for "An improved chimney-pot."
- 15028. Arthur Augustus Wincott, for "Improvements in or connected with drain-pipes."
- 15035. Harrison Dease, Rigby and Arthur Hine Knowles, for "An improved stair-rod fastener."
- 15083. Frederick D. T. Lehmann and Peter H. Kohlsaas, for "Improvements in fireproof buildings and structures."
- 15116. Edward Lloyd Pease, for "An improved construction of fireproof flooring and the like structural arrangements."
- 15134. William Johnson, for "Improvements in fire-grates."
- 15151. Arthur Smith, for "Improved means for decorating stairways."

TO INVENTORS.—Patents for Inventions, Trade-marks and Designs secured; every assistance given to inventors. Specialists in Building matters. Information free.—Messrs. RAYNER & Co., Patent Agents, 37 Chancery Lane, London, W.C.

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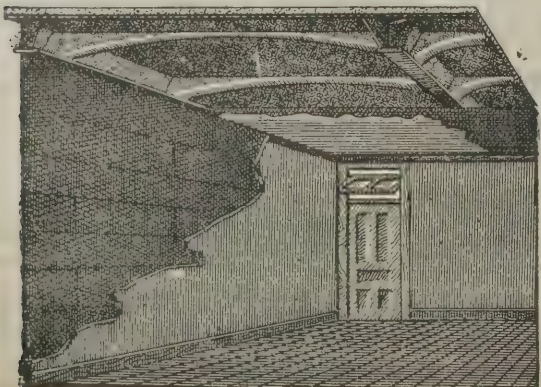
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EDITORIAL NOTICES.

The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.

Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

For Advertisement Scale, see page xv.

COMPETITION OPEN.

BOOTLE.—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000l. Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

CONTRACTS OPEN.

ABERDARE.—July 23.—For building thirty to fifty houses. Mr. T. Roderick, architect, Ashbrook House, Clifton Street, Aberdare.

ABERDEEN.—July 20.—For building cross wall at Allenvale cemetery extension. Mr. T. R. Gillies, advocate, 181 Union Street, Aberdeen.

ARDWYN.—July 29.—For erection of additional buildings at County School. Mr. T. E. Morgan, architect, 12 Baker Street, Aberystwith.

BARNSELY.—July 21.—For erecting two houses and out-buildings in Beech Street. Mr. Herbert Crawshaw, architect and surveyor, 13 Regent Street, Barnsley.

BERKHAMSTED.—July 28.—For erection of boys' school at the Victoria National Schools. Mr. C. H. Rew, architect, Great Berkhamsted.

BERKHAMSTED.—July 22.—For thorough repair of four cottages, Nos. 77, 78, 79, 80, at Gossoms End. Mr. George Scott, clerk, 10 Chapel Street, Berkhamsted.

BOURTON-ON-THE-WATER.—July 24.—For erection of hall and reading-room. Messrs. Prothero & Phillott, Cheltenham.

BRECONSHIRE.—July 28.—For erection of a dwelling-house at Llanwrtyd Wells. Mr. H. Teather, architect and surveyor, Andrew's Buildings, Queen Street, Cardiff.

CARDIFF.—July 21.—For construction of a dwarf wall and railings round St. John's churchyard. Mr. W. Harpur, borough engineer, Town Hall.

CARDIFF.—July 21.—For construction of a steam-roller shed, masons' shed, tar macadam shed, stores, offices and inspector's house at Trade Street. Mr. W. Harpur, borough engineer, Town Hall.

CARLISLE.—July 24.—For providing additional water-closet accommodation to wards Nos. 1 and 2 at Garlands Asylum. Mr. Geo. Dale Oliver, county architect, 5 Lowther Street, Carlisle.

CARMARTHEN.—July 27.—For erection of an additional classroom and master's house at Bankfossfelen Board School. Mr. John Thomas, clerk of the Board, Castle Hill Cottage, Carmarthen.

CHELTHENHAM.—July 28.—For erection of a Kursaal and municipal offices on the Winter Garden site. Mr. E. R. Robson, architect, 9 Bridge Street, Westminster.

CORK.—July 19.—For building a Roman Catholic church, attendants' quarters, scullery and boot-room, at Cork District Lunatic Asylum. Mr. W. H. Hill, architect, 28 South Mall, Cork.

DARLINGTON.—July 22.—For extension of boiler-house and engine-house at Gasworks. Mr. F. S. Steavenson, town clerk, Darlington.

DERRY.—July 28.—For building bank premises at Ballbofe, for the Hibernian Bank, Limited. Mr. E. J. Toye, architect, Strand, Derry.

DEVIZES.—July 20.—For construction of engine-house, boiler-house, with coal store and chimney-stack, Wilts County Asylum. Messrs. Massey & Allpress, 25 Queen Anne's Gate, Westminster, S.W.

DEWSBURY.—July 19.—For erection of a house at Westborough. Mr. Fredk. W. Ridgway, architect, Bond Street, Dewsbury.

DINNINGTON COLLIERY.—July 24.—For erection of Primitive Methodist chapel. Mr. I. G. Crone, architect, 50 Grainger Street.

DURHAM.—July 21.—For erection of a pair of cottages at Mainsforth, near Ferryhill. Mr. F. H. Livesey, architect, Market Place, Bishop Auckland.

DURHAM.—July 29.—For repairs to chimneys at Sedgefield workhouse, and for the reconstruction and repair of the garden and other walls in connection with same. Mr. William Snowden, sanitary inspector and surveyor, Sedgefield.

EAST ARDSLEY.—July 26.—For erection of five brick houses. Mr. T. A. Battery, architect, Exchange Buildings, Queen Street, Morley.

FELIXSTOWE.—July 21.—For erection of a large shelter in the cliffs at Felixstowe, near the town hall. The Chairman, general purposes committee, Town Hall, Felixstowe.

GATESHEAD.—For building fourteen small self-contained houses. Mr. Morris, brick manufacturer, Millicent Terrace, Gateshead.

GOOLE.—July 26.—For extension of Boothferry Road Schools, for the Goole School Board. Mr. W. B. Andrews, architect, 24 Boothferry Road, Goole.

GRIMSBY.—July 21.—For additional classroom, infants' school, at Barcroft Street School. Messrs. Croft & Bentley, architects, Osborne Street, Great Grimsby.

HALIFAX.—July 28.—For erection of fireproof stables for eighty horses, large coach-houses, offices, manager's residence, &c., in Fenton Road, King Cross. Messrs. Richard Horsfall & Son, architects, 15 George Street, Halifax.

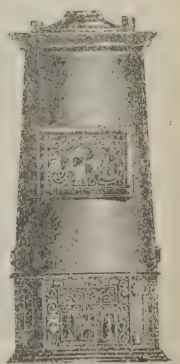
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HALIFAX.—July 29.—For erection of a warehouse off Pellon Lane. Messrs. C. F. L. Horsfall & Son, architects, &c., Lord Street Chambers, Halifax.

HEATON.—July 19.—For erection of a pair of semi-detached villas in Wilmer Drive. Mr. Jas. Ledingham, District Bank Chambers, Bradford.

HENSINGHAM.—July 22.—For building a farmhouse at Sneckyeat Farm. Mr. C. H. Bonsey, Somerset House, Whitehaven.

HIGHGATE, N.—July 22.—For erection of new entrance-lodge at the infirmary, Dartmouth Park Hill. Messrs. Segrave, Browett & Taylor, architects and surveyors, 9 Warwick Court, High Holborn, W.C.

HULL.—July 21.—For erection of engineers' workshops, blacksmiths' shops, &c., at the St. Andrew's Dock. Messrs. Freeman, Son & Gaskell, architects and surveyors, Albert Chambers, Carr Lane, Hull.

KILLYBEGS.—July 17.—For building a sacristy in connection with St. Mary's Church. Rev. John Sweeney, P.P., Killybegs.

KING'S LYNN.—July 19.—For building engine-house, boiler-house, coal-store, chimney-shaft and three cottages. Mr. E. J. Silcock, borough and water engineer, Town Hall, King's Lynn.

KING'S NORTON.—July 19.—For erection of two chapels and a lodge in connection with the proposed cemetery. Mr. J. Brewin Holmes, architect, Cobden Buildings, Corporation Street, Birmingham.

KIRKBY-IN-ASHFIELD.—For erection of stores, for the Kirkby-in-Ashfield Working Men's Co-operative Society, Limited. Messrs. Fredk. Ball & Lamb, architects, 5 Hounds-gate, Nottingham.

LANCASTER.—July 20.—For erection of four shops. Mr. J. Parkinson, architect, 67 Church Street, Lancaster.

LEAVESDEN.—For structural alterations at the St. Pancras Schools, Leavesden, near Watford. Mr. Charles P. Ayres, architect, 14 High Street, Watford.

LEEDS.—For erection of infants' school at Hunslet Carr. Mr. W. S. Braithwaite, architect, School Board Offices, Leeds.

LEEDS.—For erection of eight houses and two shops in Upper Accommodation Road. Mr. J. R. Conyers, 159 East Street, Leeds.

LEEDS.—For alterations to house at Newlay, new billiard-room, stabling, &c. Mr. J. Peakman, architect, Hopwood Bank, Horsforth.

LINCOLN.—July 20.—For erection of electricity works, offices and stores on Brayford Side (North), Lincoln. Mr. R. A. Macbrair, city surveyor, Lincoln.

LINCOLN.—July 20.—For erection of a tall chimney on Brayford Side (North), Lincoln. Mr. R. A. Macbrair, city surveyor, Lincoln.

LITTLE HINTON.—July 24.—For repairs at the West Hinton Farm, Little Hinton, Wilts. Messrs. William Drew & Sons, 22 Victoria Street, Swindon.

LONDON, E.C.—July 20.—For removing the wall at the junction of Queen Victoria Street and Upper Thames Street, and for substituting a flight of steps thereat. Mr. H. Montague Bates, principal clerk, Guildhall.

LONDON.—July 21.—For erection of a coroner's court and mortuary, for the Vestry of the parish of Hammersmith. Mr. H. Mair, surveyor.

LONDON.—July 22.—For laying new drains and alterations and additions to workhouse and infirmary in Fulham Palace Road, W. Mr. A. Saxon Snell, architect, 22 Southampton Buildings, Chancery Lane, W.C.

LONDON, S.E.—July 27.—For construction of an underground convenience at Old Kent Road. Mr. Oliver E. Winter, vestry surveyor, Vestry Hall, Borough Road, S.E.

LOWESTOFT.—July 20.—For erection of an annexe to the infirmary at Oulton Workhouse, near Lowestoft. Mr. Alfred Clarke, architect, 126 London Road, Lowestoft.

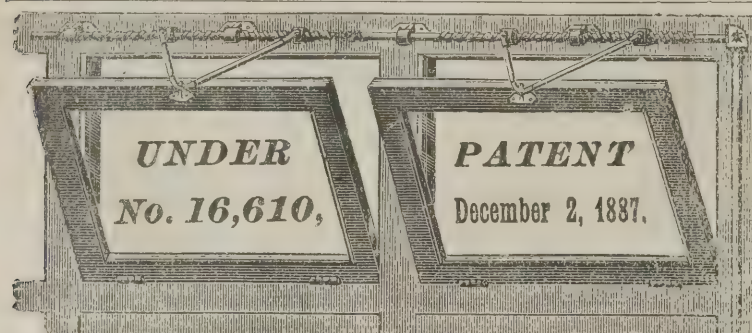
LUTON.—July 19.—For cleaning and repairs, for the School Board. Mr. William Hoyle, clerk, Board's Offices, Waller Street, Luton.

LYTHAM.—For erection of grand stand on the beach, for the horse sale. Mr. J. Allen Parkinson, secretary, 5 Chapel Street, Preston.

MANCHESTER.—July 26.—For erection of sixty dwelling-houses at Lodge Street, Junction Street and Malton Street, Miles Platting. City Surveyor, Town Hall, Manchester.

MARYLEBONE.—For rebuilding 90 High Street. Mr. J. Randall Vining, 89 Chancery Lane, W.C.

MERTHYR TYDFIL.—July 25.—For erection of seventeen houses, making of road, &c., at Penydarren Park. Mr. Mathew Warlow, architect, Warlow Street, Merthyr Tydfil.



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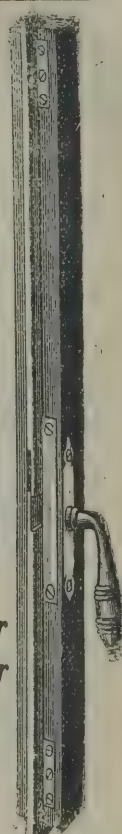
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MIDDLESBROUGH.—July 21.—For erection of shed at the workhouse. Messrs. R. Lofthouse & Sons, architects, Middlesbrough.

MICKLEFIELD.—July 21.—For erection of four cottages at Peckfield, for the North-Eastern Railway Company. Mr. William Bell, company's architect, York.

MIDDLEWICH.—July 21.—For erection of technical schools and free library. Mr. Reginald T. Worth, Town Hall Chambers, Middlewich.

MILES PLATTING.—July 26.—For erection of sixty dwelling-houses at Lodge Street, Junction Street and Malton Street. City Surveyor, Town Hall, Manchester.

RADSTOCK.—July 19.—For enlarging Radstock working-men's hall. Mr. W. J. Wilcox, architect, 1 Belmont, Bath.

NEWCASTLE-ON-TYNE.—July 20.—For erection of a dwelling-house at Flint Hill. Mr. J. H. Moyle, architect, Hobson Colliery.

NEWMARKET.—July 26.—For erection of a new block to joint fever hospital, Fordham Road, Exning. Mr. Sidney J. Ennion, clerk, Deva Chambers, Newmarket.

NEWPORT.—July 30.—For erection of buildings and machinery foundations for extensions of the municipal electricity works of the borough. Mr. Robert Hammond, consulting electrical engineer to the Corporation, Ormond House, Great Trinity Lane, London, E.C.

NORTHUMBERLAND.—July 19.—For erection of shop and dwelling-house at Whitley. Mr. Arthur Stockwell, architect, 11 Pilgrim Street, Newcastle-on-Tyne.

OVER KELLET (LANCS.).—July 22.—For erection of house. Mr. J. Parkinson, architect, 67 Church Street, Lancaster.

PECKHAM, S.E.—July 20.—For erection of four terrace houses. Mr. J. T. Smith, 8 Finsbury Circus, E.C.

PERRANPORTH.—July 22.—For erection of four houses, two pairs semi-detached. Mr. Sampson Hill, architect, Green Lane, Redruth.

PRESTON.—July 31.—For alterations and additions to the Bushell's Hospital, Goosnargh. Mr. Edward Garlick, 33 Winckley Square, Preston.

ROSS.—July 26.—For additions and alterations to mission-room, St. Mary's Church. Rev. E. H. W. Ingram, The Rectory, Ross.

SALFORD.—July 22.—For the construction of a dry area round the "D" block at the sanatorium at Ladywell. Mr. Saml. Brown, town clerk, Town Hall, Salford.

SHEFFIELD.—For erection of four dwelling-houses, Broad-oaks, Attercliffe. Messrs. Walker Bros., architects, 76 Carver Street.

SHREWSBURY.—July 21.—For supplying and fixing stalls in the general market, for the markets committee. Mr. W. Chapple Eddowes, borough surveyor, The Square, Shrewsbury.

STREATHAM HILL.—July 19.—For completion of four houses on the Telford Park Estate. Mr. F. H. Harvey, 183 Lavender Hill, Clapham Junction.

SUFFOLK.—July 21.—For additions to classroom at Cotton Schools. Mr. Isaac A. Clarke, architect, Walsham-le-Willows.

SUFFOLK.—July 23.—For erection of a teacher's residence in connection with the Swilland Schools, for the Swilland School Board. Mr. John S. Corder, architect, Wimbourne House, Ipswich.

SWANSEA.—July 20.—For erection of a cottage at Morriston Station, near Swansea. Mr. G. K. Mills, secretary, Paddington Station, London.

THORNE.—July 23.—For additions and alterations to Grammar School. Mr. H. B. Thorpe, architect and surveyor, Goole.

WALES.—July 20.—For erection of hotel at Tylorstown. Mr. T. R. Phillips, architect, Pontypridd.

WAKEFIELD.—July 19.—For additions and alterations to the Stafford Arms Hotel, and stabling, forming covered yards, erection of four shops, store-rooms, &c., in Northgate. Messrs. Fred. Simpson & C. W. Richardson, architects, Southgate Chambers, Wakefield.

WALSALL.—July 19.—For erection of infants' school to accommodate 350 children at the Croft Street Schools, Birchills. Messrs. Bailey & McConnell, Bridge Street, Walsall.

WEDNESBURY.—July 20.—For erection of nurses' institute. Councillor Joynson, J.P., architect, Spring Head, Wednesbury.

WESTON-SUPER-MARE.—July 31.—For erection of two dwelling-houses and lock-up shops and alterations to the market house. Messrs. Price & Wooler, architects, Weston-super-Mare.

WHITSTABLE.—July 20.—For construction of a gasholder tank, 62 feet by 16 feet 6 inches. Mr. H. E. Jones, C.E., Gasworks, Harford Street, Stepney.

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WIMBLEDON.—July 19.—For erection of stabling, out-offices and dwellings at lower storeyard, Queen's Road. Mr. C. H. Cooper, surveyor, Council Offices, Broadway, Wimbledon.

WINCHMORE HILL, N.—July 23.—For alterations to latrines, provision of urinals, &c., at the Northern Fever Hospital. Chief Office of the Board, Norfolk House, Norfolk Street, Strand, W.C.

WORCESTER.—July 20.—For repairs, papering and painting at the Guildhall. Mr. Henry Rowe, Corporation architect, Pierpoint Street, Worcester.

YARMOUTH.—July 26.—For erection of a classroom, offices, &c., at the Burgh Castle National Schools. Mr. Arthur S. Hewitt, architect, 15 King Street, Yarmouth.

YORK.—July 24.—For erection of stores, Railway Street. Messrs. Athron & Beck, architects and surveyors, Dolphin Chambers, Doncaster.

YORKS.—July 26.—For erection of proposed Primitive Methodist chapel at Camblesforth. Mr. T. S. Ullathorne, architect, Selsby.

TENDERS.

ASHFORD.

For construction of a covered service reservoir, water-tower and works in connection therewith, at Barrow Hill. Mr. WILLIAM TERRILL, surveyor.

W. Coker	£4,454	18	0
Pedrette & Co.	4,421	12	7
R. Avar	4,347	0	0
T. T. Denny	3,999	0	0
Tuff & Miskin	3,938	0	0
A. E. Nunn	3,612	0	0
W. J. LOGAN, Maidstone, Kent (accepted)	3,349	0	0

For making-up Christchurch Road, Ashford. Mr. W. TERRILL, surveyor.

J. E. Hughes	£290	0	0
W. J. Logan	249	0	0
G. F. Davis	230	0	0
G. Joy	225	15	8
W. COKER, Rochester (accepted)	220	0	0

BETHNAL GREEN.

For erection of shop and dwelling-house at Sale Street, for Mrs. Linney. Mr. J. WILLIAMS DUNFORD, architect, 100c Queen Victoria Street, E.C.

Wire & Forrest	£563	0	0
Lawrence	560	0	0
KNIGHT & SONS (accepted)	548	0	0

BRADFORD.

For extension of engineering works at Thornbury. Mr. THOMAS BARKER, architect, 5 Bond Street, Bradford.

Accepted tenders.

J. Coates, mason	£421	0	0
J. Copley & Son, joiner	358	0	0
T. Nelson, slater	89	10	0
R. Townend, plumber and glazier	55	0	0
J. Wheeler, plasterer	47	15	0
G. J. Walton, painter	16	7	0

BRIDLINGTON.

For pulling-down four houses and other buildings and the erection of six dwelling-houses and a shop, Quay Road. Mr. SAMUEL DYER, architect, Bridlington Quay.

T. Wood	£2,873	5	0
E. Wilson	2,014	1	6
J. Rennard	1,950	0	0
J. Sawdon	1,832	10	0
W. BARNES, Bridlington Quay (accepted)	1,608	0	0

BRIGHTON.

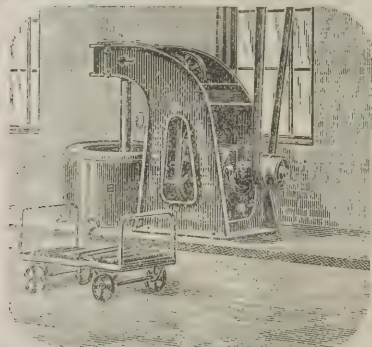
For erection of a cookery school and a school for afflicted children. Messrs. THOMAS SIMPSON & SON, surveyors, 16 Ship Street, Brighton.

W. Botting & Son	£3,773	8	0
J. Longley & Co.	3,347	0	0
G. R. Lockyer	3,256	0	0
P. Peters & Son	3,147	0	0
W. TAYLOR, Brighton (accepted)	3,103	0	0

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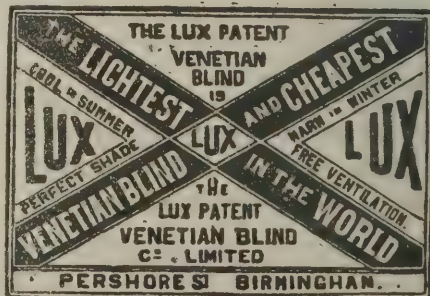
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J. Hatherley	459	5	0
Padfield & Fear	406	19	6
J. Flower	381	14	0
W. Tovey	379	11	10
M. Heal	353	15	0
GAIT & SON, Ston Easton, Bath (accepted)	209	6	0
Architect's estimate	335	0	0

CANTERBURY.

For construction of a substantial close oak park fence, also pale fencing (about 600 lineal yards in all), and the gates and fittings to enclose the site of the infectious hospital at Fordwich Lane, St. Martin's. Mr. A. H. CAMPBELL, city surveyor, 28 St. Margaret Street, Canterbury.			
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TAYLOR & PARSONS (accepted)	£889	0	0

CONWAY.

For erection of new market hall, armoury and public hall. Mr. T. B. FARRINGTON, borough engineer.			
J. Roberts	£3,500	0	0
D. Owen	3,379	0	0
I. Hughes	3,250	0	0
B. Jones	3,150	0	0
Matthews	2,950	0	0
THORPE & SONS, Breton Works, Lloyd Street, Llandudno (accepted)	2,900	0	0

CRICKLADE.

For alterations and additions to the White Horse Hotel, for Messrs. R. B. & C. L. Bowly. Messrs. W. DREW & SONS, architects, Swindon.			
J. WILLIAMS, Swindon (accepted)			

DEPTFORD.

For supply and erection of iron roofs at the Foreign Cattle Market. Mr. R. A. MURRAY, engineer.			
HUMPHRIES, Limited (accepted)	£2,700	0	0

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C. S. Mallett	191	0	0
F. C. Blyth	135	0	0
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Stacey & Escourt	97	14	8
A. BARNES & CO., Woodbridge (accepted)	82	10	0

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For erection of dwelling-house at Glengeary, co. Dublin. Mr. CECIL ORR, architect, 1 Suffolk Street, Dublin.			
H. PEMBERTON, Ballybrack, co. Dublin (accepted)	£3,993	0	0

DURHAM.

For completion of main road improvement at Annfield Plain. Mr. T. TROWSDALE, surveyor, Annfield Plain.			
J. Goldsborough	£308	1	6
T. A. Turnbull	304	19	3
J. Dunn	289	11	0
GATISS & GOLDSBOROUGH (accepted)	259	0	4
For the erection of three public urinals and conveniences. Mr. T. J. TROWSDALE, surveyor, Annfield Plain.			
W. E. FAWCUTT, Annfield Plain (accepted)	£60	1	3
J. Dunn	60	0	0

EALING.

For additions and alterations to St. John's Schools. Mr. ROBERT WILLEY, architect, 33 New Bridge Street, E.C.			
Penny & Co.	£3,410	0	0
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Cleary Bros.	1,525	0	0
B. ENNIS, Edenderry (accepted)	1,270	0	0
Engineer's estimate	1,226	0	0

ENNISKERRY (IRELAND).

For repairs and cement plaster works at Powerscourt Rectory.
Mr. CECIL ORR, architect, Enniskerry.

P. J. KINLEN, Co. Wicklow (accepted)	£357	10	0
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FARINGDON.

For erection of post office. Messrs. WILLIAM DREW & SONS, architects, Victoria Street, Swindon. Quantities by the architects.

Cadel Bros.	£1,180	0	0
Flewelling & Hucksion	1,042	0	0
T. Colborne & Son	985	17	0
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J. Leith, jun.	1,475	0	0
A. & F. Manuelle	1,466	0	10
J. Fyfe	1,461	5	0
P. TAWSE, Clayhills, Aberdeen (accepted)	1,440	0	0

FOYERS.

For drainage and water supply in Foyers village, viz. works at and near the loch; small reservoir; tracks for cast-iron pipes, about 2,635 yards; supply and laying about 2,635 yards of 3-inch cast-iron pipes, 200 yards lead pipes, valves, &c.; tracks for drainage pipes, about 1,675 yards; supplying and laying about 1,675 yards F C pipes. Mr. C. B. MANNERS, engineer, Inverness.

T. Mochan	£1,302	15	11
Chisholm & Co.	1,264	3	3
H. R. Blackburn	1,248	4	3
W. A. Mackay	1,006	10	0
R. Fraser, Inverness *	975	4	6
G. M. Stirling	765	7	6

* Accepted provisionally.

GLAISDALE.

For erection of school buildings and master's house. Mr. EDWARD H. SMALES, architect, 5 Flowergate, Whitby.

C. Winterburn	£1,776	0	0
W. Atkinson	1,764	10	10
R. HARLAND, Whitby (accepted)	1,750	0	0

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For painting of the infirmary at the workhouse.
W. T. HARRISON, Redcar Road (accepted) £67 17 0

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J. PRESTON & SONS (accepted) £112 6 6

LEICESTER.

For erection of manager's house and horse-keeper's cottage, stabling, shedding. Mr. T. W. PETTIFOR, architect, Berridge Street Chambers, Leicester.

J. E. Johnson & Son	£10,720	0	0
M. Martin	9,818	0	0
G. Holt	9,463	0	0
Tyers & Yates	9,261	0	0
E. Orton	8,998	0	0
Bradshaw & Sons	8,923	5	0
W. M. Sharp	8,657	14	0
Riddett & Son	8,475	0	0
E. FOX, Leicester (accepted)	7,999	0	0

LINCOLN.

For additions and alterations at Bracebridge Asylum, near Lincoln. Mr. F. H. GODDARD, architect, Lincoln.

W. Pattinson & Sons	£6,850	0	0
F. Pattinson	6,350	0	0
G. W. Cook	6,216	5	0
H. S. & W. Close	5,865	0	0
W. Wright & Son	5,770	0	0
S. & R. Horton	5,554	0	0

Although no tender has been accepted, that sent by S. & R. Horton will be recommended.

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LEEDS.

For alteration at the new entrance, Roundhay Park, for the formation of an electric battery station for the electric tramways.

WADE BROS., Woodhouse Lane (accepted) . £451 3 6

For erection of a battery station in connection with the tramways at Kirkstall.

J. SCHOFIELD, SONS & CO., LIMITED, Kirkstall Road (accepted) . £485 9 11

LIGHTCLIFFE.

For erection of house at Wood Nook, Hove Edge.

S. Mitchell, mason.

J. Booth, joiner.

L. Lister, plasterer and slater.

F. Ogden & Cardwell, plumber.

LOUGHBOROUGH.

For the construction of about 365 lineal yards pipe sewers, including a railway crossing, manholes, &c. Mr. A. H. WALKER, borough surveyor.

J. Ford £378 17 0

Main, Kendall & Main 366 0 0

MOSS & SON, Loughborough (accepted) 351 0 0

LOWER CLAPTON.

For alterations and redecoration of the Downs Chapel. Messrs. W. BRADBPEAR & CO., architects and surveyors, Canonbury Station, N.

Higgs & Hill £894 0 0

Bradford 873 0 0

Colls & Son 848 0 0

BRITTON (accepted) 665 0 0

MANSFIELD.

For erection of two houses in St. John Street. Mr. WM. DODSLEY, architect, Mansfield.

Fisher Bros. £1,419 0 0

W. A. Vallance 1,390 0 0

W. Bains 1,387 0 0

C. G. Percival 1,375 0 0

W. S. Cuddy 1,270 0 0

A. H. Sharley 1,252 0 0

J. Tate 1,179 0 0

J. POGSON, Farnsfield, near Southwell, Notts

(accepted) 1,150 0 0

MOORDOWN.

For erection of a lych gate at St. John's Church.

J. WRIGHT (accepted) £52 10 0

NORTHWRAM.

For additions to Mechanics' Institute.

Accepted tenders.

E. Balmforth, Queensbury, mason.

Sowood & Sykes, Stump Cross, Shibden, joiner.

S. Hainsworth & Co., Bradford, concreter.

C. Kershaw & Son, Slead Syke, Brighouse, asphalter.

Hinchcliffe & Hainsworth, Northowram, plasterer.

J. Smithies, Great Horton, Bradford, slater.

F. Bates, Shelf, plumber.

Hinchcliffe & Hainsworth, painter.

PENRITH.

For erection of a cement concrete wall, about 550 yards in length, along the margin of Lake Ullswater, near Pooley Bridge.

Ormerod & Son £687 10 0

J. Rule 568 6 8

W. Grisenthwaite 495 0 0

J. JACKSON, Penrith (accepted) 330 0 0

PLYMOUTH.

For making-up and completing the following streets:—Grenville Road, Grenville Road Lane South, Clarendon Place Lane South, Egerton Place. Mr. JAMES PATON, borough engineer and surveyor.

Grenville Road (Section 3).

T. Shaddock £658 3 2

C. L. Duke 594 6 3

A. N. COLES (accepted) 593 2 9

Grenville Road Lane South.

T. Shaddock 430 14 6

A. N. Coles 421 17 0

C. L. DUKE (accepted) 414 15 6

Clarendon Place Lane South.

A. N. Coles 177 3 0

C. L. Duke 165 8 0

T. SHADDOCK (accepted) 164 16 0

Egerton Place.

T. Shaddock 516 17 2

A. N. Coles 494 16 9

C. L. DUKE (accepted) 477 6 0

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PECKHAM.

For erecting bottling warehouse and alterations at Tyrrel Road.
G. BARKER, Mile End (*accepted at schedule price*).

PONTEFRACT.

For rebuilding Birkin Bridge. Messrs. J. H. GREAVES & CO., architects, Pontefract.
G. SPURR, Northgate (*accepted*).

RAMSGATE.

For erection of Wesleyan church at St. Lawrence. Mr. JOHN WILLS, architect, Victoria Chambers, Derby.
W. W. MARTIN, Ramsgate (*accepted*) . . . £1,416 18 0

RICHMOND.

For constructing a new entrance to the gallery and other works at the public baths, Kew Foot Road, Richmond (Surrey), and for painting and general repairs and works at the free library. Mr. J. H. BRIERLEY, borough surveyor.

Entrance, &c., public baths.

Speechley & Smith	£337	0	0
S. N. SOOLE & SON, Sheen Road (<i>accepted</i>)	320	0	0
Surveyor's estimate	300	0	0

Repairs at free library.

S. N. Soole & Son	132	0	0
SPEECHLEY & SMITH (<i>accepted</i>)	125	0	0
Surveyor's estimate	120	0	0

SALE.

For sewerage Hampson Street, length 55 yards, depth 10½ feet, with manhole, &c.; also for sewerage, paving and lighting a passage off Springfield, length about 49 yards, width 15 feet, for the Sale Urban District Council. Mr. A. G. M'BEATH, surveyor.

G. Bozson	£50	0	0
H. Davison	47	0	0
W. J. WILKINSON, Pendleton (<i>accepted</i>)	42	0	0

SWINDON.

For additions to shop, 14 Fleet Street, New Swindon, for Mr. Farnham Budgett. Messrs. W. DREW & SONS, architects, Swindon. Quantities by the architects.

Flewelling & Huckson	£440	0	0
C. Williams	419	0	0
T. COLBORNE & SON, New Swindon (<i>accepted</i>)	373	0	0

SHEFFIELD.

For painting and distempering at Board schools.
J. Puttrel & Co., South Street, Moor.
T. G. Woof, Devonshire Street.
A. Machin, 202 Witham Road.
Sheffield 'Co-operative Painters' Society, Limited, 18 Cemetery Road.
C. Chadwick & Sons, Victoria Street.
A. S. Hepworth, West Street.
Johnson & Appleyards, Limited, Leopold Street.
All at per schedule of prices.

ST. GERMANS.

For repairs, &c., to the interior of workhouse at Torpoint.
S. Hyde 4,210 0 0

UPPER SIAGRY.

For erection of a dwelling-house at Upper Siagry, Wilts. Mr. T. HOLLOWAY, architect, Chippenham.
W. Cowlin & Son £1,150 0 0
J. Downing 866 0 0
SMITH & LIGHT, Chippenham (*accepted*) 858 0 0

WAKEFIELD.

For alterations, new shop front, &c., to premises 32 and 34 Wood Street. Mr. WILLIE WRIGLEY, architect, 10 Wood Street, Wakefield.

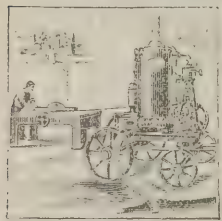
Accepted tenders.

J. Mountain, joiner	£25	0	0
G. Summers, builder	24	5	0
F. Stafford, plumber	22	0	0
A. Oakes, steelwork	17	10	0
Turner & Hood, electric lighting	13	5	0
J. Naylor, painter	9	0	0
E. Driver, plasterer	5	0	0

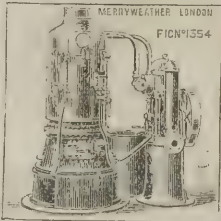
WALLASEY.

For building a river wall, with the necessary slipways, steps, &c., and for constructing and sewerage a riverside promenade along the river Mersey from the termination of the existing promenade at the south end of Marine Terrace, Magazines, to the pier at New Brighton, in the district of Wallasey. Mr. THOMAS MOULDING, assistant district engineer.
E. GABBUTT, Oakes Street, Liverpool (*accepted*) £27,945 0 0

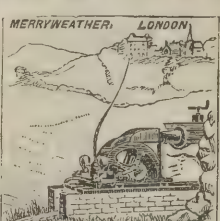
MERRYWEATHER on WATER SUPPLY TO COUNTRY MANSIONS, &c.



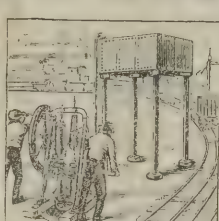
"Estate" Steam Pumping and Driving Engine.



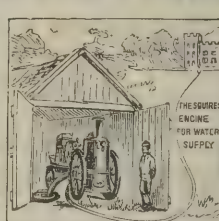
Light Pumping Engine and Boiler.



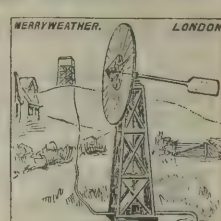
Water Wheel Pumps.



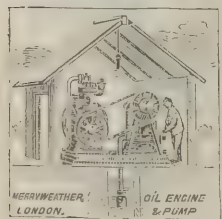
"India" Pattern Pumping Engine.



"Squire" Portable Fire Engine.



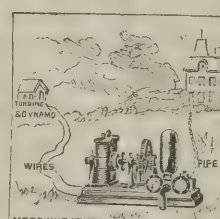
Windmill Pump.



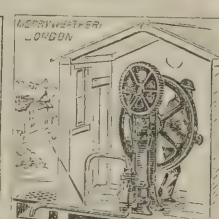
Oil Engine and Pump.



Estate Manual Force Pump.



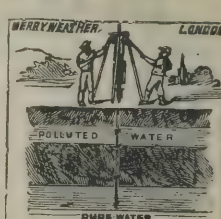
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LARGEST MAKERS OF HIGH-CLASS HOSE IN THE WORLD. WORKS: GREENWICH, S.E.

TRADE NOTES.

THE Howrah House, Poplar, London, is being warmed and ventilated by means of Shorland's patent Manchester stoves and grates and special ventilators.

APROPOS of the opening last week by H.R.H. Princess Christian of the Birmingham General Hospital, we may state that the two hydraulic passenger and bed lifts and the whole of the hand lifts were constructed by Messrs. Clark, Bunnett & Co., Limited, of New Cross Road, S.E. The sanitary appliances of Messrs. Morrison, Ingram & Co., sanitary engineers, Manchester, were approved out of a selection of samples submitted by them and the other leading sanitary engineers of this country.

THE Engraved Wood Company, Limited, of Midghall Street, Vauxhall Road, Liverpool, lay themselves out to produce carvings upon the solid wood at a very low figure, about one-tenth of the cost of hand-carved work. The process is a patent one, and their goods are most suitable for decoration of all kinds, and are being extensively used in private houses, offices, hotels, ships' cabins and cabinet-making generally. The designs are artistic, and in very bold relief. The relief is not hollow at the back, but is upon the solid wood; they are durable, and no ordinary pressure from the front can affect them. This firm have just obtained the contract for fitting up with their carved panels the Star Chamber of Leasowe Castle, Cheshire, a residence which until lately belonged to Sir Charles Cust, but which now is in the hands of a company who are transforming the building into a hydropathic hotel.

ELECTRIC NOTES.

THE new electric shop in Portsmouth Dockyard, which occupies part of the site of the old convict prison, has a boiler installation capable of working up to 250 lbs. per square inch.

THE London County Council has at length decided that the Victoria Embankment and Westminster and Waterloo Bridges are to be lighted by electricity. The Council is to have its own installation, and the whole thing is to cost about 22,000/.

AS soon as the electric light has been installed, the clock-tower at the School Board offices on the Thames Embankment will be illuminated at night.

THE watch committee of the Bootle Corporation have issued a third report on a scheme for electrically lighting the borough. The committee recommend that, subject to the approval of the Board of Trade, the Council should approve and adopt a scheme for 8,000 lamps of 8 candle-power, and should apply to the Board of Trade for their approval of the proposed system and sanction to borrow 35,000/., to be taken up as and when required.

VARIETIES.

THE Imperial Insurance Company, Limited (Fire), announce that their London offices will in future close on Saturdays at one o'clock.

THE Duke and Duchess of Westminster have consented to visit Northwich on the 24th inst. to open the technical schools presented to the town by Sir Joseph Verdin, Bart.

THE Duke of Norfolk, accompanied by Lady Mary Howard, visited on the 7th inst. St. Joseph's Home, Howard Hill, to open some extensions of that institution. They consist of a new laundry, baths, and additional dormitory accommodation. The cost has been 1,942/.

A NEW church, erected by the Free Church congregation of Chirnside, was publicly opened recently by the Rev. Dr. J. H. Wilson, of the Barclay Church, Edinburgh. The church, which occupies a good position in the village, has cost nearly 1,500/.

THE British Linen Company Bank is about to erect a building at the corner of Byres Road and Dumbarton Road, Partick. The block, which will be of a very handsome character and four storeys in height, will contain bank offices and shops on the ground floor, and dwelling-houses above.

AT the monthly meeting of the Douglas Town Council, held on the 14th inst., the tender of Mr. W. J. Fargher for the erection of a block of artisans' dwellings in King Street was accepted, his quotation being 3,960/., and for the erection of municipal buildings, public library and fire-station in Ridgway Street, the tender of Messrs. W. Gradwell & Co., Barrow-in-Furness (10,358/.), was accepted. There were eight tenders in all, four English and four local.

AN alarming fire occurred at Derby on the 7th inst., when the extensive timber yard of Messrs. Roe & Son was completely

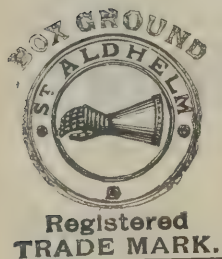
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RAIN GAUGES, &c., &c.

W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, & 78 SWANSTON STREET, MELBOURNE.

destroyed, and about 500 persons rendered homeless by the damage occasioned to surrounding property. The loss entailed is tremendous, and there were some cases of personal injury, but fortunately no loss of life.

EVERY year the number of desirable building sites that are worth the attention of speculators is becoming diminished, and it is consequently rare to find one so eligible as the Hyde House estate at Battersea Park which Messrs. Ventom, Bull & Cooper will sell by auction on August 4. The neighbourhood is one of the most densely packed spots round London, and as every inch of the estate can be turned to building account, from the fact that it lies between two main thoroughfares, it will doubtless command a good deal of attention. For hospital outposts, manufacturing or factory purposes, where a large area is required close to London, it would be invaluable.

CULLODEN HOUSE, the ancient seat of the Forbeses, near Inverness, is being dismantled in consequence of the recent death of Mr. Duncan Forbes, and the large and unique collection of Scottish historical relics, splendid old furniture and china, and curious works of art will be sold there by auction next month. Among the Jacobite relics is the bedstead on which Prince Charles Edward slept the night before the battle of Culloden.

SOME eighteen carpenters who were employed in the reconstruction of the Star Theatre, Dublin, struck work because, as is alleged, three of them were dismissed for refusing to unload a cart of timber. The carpenters state that such work is altogether outside their recognised duty. About 150 tradesmen and labourers still remain at work, as they are not immediately concerned in the dispute, but it is anticipated that unless a settlement is soon arrived at with the carpenters most of the hands will necessarily be thrown out of employment.

TROON has experienced a boom in house building during the past two years. About fifty new houses have been erected, most of which are for "letting" to summer visitors, and a number of them are to the order of bona-fide working men. The result of these operations is that quite a new town has been formed in the vicinity of the new passenger station, and that what a year or two ago were green fields now form a beautiful residential district. The prosperity of the golf clubs has also necessitated additional accommodation. A new ladies' club-house is approaching completion, and an enlargement of the gentlemen's one is under consideration. The handsome new Marine Hotel on the links is now completed

and ready for the reception of visitors. Several new blocks of buildings with shops on the ground floor and dwelling-houses above have also been erected in the town, and others are in progress. The building boom is likely to continue for some time.

SOME commotion was caused at the Waverley Station, Edinburgh, on the 7th inst., by the discovery that the scaffold of the new North Bridge had become ignited under the central span. The fire brigade was at once apprised of the outbreak, and a detachment with the necessary appliances was quickly on the spot, police precautions being simultaneously taken to stop the traffic on the bridge if necessary. As it happened, however, the fire was so speedily got under that the danger at first apprehended was avoided. Indeed, though for a few minutes the blazing woodwork looked threatening, so soon as the water was turned on all risk to the scaffolding was passed. Some time, however, elapsed before this was accomplished, owing to the distance the hose had to be carried; but the wind, luckily, not being high, the flames did not spread very rapidly. How the fire originated is not known.

THE premises of the Edinburgh Building Trades Exchange were formally opened on the 15th inst. The Exchange is common to America, and has had a successful existence in Glasgow during the last two or three years, being run on lines made familiar in Edinburgh by the Corn Exchange. The Association was started as a limited liability company with a capital of 10,000*l.*, and is made up of members of the Edinburgh building trades, firms supplying these trades, &c. The first of three floors has two large square rooms, in one of which meetings will take place, and a smaller room, which will be occupied by the secretary. The second of the large rooms will be used as a sample room, as will also those rooms on the second floor, the third floor being tenanted by the caretaker. The building is well appointed, and is lit by electricity.

THE representations which have been made to the Leeds Corporation by the butchers occupying shops in the Shambles to provide a dead meat market, public abattoir, and shops for retail meat dealers, came before a meeting of the Leeds markets committee on the 12th inst., Mr. Knowles presiding. A plan for the building of a dead meat market, with abattoir adjoining, on the site known as the hay market, was provisionally adopted by the committee. It was also decided to make inquiries as to the number of retail shops likely to be wanted, and to get an estimate of the cost of such premises. As has already been

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pointed out, the butchers are indignant at the dilatory manner in which this matter has been dealt with by the committee. Liable as the tenants in the Shambles are to receive short notice to quit at any time their landlords choose, they have repeatedly requested the committee to promptly decide one way or the other what they are going to do. If for the convenience of the ratepayers the Corporation desire to keep the butchers together by the erection of a central market, the latter are anxious that no time shall be lost, lest they have to leave the Shambles before the new premises are ready for occupation.

LAMBETH BATHS, KENNINGTON ROAD.

THE Prince of Wales, accompanied by the Princess of Wales, Princess Victoria and Prince and Princess Charles visited Lambeth on Friday last for the purpose of opening the admirably-appointed baths and washhouses which have been erected in the Kennington Road, of which they form a prominent feature. The buildings, which are of pleasing elevation in red brick, are erected on a site which was purchased in the year 1895 at an aggregate purchase price of 14,350/. The contract for the building was signed on June 13, 1896, and the foundation-stone was laid on October 10, 1896, by the Chairman of the Commissioners. They form the largest establishment of their kind in England, and every detail of their plan and general arrangement has been brought perfectly up to date by the architect to the Commissioners, Mr. A. Hessel Tiltman, of John Street, Bedford Row.

The superficial area of the site amounts to 33,330 feet, the whole of which (with the exception of the yard to the boiler-house) is covered with the buildings.

The general accommodation is as follows:—Men's first-class swimming-bath, 142 feet 6 inches by 56 feet 6 inches. Clear size of pond, 132 feet by 40 feet. Men's second-class swimming-bath, 98 feet by 42 feet. Clear size of pond, 90 feet by 30 feet. Women's swimming-bath, 64 feet by 40 feet. Pond, 56 feet by 25 feet. Men's first-class private baths, nineteen in number; men's second-class private baths, forty-six in number; women's first-class private baths, ten in number; women's second-class private baths, twenty in number—being a total of ninety-five private baths. Public wash-house for sixty-four washers.

The first-class swimming-bath has been specially arranged to adapt it for letting during the winter months for purposes of entertainment, and last year special powers were given to the

County Council for the licensing of this class of buildings for music and dancing.

The hall, when arranged for entertainments of any kind, will be entirely shut off from every other portion of the establishment and will afford seating accommodation on the ground floor for 1,222 persons and on the gallery floor for another 300, making in all seating accommodation for 1,522 persons. The first-class swimming bath (with that of the Hornsey Road baths) contains the largest public swimming pond in use in Europe, requiring some 250,000 gallons of water to fill it. A well is being constructed for the supply of water for this and the other swimming-baths of the establishment, in order to save a large portion of the cost of supplying the water.

The greater portion of the interior is lined or faced with glazed bricks for cleanliness and for minimising the cost of periodical repair.

The lighting is by electricity, the current for which will be generated in the establishment.

The building has been erected by Mr. Walter Wallis, of Lincoln House, Ramsden Road, Balham; the engineering work has been supplied by Messrs. J. & F. May; and the ironwork by Messrs. Moreland, of Old Street, E.C.

ENGINEERING CLASSES, LIVERPOOL.

ON the 4th inst. a meeting was held in the Walker Engineering Laboratory, University College, Liverpool, to announce the results of the last examination. The prizemen were as follows:—

Machine design (third year): Prize divided between Messrs. W. H. Riddlesworth and E. Brown. Machine design (second year): First prize, Mr. S. Holt; second prize, divided between Messrs. A. Thomas and F. W. Hewitt. Machine design (first year): First prize, Mr. W. L. Bomford. The following results of the University examinations were then read out:—Honours B.Sc.: First class, Messrs. W. H. Riddlesworth, E. Brown, and P. S. Couldrey. Second class: C. H. Stewart. Final B.Sc. ordinary: First class, H. Rigby. Second class, J. E. Evans. Intermediate B.Sc.: C. C. S. Anderson, A. Pinto Leite, C. Stewart. Professor Hele-Shaw then called upon the Principal to address a few words to the students.

Dr. Rendall had great pleasure in congratulating the department upon the satisfactory work accomplished during the past session. He was pleased to find that three out of the four engineering students had gained a first-class in the

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Honours School of Engineering, while the other departments had each placed one in the first class in their respective schools, the fourth engineering student taking a good place in the second class. Five out of the six engineering students who sat for examination had passed for the B.Sc. in engineering, and the results reflected great credit upon the teaching staff. He was also glad to find that not only had the engineering department of the college taken a high place in the University examinations, but the general work of the engineering students, as shown by the exhibition in the Museum, was of that excellent character which proved that in all directions the vigour, strength and heartiness of the department was sustained even to the end of the session, as attested by the attendance at that meeting and the terminal examinations. He then referred to the athletics, and the fact that the engineering section of the college had won the challenge cup from the other three divisions of the college, viz. the arts, science and medical, in the annual departmental contest. Referring to the general class lists, he assumed that a jubilee spirit pervaded the whole department, from the fact that there were no students unclassified.

Professor Hele-Shaw thanked the Principal for his encouraging remarks, and said that out of fifteen honours candidates in engineering from Manchester, Liverpool and Leeds there were five in the first class. Of these three were from this college and one had been specially recommended for a university scholarship on account of the excellence of his work. He alluded to the important step taken by the great parent institution in adopting for all future candidates for membership of the Institution of Civil Engineers an examination, a step which, although talked of for so many years, had been taken with the greatest deliberation and caution. This might greatly affect the position of the profession, and tended to place it more in line with that of the Church, law and medicine, where, of course, examinations were compulsory. It showed that the oldest and wisest heads of the profession considered that engineering was now recognised as requiring the highest scientific training, as well as the practical experience which was even more necessary than ever. The Professor commended the work of the College Students' Engineering Society, and referred to the members' successful trip to London during the Easter vacation. He hoped they would ever regard the University College as the alma mater where they would always receive a welcome if they visited it at any future time, and he hoped that some of them would remember the students of the college when they were looking out for a young and promising assistant.

ILLUSTRATIONS.

THE CHOIR, CANTERBURY CATHEDRAL.

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SYDNEY HOUSE OF REPRESENTATIVES.

CARR'S LANE CHAPEL, BIRMINGHAM.

RECENTLY some striking changes have been made in the interior aspect of Carr's Lane Chapel. The old gallery fronts, which have been the subject of various experiments in decoration, have now been superseded by fronts of solid English oak. The decoration is brought out mainly by the contrast of two tones of oak, the polished flat surface and the dead grain of the incised ornament, with the aid of simple colours judiciously used as accessories rather than as variants to the general effect, which is intended to suggest the fine inlays seen in old Grecian work. The seating in the body of the chapel has been simply repolished. An important change, however, has been made in the galleries. The whole of the pews have been removed, and for them have been substituted single lift-up seats, similar in structure to those with which theatre-goers are now familiar. An opera-house effect, however, has been avoided by making the chair backs of plain oak, and the alteration gives more than a hundred extra seats. The walls and ceiling have been effectively redecorated, and the iron columns and arcading introduced a few years ago to support the roof have been made to look more ornamental and, at the same time, less obtrusive. These decorations have been carried out in a Classic style, and the colouring has been kept in quiet tones, creams, greys and soft terra-cottas predominating. The ceiling, which is in panels, is picked out, and the ornamental parts, which are in modelled plasterwork, have been relieved with gold. The cove is panelled out and decorated in a very elaborate manner, as are also the walls. The iron girders and supports at the entrance to the body of the chapel have been hidden under Classical moulding of fibrous plaster, the making of which is a new Birmingham industry. Several structural alterations have also been made. Screens have been erected in the vestibule to add to the comfort of the congregation, and additional exits have been provided at the pulpit end of the chapel on each side from each of the galleries and the aisles. The chapel is now lighted by electricity, chiefly by means of light brass pendants. A thorough renovation of the organ has taken place; tubular pneumatic action has been fitted throughout. The internal

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work at the chapel has cost some 2,500/., but including the structural alterations and the contemplated reconstruction of the lecture-hall, the expenditure altogether will amount to about 6,000/.

THE PARK HOSPITAL, HITHER GREEN.

LEWISHAM wore a festive air on Monday last in honour of the visit of the Prince and Princess of Wales, the object of the visit being the opening by H.R.H. of an important addition to London's numerous hospitals. The Park Hospital, as the new building is called, is the ninth hospital erected by the managers of the Metropolitan Asylum district for the reception of patients within the parishes and unions of the Metropolis suffering from infectious diseases. Work was commenced on the hospital in the autumn of 1895, and, with the exception of the delay of some weeks caused by the strike of 1896, building operations have regularly proceeded up to the present time. With the exception of two hospitals provided by the Board for convalescing patients—one at Winchmore Hill and one at Darenth—the Park Hospital is probably the largest infectious hospital, not only in London, but in the United Kingdom. It is situated on an elevated site (the highest in the district) near Hither Green station, on the South-Eastern Railway, about three-quarters of a mile from Lewisham and six miles from London Bridge. The average level is about 95 feet above high-water mark, there being a difference of over 30 feet in altitude from east to west, and of 23 feet from north to south. The "infected" buildings are generally about 100 feet from the boundaries of the site. In this zone is retained a large number of beautiful full-grown trees, and a road has been formed round giving access to all parts.

The site consists of 20 acres of ground, or about 2½ times the area occupied by St. Thomas's Hospital, and in the forty-two buildings of which the hospital is composed, upwards of 10,000,000 bricks have been used (about double the number employed in the construction of the Blackwall Tunnel). There are six miles of drains within the hospital area, twenty-nine miles of water and steam-pipes, three miles of roof gutters, forty-two miles of electric wires and 350,000 slates. The pavilions, which are, of course, isolated, are disposed on a roughly radial plan, and are connected by covered ways with the kitchen, steward's stores, water tower, dispensary and telephone exchange, all of which are in the centre, together with the male and female servants' residences, the latter facing

the road. The distances to be traversed by the staff, the lengths of pipes, &c., are thus reduced to a minimum.

All the pavilions are axially nearly north and south, and are two-storeyed, with fire and sound-proof floors. There is no internal communication between the two floors, the upper one being reached by an external staircase from the covered way. There is an ample provision of lifts for coals, food, trollies, &c.

A scarlet fever pavilion contains on each floor three wards—one for twenty beds, one for two beds, and one for one bed—a ward scullery and other offices, the scullery being fitted with hot-plate kitchen, sink, &c. There are also provided a bathroom, two water-closets for patients and one for staff, sink-room, two bed-pan slop sinks, lavatories, movable baths, &c.

All the wards are heated by hot-water radiators in cases designed to admit fresh air, which air is then warmed and passed into the ward at a low velocity calculated to change the air in each ward three times per hour. The inlet of cold air can be adjusted to suit varying wind pressures.

In addition there are central open fireplaces and stacks of flues of novel design specially made by the architect for this hospital. In these central stacks every smoke flue can be swept from the external basement. The smoke flues are surrounded by aspirating flues, which, being thus heated, induce an up current, and so draw off the heated vitiated air from the centre of the wards. In each stack (which is externally made of glazed faience) are eight of these air flues and four smoke flues, and the whole are contained in an area 3 feet 6 inches square. All these air flues can be swept, and all have outlets on two sides. These stacks have formed an object of interest to a large number of architects and public officers during their construction.

Throughout the pavilions there is not a single buried pipe or inaccessible space of any kind. The linings of the sash windows are made to open for sweeping. Weights and sash lines can be removed and renewed without taking out the sashes. In some of the buildings is a new type of sash window designed by the architect. There are no hollow linings, the frame is solid, but the sashes slide up and down. In addition, they are made to open inwards to throw the air upwards. They can be regulated to any angle, and can be opened to admit air through the full area of the frame, i.e. double the area of an ordinary sash window. For "scouring" a ward this is of value. They can also be cleaned, painted and reglazed from the inside. The mode of securing these sashes is by a fastener on the bottom rail, avoiding the necessity in high windows of steps.

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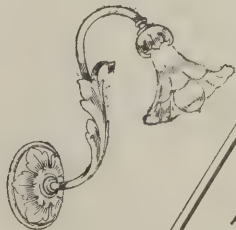
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In one of the wards ordinary hollow sash frames have National Accident Prevention Window Co.'s sashes, which are hung on centre pivots and are similarly accessible for cleaning, painting and reglazing from the inside. The w.c.'s used are of the bracket type fixed clear above the floor, which can thus be readily kept clean. The main waste from the baths is an open trench in the floor, and this principle of ready inspection has been observed throughout. Attached to the pavilions at both ends are airing balconies to which the beds can be wheeled for "sun" baths, and every pavilion has its own airing court. The laundry—divided into two parts for patients and staff respectively—is a long rectangle. Soiled linen enters at one end and passes through the several cleansing processes to the distributing room at the other.

The disinfectant is at the entrance to the laundry yard. The boiler-house is partly under the laundry, and contains four large boilers, with "economiser" connected to the furnace shaft. The engine-room contains laundry-engine, and the electrical plant of three engines and dynamos for lighting the hospital. The water supply is taken from the chalk, and subjected to a softening process.

The water tower, which forms an important central feature in the design, contains a four-dial clock.

The kitchen block is a one-storeyed building, the walls of which are faced internally with glass, while the fittings are up-to-date specimens of gas and steam apparatus. The female servants' block contains a separate cubicle for each maid, mess and sitting-rooms, &c. The matron's flat is in the same block. Similar accommodation is provided for the male servants. The Nurses' Home is divided into three houses, connected with glass and iron corridors on each floor as an additional means of egress in case of fire. Separate dining and sitting-rooms are provided for charge and assistant nurses, and each nurse has a separate bedroom.

In these residences as well as in the fever pavilions, all water-closets, lavatories, &c., are in detached towers, approached by enclosed passages, so that every building is practically separated from its sanitary annexe. All annexes are warmed and hot water is laid on to baths and lavatories. There are telephones in the various buildings, and from any one an official can communicate with every other building throughout the hospital. Fire hydrants are fitted throughout the buildings and in the yards, and fire-alarms in every block communicate

with six alarm bells in various parts of the hospital, while a special arrangement is made to call all the staff together in emergencies.

Covered ways connect all parts. These are of brick and concrete. The floors and steps are of red granolithic concrete. Under all these covered ways are well-lighted subways in which are fixed the water and steam-mains and heaters, electric light, telephone and fire-alarm cables, &c., all accessible at any point for repair.

The various diseases are kept separate in the drainage scheme, and all "non-infected" drains are kept distinct from the others. The manholes or inspection-chambers are of solid glazed fire-clay (Border's patent), the bottoms and all the branches being cast in one piece. The pipes are of the Archer jointed type, laid on and covered with concrete. The whole pipe system is divided into separate lengths for efficient ventilation, and all drains are fitted with flushing-tanks.

The architect is Mr. Edwin T. Hall, F.R.I.B.A. and F.S.I., Mr. Turner, chief clerk of works, and Mr. Mansell, assistant clerk of works.

Messrs. Leslie & Co., Limited, of Kensington, are the contractors for the hospital. The contract sum is 210,000*l.*, a little less than the architect's estimate.

The locks, lock-furniture and brass-foundry were supplied by Messrs. Colledge & Bridgen, of Wolverhampton.

Messrs. John Hall & Co., Fireclay Works, Stourbridge, supplied all the ivory-coloured glazed bricks, of which large quantities have been used. Many of these bricks were specially designed by the architect to do away with all square and sharp corners, and thereby prevent any accumulation of dust or dirt. The same firm supplied large quantities of fire-bricks and clay.

MUNICIPAL ENGINEERS' CONFERENCE.

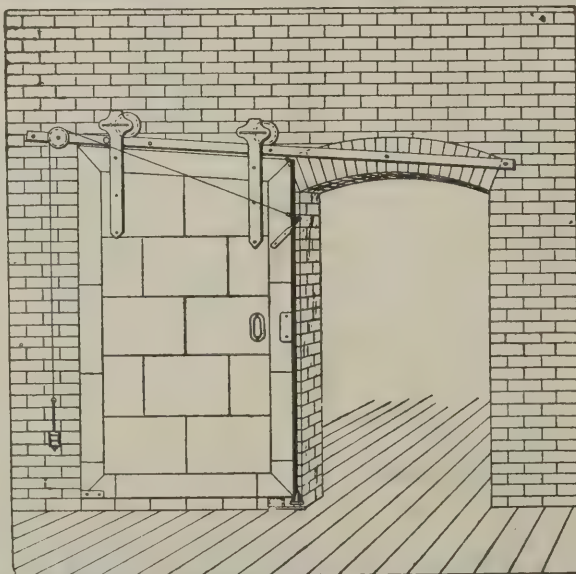
THE annual conference of the Association of Municipal and County Engineers was opened in the Town Hall, Westminster, on the 8th inst. Mr. F. J. C. May, the retiring president, presided at the opening of the meeting and was supported by Sir A. R. Binnie, chief engineer to the London County Council, president elect, and amongst those present were Mr. T. de Courcy Meade (Manchester), Mr. H. Percy Boulnois (Liverpool), Mr. J. Cartwright (Bury), Mr. S. S. Platt (Rochdale), Mr. H. Fowler (Manchester), Mr. J. E. Sharpe (Clitheroe), Mr.

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Sir A. R. Binnie, in his presidential address, dealt with the institution and work of the London County Council. He said that during the short period the Council had been in existence, and notwithstanding the natural opposition to any new body, it had done an enormous amount of remarkably good work. The public out of doors were perhaps too much in the habit of judging of the work of the Council solely by those controversial matters which were the subject of discussion at its weekly meetings, and either forgot or ignored the enormous mass of work which was performed by means of its committees without controversy and which was work for the public good unanimously acquiesced in by all its members. During the last seven years a vast improvement had been effected in the purity of the Thames by the mode in which the sewage was discharged at Crossness and Barking by the establishment of precipitation works and the removal to sea twenty miles below the Nore of about 2,000,000 tons of sludge per annum. Great improvements had been effected, but yet they had not approached what they might hope to attain when they became better acquainted with the right mode of dealing with huge volumes of sewage. One of the great difficulties which surrounded all London questions was the magnitude of the problems with which they had to deal. Take, for instance, main drainage, which now amounted to over 200,000,000 gallons a day, or half the average flow of the Thames at Teddington Weir. With reference to local government, he was of opinion that there was a great deal of energy wasted in the useless discussion of professional details. Local governing bodies must, of course, discuss the general principles of the work which they entrusted to their officials, but having done so, he thought it would conduce to the general welfare if there were less discussion of details and criticism of uncompleted work. He knew there were many points relating to the housing of the working classes and the rates of pay and working hours of the labouring classes with which only an assembly representative of the ratepayers could properly deal, but on purely professional details he thought there was too much criticism. He felt that success in the public work in which they were engaged could only be obtained when they were working, not only in unison with the general policy of their governing bodies, but also in terms of unity and friendship with the various constituent members of those bodies.

Mr. W. Dibdin, chemist to the London County Council, read

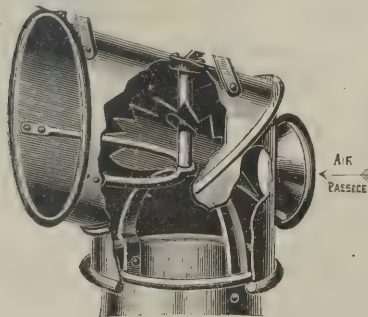
a paper on "The Biological Purification of Sewage." He said the history of the development of the process of treating sewage by biological agency might be said to have commenced in connection with the inquiry into the condition of the river Thames by the Royal Commission presided over by the late Lord Bramwell. The investigations which were carried out by the various chemists and biologists engaged established the position that the sewage was ultimately destroyed by the action of living organisms, and that it was only when these were not allowed full scope to exercise their beneficent life action that putrefaction resulted and the polluted water became a foul nuisance. The biological filtration of sewage was carried still further in connection with the treatment of the sewage effluent at Barking, where results never before anticipated were obtained. The fact that a bad effluent could be purified to a degree comparable in colour and character to that of a clean river water, and at a rate equal to 1,000,000 gallons per acre per day came as a startling surprise upon the community, and, although it was at first received with a considerable degree of doubt, the present experience throughout the country at many places where the coke-breeze filters had been adopted had established the system as being one of the most useful economical advances of practical sanitation.

Mr. E. J. Silcock, borough engineer of King's Lynn, afterwards read a paper on tramway haulage, and Mr. R. J. Thomas, county surveyor of Buckingham, one on the Buckinghamshire road system of equalising the highway rating.

Mr. J. T. Eayrs, of Birmingham, read a paper on brick-paving for carriageways. He said the question of paving roads with bricks had received very little attention in England, and although this country was justly celebrated for the quality of its bricks, and notwithstanding the fact that such large quantities were used for footpaths, strangely enough it had been left for their American cousins to show what could be done in the way of providing a brick pavement for carriage traffic. One American State alone produced 500,000,000 paving bricks per annum; another 300,000,000. He had obtained particulars from 52 towns and cities where no less than 410 miles of brick-paved roads had been laid. It was claimed that neither granite, asphalt nor wood could offer so many advantages as vitrified brick as a paving material, and that if properly laid it was as noiseless as any other kind of pavement. The surface was smooth without being slippery, it offered a minimum of resistance to the passage of traffic, and inflicted a minimum amount of wear and tear on horses and vehicles. It was

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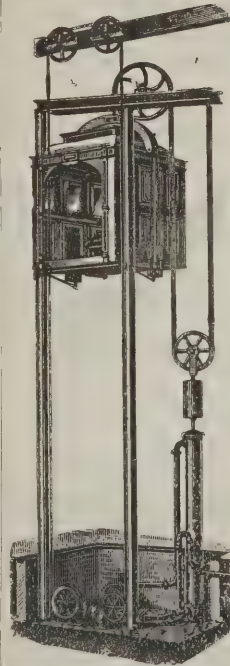
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Mr. L. H. Isaacs, surveyor to the Board of Works for the Holborn district, read a paper on tramways laid in asphalte carriageway pavements in the city of Berlin, and Mr. W. Weaver, Kensington, read a paper on street scavenging.

The afternoon was devoted to a visit to the works of Messrs. Doulton & Co. at Lambeth.

A SCOTTISH CHURCH.

IN the Glasgow Sheriff Court evidence was given before Sheriff Strachan to determine whether Shettleston parish church should be rebuilt or repaired. Mr. J. Leiper Gemmill, writer, appeared for the Rev. John White, minister of the parish, while Mr. William Borland, writer, represented the heritors.

Mr. Robert Dalgleish, architect, Glasgow, said that he had examined Shettleston Church. The roof had been unskillfully constructed. The stone and mortar of the building were good. The front wall and the two side walls had kept their position. There were one or two slight hair cracks in the front wall that had been there since the beginning. The back wall was 5 inches off the plumb at the top owing to the placing of the chimney of the heating apparatus up it, and also owing to defective construction of the roof. The front wall, being stronger than the back wall, threw the lateral pressure against the back wall, which gave way. The columns which had been put in to support the roof had not yielded. In consequence of the sagging of the roof and the partial displacement of the brick wall, rain water got into the building. There was almost a total want of ventilation in the floor. The place had been neglected, and some of the gratings were choked with mud. Nobody seemed to open a window, or do anything to ventilate the church, and there was a close, nasty smell inside. Some of the woodwork was what was called worm-eaten, although it was not a worm at all, but a beetle—what superstitious Scotch people called the death-watch. The gallery was not unsafe, even though it were filled with people. He proposed that there should be a new roof, using the old

slates so far as good. He approved of Mr. Gordon's plan of a roof. The back wall should be taken down as far as it was off the straight. The other walls would be repaired and pointed. The area floor was not bad, but he was of opinion that it should be lifted, asphalte laid below it, and new flooring laid on the asphalte. The pews would be replaced. They were made of good timber, a timber which could not be got in Glasgow now. The wood was fit for varnishing if it were washed. He would simply repair any defects. The decayed wood of the gallery should be renewed, and a runner put in to support the ends of the joists. He proposed to floor the gallery under the seats where there was no flooring at present. If the repairs he suggested were carried out, the church would be safe, substantial and comfortable for many years. It would be in as good a condition as the majority of the old country churches of Scotland, and in better condition than Shettleston Church had ever been. These repairs were estimated to cost 941*l*.

By Mr. Gemmill: He visited Shettleston Church twice, and examined it carefully for dry rot. Six or seven places were opened. He saw no indication of dry rot. At the end of the west passage he saw natural decay. The wood was soft and brittle owing to damp.

Mr. Gemmill: Have you had much experience of dry rot?

Witness: I am sorry to say I have; in my own house. Mr. Dalgleish, after examining a sample of wood, said he did not think that it was affected by damp rot. It seemed to be only decay arising from damp and age. If he wanted to know about dry rot he would not go to the "Encyclopædia Britannica." There were very much more modern works on timber and decay than that.

The Sheriff: The last edition of it is not very old.

Mr. Gemmill asked witness if he had seen "Notes on Building Construction."

Witness: I think I have got far beyond these elementary treatises at this time of day.

Mr. Gemmill: Have you seen the "Treatise on Hygiene and Public Health"?

Witness: No; I never saw the book. And if you make me a present of a copy I won't promise to read it.

Mr. Gemmill: Have you read any recent books on building construction?

Witness: I have read the book of experience, and that is the best of all books. Witness having been shown a piece of wood from the pulpit, said that there was a slight trace there of the dry rot plant. Replying to further questions by Mr.

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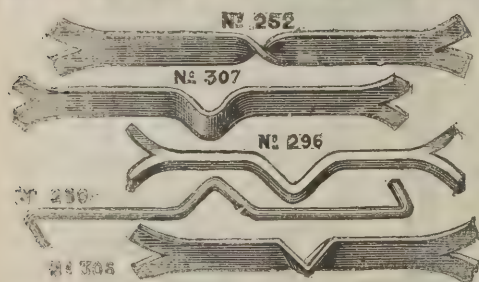
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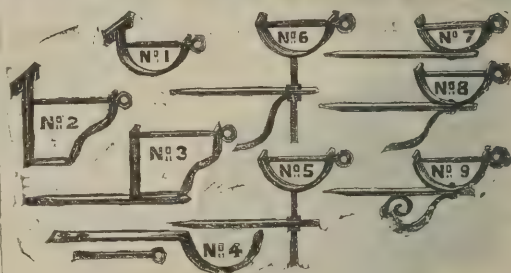
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Gemmill, the witness said that he had seen the spores of dry rot going through a brick wall, but they could be cured by a strong solution of sulphate of copper. Witness, continuing, said that Gill stoves, such as used in Shettleston Church, were getting obsolete now, but they were still introduced in many country districts, and there were many of them in use in Glasgow. Generally, heating now was by coils and steam.

Mr. Gemmill handed witness two pieces of decayed wood, and asked if there was much wood like it in the gallery would Mr. Dalgleish consider the gallery in a safe condition?

Witness: There is no immediate danger.

The Sheriff: There is no immediate danger of its coming down with a rush.

Witness: No.

Mr. Gemmill: Would it surprise you to learn that one of our witnesses said the main beam was rotten?

Witness: I am old enough not to be surprised at anything. I never saw it when I was there.

Mr. Gemmill: If the main joists of the gallery have no rest on the wall, and if the people are sitting at the back of the gallery, will their weight not act as a lever and affect the woodwork where it rests on the pillars?

Witness: He made no suggestion in his scheme as to widening the seats or making them more comfortable. That was a modern improvement, not a repair. The back wall had sunk a wee thing at the west end, but he thought that happened soon after the church was built. In a modern church he would consider 150 or 160 cubic feet per sitter a fair allowance.

By Mr. Borland: The amount of cubic feet per sitter depended upon the width of the pews and the height of the roof. Modern churches were very much higher than this one, and even old churches—the cathedral, for instance. In schools in England a 10-feet high ceiling was common, but in Glasgow he had built a school with a roof 17 feet high. The masonry of the back wall of Shettleston Church was very good, but it had been weakened by cutting the channel for the flue in the centre of it.

Mr. Matthew Henderson, builder, Glasgow, said that he carefully examined Shettleston Church. The wood of the roof was Danzig red pine, a wood that was not got nowadays. It was the very best wood among rough timbers. The roof was not in a good condition, as it had sagged down 4 or 5 inches. Some of the joists of the gallery were decayed with old age, but the rest were as good as ever. Small parts of the gallery floor were affected by decay and tear and wear. The pews in the

gallery and the area required repairing. The inside of the area floor was good, but where the sleepers came in contact with the wall they were decayed with damp or old age. He did not find any timber affected by dry rot. The cause of the bulging of the back wall was the sagging of the roof and the cutting of the channel for the flue. The gallery would stand although the back wall were taken down, because there were double rows of pillars. He proposed to put on a new roof. A good deal of the old wood could be used. He would take down all the back wall, except the two corners, and rebuild it with the old stones, remove all the area floor and all the lath and plaster under the gallery, and make good any deficiencies in the woodwork, providing a runner to support the joists, although he did not think that necessary. After the repairs the church would be in a better condition than ever, and it would stand for another 60 or 70 years. He had put in an offer to execute the repairs, which he was prepared to carry out for the sum named if the heritors accepted it.

By Mr. Gemmill: He saw evidence of decayed wood all over the building, but the samples he produced were average specimens of the wood in the church. They were not from wood where the air circulated round it; they were taken from below the seats. In parts of the samples there were serious indications of worm-eating. The seats were old-fashioned, so that a man could lie back and take a sleep. In new churches the seats struck the sitter in the middle of the back, so that if he took a wink he tumbled over on his neighbour.

Mr. Gemmill: The new seats are a great improvement?

Witness: That is very questionable.

Mr. Gemmill: What church do you sit in?

Witness: I sit in Dr. King's church at Bearsden. Some of the seats there are like those in Shettleston Church. I sit in one of them myself, and I enjoy it very much.

The Sheriff: For the facility for sleeping?

Witness: It is a good, old-fashioned sitting.

Mr. Henderson, continuing, said that wood affected by dry rot had a skin, and was quite smooth beneath, crumbling away to the touch. Dry rot would commence anywhere, even on the top of the pulpit.

The Sheriff: Or in the pulpit.

By Mr. Boring: There must be a moisture, or dry rot would not grow. If a bath-room floor were washed and linoleum laid down before the wood had dried, dry rot would result. He had seen that in hundreds of cases.

The hearing of further evidence was adjourned.

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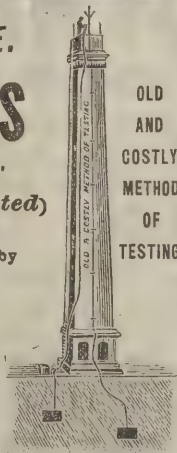
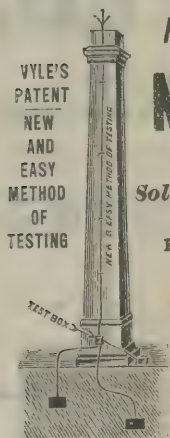
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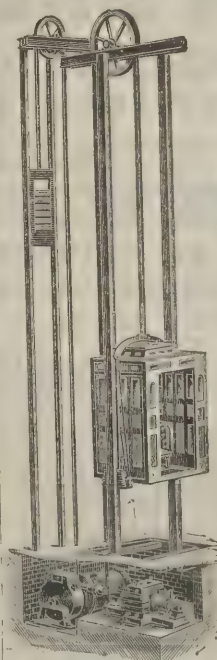
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THE TRAINING OF TECHNICAL TEACHERS.*

ONE of the most marked features of the recent development of technical education is the growth of facilities for instruction in what are termed "technological" or "trade" subjects. During the ten years prior to 1896 the number of separate classes registered by the City and Guilds of London Institute increased from 262 to 1,120; while in half that time the number of students more than doubled, the total last year being nearly 27,000. The programme of the Institute for the current session provides for examination in no less than sixty-eight different subjects, sixty-three of which are directly connected with important practical industries. Large as these figures are, they do not include all the subjects in which classes for imparting distinctly trade instruction are held, as nearly every technical school or institute conducts special classes suited to the particular needs of its locality. These include, for example, such subjects as horticulture and agriculture, tailoring and upholstery, artificial flower making, pattern making, smiths' work, and many others not included in the City and Guilds Institute programme. It is, moreover, certain that however large the present supply may be as compared with ten years ago, the next decade must mark an equally great advance if the trade workers of our country are really to be provided with efficient technical education.

From what has been already said it will be understood that this paper refers only to instruction in distinctly trade subjects, and not in technical subjects generally. Admission to these is primarily, and in some institutes entirely, confined to *bonâ fide* workers in the trade concerned, this qualification being compulsory for all students upon whom grants are claimed from the City and Guilds of London Institute.

The greatest of all difficulties in connection with such classes as these is undoubtedly the provision of satisfactory and efficient teachers. The larger technical institutes are often asked to recommend teachers, and cases are not infrequent where suitable men are actually bought at high prices from one town to another in order to conduct classes. In other cases advertisements have quite failed to bring suitable applicants, while it is a common condition to find the successful teacher engaged for four, five, or even six evenings weekly at different institutes. Indeed, it is probably the case that many centres cannot conduct classes for want of teachers, while it is certain that many others fail to make classes successful owing to the teachers

* A paper by Mr. Sidney H. Wells, principal of the Battersea Polytechnic, read at the International Congress on Technical Education.

being insufficiently qualified. The wonder is not that some classes fail, but that so many have succeeded, for if any vital matter has been overlooked and neglected it is surely that of the training of the teachers.

What, then, are the essential qualifications of a teacher of technical classes?

The first and most natural is that he should possess a practical knowledge, acquired in the factory or workshop, of the subject to be taught; the second, that he should possess a sound knowledge of the elements of the arts and sciences applicable to the subject; and the third, that he should be able to impart his knowledge to others, to arrange a syllabus of instruction, to manage a class—in a word, to teach.

The first of these conditions is apparently the most easy to satisfy, and of its absolute importance there can be no question. Those who have had experience in such matters will know what great value the trade student attaches to the practical knowledge and position of the teacher, and how he is attracted by the man of recognised experience and skill, as much as he is repelled by the absence of these qualities. But here a very real difficulty presents itself. There is a growing feeling that a man cannot teach efficiently after working hard all day at his trade, the suggested remedy for which is to remove him from the factory or workshop, and let him devote his time entirely to teaching. But in doing this he gradually loses that very qualification which is regarded as essential, for he is no longer able to keep in touch with his trade, or to gain experience of its new methods, processes or machines, and he very soon ceases to be regarded as a "practical man." This may not be of equal importance in all trades, but in the majority of cases the loss of practical qualifications is probably only a question of time. On the matter of working all day and teaching in the evening, the author may mention that he knows six teachers of trade classes who teach from three to six evenings per week each, and in all cases after working at their respective trades during the day. Perhaps, when the supply of good teachers is greater, this condition of work will cease, for it can scarcely be permanently efficient.

The second qualification, that of a knowledge of the arts and sciences connected with the subject, does not, of course, apply with equal force to all trades, and depends also upon whether the teacher's work is limited to workshop instruction or includes the conduct of the lecture or theory class. Such a subject as plumbing, for example, including, as it does, something of the sciences of chemistry, physics and mechanics, requires a wider range of knowledge than, say, plasterers or

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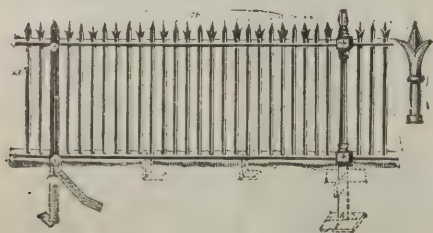
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smiths' work. The present generation of trade teachers have had to gain their theoretical knowledge in evening classes, by no means an insufficient medium, provided the course of study is sufficiently wide, properly co-ordinated and continues for a long enough time. But how rare are the practical men who have taken such a course as this will be apparent to all who have tried to obtain them. In some of the newer subjects of trade instruction they are unobtainable, and one is forced to be content with the essentially practical man who has never attended a class or undergone an examination. The author has had this experience in three important subjects within the last two years, and others have probably met with the same difficulty. Not that the certificated teacher is by any means always the better, or the uncertificated one incompetent. In cases known to the author the teacher of a trade class failed to pass the examination, while three of his students were successful, two of them gaining medals; and in another the class which had been large and successful under a purely practical teacher fell to pieces under a teacher whose theoretical qualifications were all that could be desired.

The author is aware that experiments have been made by the Plumbers' Company in sending selected plumbers for a course of theoretical training at a university college with a view to becoming teachers, but he believes the time was quite insufficient for anything like a proper course. Such a plan obviously has very much to recommend it, but the chief difficulty would appear to be in the men being spared by their employers for a sufficient length of time, while it is not improbable that they are less able to assimilate knowledge when crowded into a few weeks or months than when spread over several years, as in evening classes.

Much of what has been already said applies also to the qualification of ability to teach. How often it is that the man with ample knowledge of both theory and practice is unable to impart it to others, and fails altogether as a teacher. Sometimes it may be due to want of interest and enthusiasm which nothing can cure, but more often it is want of method, of inability to arrange the work in its natural sequence, of too great haste and lack of clearness, and of faults in elocution, all of which it is possible to improve.

Owing to the difficulties which the author has himself experienced in obtaining suitable teachers, and the belief that the general demand for teachers was quite in excess of the supply, he has for some time given attention to methods for meeting the deficiency. At the commencement of last session he formu-

lated a scheme for the institution of scholarships for training instructors in trade subjects at the Battersea Polytechnic. Scholarships were offered in each of the trades of bricklayers, carpenters and joiners, masons, plasterers, plumbers, and painters and house decorators. The scholarships gave free admission to evening classes in approved subjects for two, three, or four years, with the provision of text-books and materials. The holders were to be under thirty years of age, to be practically engaged in one of the trades mentioned, to promise to attend at least two evenings weekly for not less than two years and to undergo examinations as required.

It was understood that they would receive special attention from their teachers, and that during the last year they would receive instruction in matters relating to the conduct of classes. Should occasion require the scholars would, if qualified, be engaged as temporary instructors, and in the event of vacancies for permanent instructors they would be given the preference over other applicants.

This scheme having come under the notice of Sir Philip Magnus, he was able to obtain from the Plasterers' Company a grant of money for increasing the value of the two scholarships offered for plasterers' work, this being one of the subjects for which there is much difficulty in obtaining teachers.

Of the twelve scholarships offered only nine applicants were found suitable, namely, three in carpentry and joinery, two each in masons' work and plumbing, and one in plasterers' work, and painters and house decorators' work. Two of the scholars relinquished their scholarships within a month, but the others attended regularly for the classes prescribed, underwent the examinations and generally acquitted themselves well.

The scholarships of these seven students will be renewed next year and afterwards until they have completed the course of study agreed upon, provided they continue to be satisfactory. In all cases they are required to attend classes in subjects of art or science connected with their trade in addition to the regular trade class, and the scholarship is only tenable while they continue working at their trade during the day. In the last year the scholars will be expected to attend classes in elocution, and to act as assistants to some senior teacher whose methods of teaching are deserving of imitation. They will also receive a few special lessons of a thoroughly practical character dealing with such matters as the arrangement of courses of study, the management of classes and methods of teaching, and will be expected to draw up syllabuses of work, and to give practical lessons before a teacher qualified to criticise and

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advise. Other scholarships will be awarded in the coming session.

Of the ultimate success of such a scheme as this it is impossible to do more than prophesy, but the author has strong hopes that it will prove successful, and will produce teachers of good all-round qualifications. One difficulty would seem to be in influencing the character of the work of the scholar in the workshop or factory and in insuring its sufficiency, but this can partly be met by selecting scholars who are employed by good firms, or something might be done by enlisting the co-operation of the employers. Considerable time is needed for such a training as suggested, but it is difficult to see how this can be avoided if the practical experience in the shop or factory is to be gained concurrently with that in the classes, a condition which the author regards as essential to success.

The author ventures to suggest that some scheme of this character might be adopted in all our large technical institutes, and that in fact it would be a good thing if at least one student-teacher could be attached to every trade class throughout the country. To further insure its success, it would appear desirable that the scholarship awarded should include a money payment in addition to free education, and he strongly urges the consideration of this matter upon the London Technical Education Board, the technical committees of boroughs and county authorities and other bodies interested in technical education. After all, is there any subject more important than that of the teachers who are to train the workers of this country in the scientific principles and practice of the industries in which they are engaged? The teaching of subjects of science, art, commerce and domestic economy is fairly well provided for, but in that of technology the demand is considerably in excess of the supply, and fortunately for our industries the demand is constantly increasing. The syllabuses of instruction and examination are gradually being widened to include a requisite knowledge of the arts and sciences connected with the industries concerned, and efforts are made to induce trade students to attend classes in certain subjects of art or science in addition to the technical or trade class. It is probably not too much to say that these efforts will largely be futile until the teachers who have no knowledge of these subjects themselves, and are not in sympathy with and often opposed to their introduction, are replaced by others who can best show the value of a thorough course of training by their own position and work, and can assist in imparting it to their students.

Mention should be made of a method of conducting technical

classes which exist in some institutes where the teaching is carried on by the professional man or teacher in conjunction with a workshop instructor. For example, classes in plasterers' work, and painters and house decorators' work would be taken by practical teachers engaged in the trades under the immediate direction and with the assistance of the art master, or classes in brickwork would be conducted by an architect assisted by a practical instructor, the lectures and general supervision of the workshop classes being undertaken by the architect. But such an arrangement is obviously somewhat costly, and its efficiency depends largely upon the training and qualifications of the art master or architect. Generally speaking, this class of teacher is wanting in practical experience, and the arrangement is obviously not adaptable to all subjects.

In conclusion, the author would desire to express regret that pressure of work has prevented him dealing with the subject with more care and detail than has been possible in this paper. He believes that the great importance of the subject will be generally acknowledged, and he hopes that its consideration by this congress will make for the further development and success of the great work of technical education with which it is so closely concerned.

CONTRACTS FOR GIRDER BRIDGES IN EGYPT.

LORD CROMER in a despatch to the Marquis of Salisbury on the subject of a communication from the British Chamber of Commerce, which has been circulated to the various Egyptian departments, writes:—

The recent breakdown of the Embabeh bridge, which will now have to be strengthened at a cost of some 33,000*l.*, shows clearly enough that the criticisms passed by several high English authorities on this structure, before it was commenced, were well founded. Further, it shows that the system heretofore adopted in Egypt for the construction of certain classes of public works, notably that portion of it which involved the almost invariable acceptance of the lowest tender, is defective. Any changes in the system will require careful consideration. I do not, however, propose to enter fully into this branch of the question at present, but I may say that, although there are many competent engineers in the service of the Egyptian Government, one of the main reasons for the failure, which has unquestionably occurred, has been the want of a highly-trained specialist in the science of bridge-building. That want has



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now been supplied by the appointment of Mr. Robertson to be president of the Railway Board. Mr. Robertson's well known qualifications constitute in themselves a guarantee that no such failure as that which has taken place in connection with the Embabeh Bridge will recur in the future.

My immediate object is to make some remarks which may possibly be of use to English bridge-builders in the event, which is not improbable, of further bridges being constructed in Egypt.

It would, I venture to think, be a mistake to suppose because a bridge has been too cheaply constructed, and has consequently broken down, that therefore the most expensive offer should for the future be accepted. The English offers, I should mention, have invariably been much higher than those of any other nation.

In the case of the Embabeh bridge seven offers were received. Of these one was from an English firm; it amounted to 138,000*l.* The next two offers, each of 96,000*l.*, were from a German and a local firm respectively. The lowest offer, 67,340*l.*, was from an Italian firm. The construction was eventually confided to a French firm at a price of 81,200*l.* I wish to draw special attention to the fact that, after adding the 33,000*l.* which will now have to be spent in strengthening the bridge, the total cost to the Egyptian Government will only be 114,200*l.*, or nearly 24,000*l.* less than the English offer.

I give another instance in point. The English bridge-builders have at times complained of the system under which they had to prepare their own designs. After much trouble this system was changed. Designs were prepared by the Egyptian Government for certain iron bridges, and tenders invited. At the time the Government thought that the total cost would come to about 7,000*l.* Ten firms competed thus:—

Number.	Nationality.	Estimate.
1.	English	16,619
2.	French	9,690
3.	German	8,670
4.	French	7,840
5.	Belgian	7,528
6.	Belgian	7,440
7.	Belgian	6,840
8.	German	6,682
9.	Belgian	6,520
10.	Belgian	5,807

It can hardly be contended in the face of these figures that

it would have been possible to accept the English offer. I do not, of course, pretend to speak with any authority on a technical matter of this sort, but I cannot help thinking that there must be some mean between the cheap and apparently too flimsy construction of some continental bridge-builders and the very expensive solidity of the English bridges.

I need hardly add that I make these observations not with any wish to criticise the English bridge-builders, who must be the best judge of their own business and their own interests, but rather with a view to bringing certain facts to their notice which may possibly be of use to them in the future.

The following is a copy of the communication from the British Chamber of Commerce of Egypt:—

At a meeting of the committee of this Chamber on the 22nd inst. the following resolutions were passed unanimously, viz.:—

1. That in the interests of British trade in this country, and in order to procure greater publicity and accuracy, it is highly desirable that all Government administrations and departments should advertise their respective requirements, and have all specifications prepared in English as well as in the languages hitherto used, as translations, especially on technical matters, are frequently misleading.

2. That printed or lithographed particulars of the articles to be tendered for be in all cases supplied to intending contractors instead of, as sometimes happens, their having the obligation of themselves copying from one original specification, a fertile source of delay and error; also against payment of a reasonable fee, drawings and samples where these may be necessary.

3. That copies of these resolutions be transmitted to Her Majesty's Minister Plenipotentiary in Cairo.

In bringing these to your lordship's notice, we may state that the practice of the various administrations and departments in the matters referred to varies very considerably, and our resolutions have been intentionally couched in general terms, as favouring, on the one hand, the adoption of an uniform procedure by all the Administrations, whilst avoiding on the other any appearance on our part of singling out for complaint the action of any one in particular.

We permit ourselves to indulge in the hope that your lordship will accord us your powerful support in this matter and cause such remedial measures to be taken as may seem called for by the circumstances of the case. We venture to express the opinion that the removal of every condition acting as a

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possible deterrent to the tenders of the most important contracting nationality can scarcely fail to be quite as advantageous to the administrations themselves as to the interests which we represent.

Mr. W. F. E. Robertson, the president of the Railway Board, has prepared a memorandum on the resolutions of the British Chamber of Commerce in Egypt as follows:—

I have not been here long enough to be able to give a detailed opinion on this matter, but there are one or two broad features with which I am well acquainted:—

1. As to the necessity for preparing specifications in English as well as in French, I can scarcely believe that the fact of their being in French is any real hindrance to English firms. I, who have passed my time in India, and therefore have had no special connection with foreign trade, find no difficulty in understanding the French documents. Am I, then, to understand that firms who aspire to foreign trade as part of their business are unable to deal with them? There must be hundreds of men in London who can translate such papers, and I know of at least one technological dictionary for English, French and German which gives every technical word in all trades.

2. The English manufacturers have been repeatedly told that their adherence to our system of weights, measures and money is a hindrance to their foreign trade. I can only add my testimony to this effect. It would be a step backwards to encourage the use of English measures on the Egyptian railways.

3. There is a special reason why, in the matter of bridge-building by open tenders, the English firms are at a disadvantage. The continental and American bridge-building firms supply designs as well as the work, and therefore employ very competent specialists, and send up most perfect projects, with all the calculations in full detail.

But as the English firms almost always build to designs which are furnished to them, they content themselves with ordinary draughtsmen, and are consequently at a disadvantage when the tender includes the design. They send in only a general sketch, and the weights are, as a rule, much in excess of those in the more carefully studied projects. Further, a yard which is laid out for a particular style of work can turn it out more economically than one which hardly ever gets two designs alike.

4. The strike clause now so common in English tenders is a hindrance where time is an object.

As to the second resolution regarding an adequate supply of copies of specifications, that is an ordinary matter of business which should be attended to, but which can only refer to very trifling orders and affects all competitors alike. When I know more about the details of the business here I may be able to give some useful hints, but so far as I know there is no reason to suppose that English firms do not receive fair play at the hands of the Egyptian Railway Board. I was much surprised to find that an Italian firm carried off the last bridge contract, and am told that their extremely low labour rates enabled them to do this.

PATENTS.

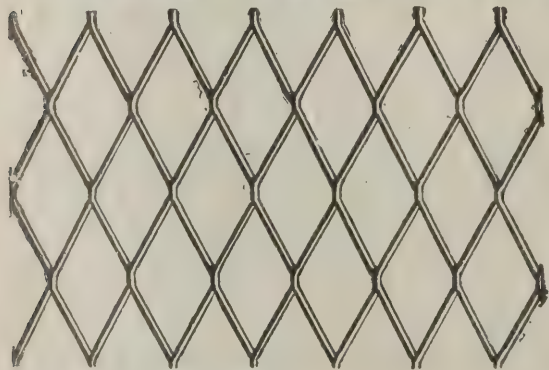
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

- 15374. Daniel Sullivan, for "Weightless window-lifts."
- 15434. Charles Plant, for "Improved flushing-cistern."
- 15443. Francis Crisp, for "Improvements in and relating to dog-fenders."
- 15448. John Charles Attlee Adams, for "Window-fastener."
- 15463. Frederic Dossogne, for "Improved automatic door-closing apparatus."
- 15486. William Lloyd Wise, for "Improvements in windows."
- 15559. Mayer Mamson, for "Improvements in means for securing window sashes."
- 15582. Arthur Martyn and Frederick Walter William Goodsall, for "An improved composite sheet material adapted for roofing lights and other purposes."
- 15637. Alfred Ernest Thomas, for "The manufacture of a fire-resisting brick or material."
- 15649. Thomas Morgan Rees, for "Improved sash-fastener and tightener combined."

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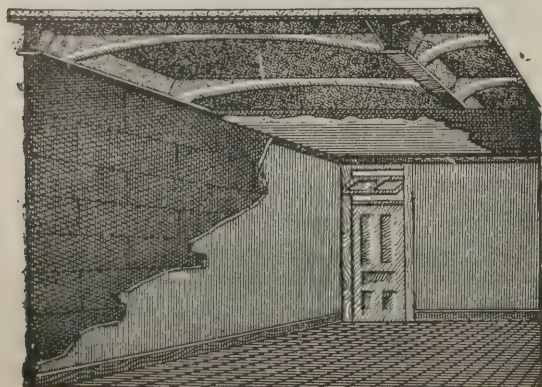
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Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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COMPETITION OPEN.

BOOTLE.—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000*l.* Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

CONTRACTS OPEN.

ABERDEEN.—July 26.—For erection of dwelling-house and new steading, Kirkhill, Potterton, Belhelvie. Messrs. Collie, advocates, 25 Union Street, Aberdeen.

ABERDEEN.—July 31.—For additions and alterations to farm offices at Bakebare. Messrs. Collie, advocates, 25 Union Street, Aberdare.

AMBLESIDE.—July 26.—For erection of chapel and classrooms. Mr. Thomas W. Cubbon, 54 Hamilton Street, Birkenhead.

ARDWYN.—July 29.—For erection of additional buildings at County School. Mr. T. E. Morgan, architect, 12 Baker Street, Aberystwith.

AUDENSHAW.—For erection of a classroom at St. Stephen's Central School. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

BAILDON.—For erection of a residence. Messrs. Isitt, Adkin & Hill, Prudential Buildings, Bradford.

BARNSELY.—July 30.—For erection of a dwelling-house in Shaw Lane. Messrs. Wade & Turner, architects, 10 Pitt Street, Barnsley.

BEAUMARIS.—July 26.—For additions to the County School. Mr. Jos. Owen, architect, Menai Bridge.

BEDLINGTON.—For erection of a house at west end of Bedlington. Mr. Nicholas Stoker, Shop Row, Bedlington Colliery.

BELFAST.—For repairing Castlereagh Presbyterian church. Mr. Chas. A. Aicken, architect, Rosemary Street, Belfast.

BERKHAMSTED.—July 28.—For erection of boys' school at the Victoria National Schools. Mr. C. H. Rew, architect, Great Berkhamsted.

BIRKENHEAD.—July 31.—For erection of buildings on the workhouse and union schools site, Church Road, Higher Tranmere. Mr. Edmund Kirby, 5 Cook Street, Liverpool.

BLACKBURN.—July 26.—For alterations to the sanitary blocks of wards No. 1 and 10 at the Blackburn and East Lancashire Infirmary. Messrs. Simpson & Duckworth, architects, Richmond Chambers, Blackburn.

BLAYDON-ON-TYNE.—July 27.—For erection of four houses at Swalwell. Mr. T. C. Nicholson, architect and surveyor, Blaydon-on-Tyne.

BRADFORD.—July 27.—For enlargement of the Harold Club, Low Moor. Messrs. T. H. & F. Healey, 42 Tyrrel Street, Bradford.

BRECONSHIRE.—July 28.—For erection of a dwelling-house at Llanwrtyd Wells. Mr. H. Teather, architect and surveyor, Andrew's Buildings, Queen Street, Cardiff.

BRIGHTON.—July 30.—For alterations to the Municipal School of Art, Grand Parade. Mr. Francis J. C. May, Town Hall, Brighton.

BRISTOL.—July 26.—For erection of a school at Westbury Park. Messrs. La Trobe & Weston, architects, 20 Clare Street, Bristol.

BROADSTAIRS.—July 28.—For erection of a police station and sessions hall, consisting of two cottages, single men's quarters, four cells, court, &c., and offices. Mr. Frederick W. Ruck, county surveyor, 86 Week Street, Maidstone.

CARLISLE.—For addition of an operating room and works in connection therewith at the Infirmary. Mr. J. G. Howitt, Cumberland Infirmary, Carlisle.

CARLISLE.—July 29.—For erection of laboratories and lecture-rooms at the Carlisle Grammar School. Mr. Geo. Dale Oliver, architect, 5 Lowther Street, Carlisle.

CARLISLE.—Aug. 2.—For erection of a public hall at Kirkpatrick-Fleming. Mr. Geo. Dale Oliver, architect, 5 Lowther Street, Carlisle.

CARMARTHEN.—July 27.—For erection of an additional classroom and master's house at Bankffosfelen Board School. Mr. John Thomas, clerk of the Board, Castle Hill Cottage, Carmarthen.

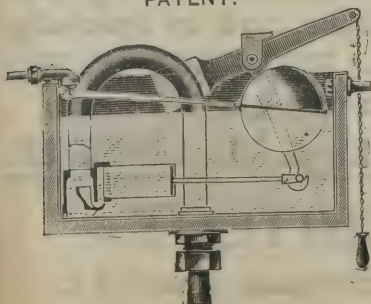
CARNARVON.—July 30.—For erection of a new county school on the Bethel Road. Mr. Rowland Lloyd Jones, architect, 14 Market Street, Carnarvon.

CHELTENHAM.—July 28.—For erection of a Kursaal and municipal offices on the Winter Garden site. Mr. E. R. Robson, architect, 9 Bridge Street, Westminster.

CORK.—July 26.—For erecting an additional floor in the old ballroom at the Cork District Lunatic Asylum. Mr. W. H. Hill, architect, 28 Southmall, Cork.

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DEWSBURY.—July 30.—For erection of twenty-eight houses outbuildings and boundary walls at Hill Head, Malkroyd Lane. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

DORSET.—Aug. 9.—For erection of a new infants' school at Heatherlands, for the Kinson (U.D.) School Board. Mr. Herbert Wm. Dibben, clerk, Matlock House, Upper Parkstone.

DOVER.—July 27.—For erection of a school building at the rear of Belgrave Road Primitive Methodist chapel. Rev. I. Dorricott, 2 Gladstone Terrace, Dover.

DRAYCOTT.—For extension to Victoria Mills. Mr. Gilbert S. Doughty, architect, Britannia Chambers, Pelham Street, Nottingham.

DROYLSDEN.—July 29.—For erection of sludge-press house, for the Droylsden Urban District Council. Mr. William Curry, Council Offices, Droylsden.

DUBLIN.—July 28.—For alterations and additions to the resident medical officer's house, and also for the erection of an operation room in connection with the male hospital of the workhouse. Mr. Morris, clerk of works, 24 Cabra Parade.

DUDLEY HILL.—July 26.—For erection of a small storehouse and urinals at Tong Cemetery, Dudley Hill. The Sexton, at the Cemetery Lodge.

DURHAM.—July 29.—For repairs to chimneys at Sedgefield workhouse, and for the reconstruction and repair of the garden and other walls in connection with same. Mr. William Snowden, sanitary inspector and surveyor, Sedgefield.

EAST ARDSLEY.—July 26.—For erection of five brick houses. Mr. T. A. Buttery, architect, Exchange Buildings, Queen Street, Morley.

EARL'S COLNE.—July 26.—For erection of master's house and accommodation for twenty-four boarders in connection with Earl's Colne Grammar School, Essex. Mr. Hunt, Earl's Colne.

EBBW VALE.—July 28.—For erection of cloakrooms at the Victoria School, near Ebbw Vale, for the Bedwelty School Board. Messrs. James & Morgan, architects, Cardiff.

ECCLES.—Aug. 9.—For erection of pavilion in the Eccles recreation ground. Mr. Geo. Wm. Bailey, town clerk, Town Hall, Eccles.

FARINGDON.—July 27.—For pulling-down certain buildings and enlarging the Salutation Hotel. Mr. Geo. Winship, architect and surveyor, Abingdon.

GLASGOW.—July 27.—For excavation and brickwork of extension to purifier-house and lime store at Dawsholm Gasworks. Mr. Wm. Foulis, gas engineer, 45 John Street.

GOOLE.—July 26.—For extension of Boothferry Road Schools, for the Goole School Board. Mr. W. B. Andrews, architect, 24 Boothferry Road, Goole.

GREAT YARMOUTH.—Aug. 6.—For erection of fourteen cottages, Stone Road, Southtown. Mr. Chas. G. Baker, architect, Town Hall Chambers, Great Yarmouth.

HALIFAX.—July 29.—For erection of a warehouse off Pellon Lane. Messrs. C. F. L. Horsfall & Son, architects, &c., Lord Street Chambers, Halifax.

HALIFAX.—July 28.—For erection of fireproof stables for 80 horses, large coachhouses, offices, manager's residence, &c., in Fenton Road, King Cross. Messrs. Richard Horsfall & Son, architects, 15 George Street, Halifax.

HARROGATE.—For alterations and additions to the Victoria Hotel. Mr. Albert E. Kirk, 13 Bond Street, Leeds.

HECKMONDWIKE.—July 26.—For erection of a warehouse and alterations at Top of Heckmondwike. Mr. John H. Brearley, architect, Hanover Street, Batley.

HEREFORD.—July 27.—For wood flooring, painting, &c., in connection with Foy suspension bridge, near Ross; also for certain piling work, painting, &c., in connection with Crifftin Ford bridge, near Leintwardine. Mr. H. T. Wakelam, county surveyor, Hereford.

HEREFORD.—Aug. 6.—For erection of a laundry works at Bodenham Road. Mr. A. Lovesey, 2 Offa Street, Hereford.

HULL.—July 26.—For erection of gymnasium at the Hymers College, Kingston-upon-Hull. Messrs. Botterill, Son & Bilson, architects, 23 Parliament Street, Hull.

HULL.—July 29.—For erection of a building on land in Albion Street, and for alteration of arches under the south approach to Argyle Street Bridge for electric-lighting substations. Mr. A. E. White, city engineer, Town Hall, Hull.

KINGSTHORPE.—July 26.—For building entrance lodge, chapel, forming roads and paths, fencing and drainage at new cemetery, Harborough Road. Mr. John Ingram, surveyor, Abington Street, Northampton.

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LEEDS.—For erection of a workshop. Mr. J. C. Warriner, Carlton Hill, Leeds.

LEEDS.—July 31.—For alteration and extension of the meter-house at the Meadow Lane Gasworks. Mr. R. H. Townsley, general manager, Municipal Offices, Leeds.

LEEDS.—July 26.—For alteration and extension of laundry premises at the workhouse, Beckett Street. Mr. Thomas Winn, architect, 90 Albion Street, Leeds.

LONDON, S.E.—July 27.—For construction of an underground convenience at Old Kent Road. Mr. Oliver E. Winter, vestry surveyor, Vestry Hall, Borough Road, S.E.

LONDON.—July 28.—For erection of boundary walls, fences and gates at the site of the proposed Tooting Bec Asylum, Tooting Bec Common. Messrs. A. & C. Harston, architects, 15 Leadenhall Street, E.C.

LOUGHBOROUGH.—July 27.—For erection of the Green Man Hotel, Swan Street. Mr. W. T. Hampton, architect, Swan Street, Loughborough.

MANCHESTER.—July 26.—For erection of sixty dwelling-houses at Lodge Street, Junction Street and Malton Street, Miles Platting. City Surveyor, Town Hall, Manchester.

MILES PLATTING.—July 26.—For erection of sixty dwelling-houses at Lodge Street, Junction Street and Malton Street. City Surveyor, Town Hall, Manchester.

MIRFIELD.—July 29.—For erection of a coachman's lodge at Knowle House. Messrs. John Kirk & Sons, architects, Dewsbury.

NEWMARKET.—July 26.—For erection of a new block to joint fever hospital, Fordham Road, Exning. Mr. Sidney J. Ennion, clerk, Deva Chambers, Newmarket.

NEWPORT.—July 30.—For erection of buildings and machinery foundations for extensions of the municipal electricity works of the borough. Mr. Robert Hammond, consulting electrical engineer to the Corporation, Ormond House, Great Trinity Lane, London, E.C.

NORTHUMBERLAND.—July 28.—For converting old Congregational chapel at Amble into Freemasons' hall. Mr. Geo. Reavell, jun., architect, Alnwick and Morpeth.

PRESTON.—July 31.—For alterations and additions to the Bushell's Hospital, Goosnargh. Mr. Edward Garlick, 33 Winckley Square, Preston.

RISHWORTH.—July 31.—For the baring and getting of stone for and erection of about 140 lineal rods of walling, with lined tops, at Rishworth Hall Lanes. Messrs. Richard Horsfall & Son, architects and surveyors, George Street, Halifax.

ROSS.—July 26.—For additions and alterations to mission-room, St. Mary's Church. Rev. E. H. W. Ingram, The Rectory, Ross.

SCOTLAND.—Aug. 2.—For erection of a tower, dwelling-houses, engine-house, &c., at Blackhead, near Portpatrick. Mr. David A. Stevenson, engineer, 84 George Street, Edinburgh.

SLAITHWAITE.—July 27.—For erection of four dwelling-houses in Meal Mill Lane. Mr. J. Berry, architect, Queen Street, Huddersfield.

SOUTHMOLTON.—Aug. 2.—For erection of two houses in South Street, Southmolton. Mr. F. W. Petter, architect, Bridge Buildings, Barnstaple.

SWANSEA.—For pulling-down and rebuilding the Mermaid Hotel, Mumbles, Swansea. Mr. H. Tudor Thornley, architect, 100 St. Mary Street, Cardiff.

THORNHILL.—July 31.—For construction of a boundary wall round the site of infectious hospital at Bunker's Hill. Mr. S. W. Parker, surveyor, Council Offices, Thornhill.

TRURO.—July 27.—For building a classroom at the Practising Schools. Rev. G. F. Forbes, St. Paul's Vicarage, Truro.

WALES.—For building a large hotel and stables, Holton Road, Cadoxton Barry. Mr. H. Tudor Thornley, architect, 100 St. Mary Street, Cardiff.

WALES.—July 26.—For erection of an infants' school on Barry Island to accommodate 224. Mr. G. A. Birkenhead, architect, Caledonian Chambers, St. Mary Street, Cardiff.

WALES.—July 29.—For erection of church at Garreg-ddu, Elan Valley, near Rhayader, Radnorshire. Mr. Stephen W. Williams, architect, Rhayader.

WALES.—Aug. 4.—For certain alterations and additions at the Board school, Glanamman. Mr. H. Herbert, architect, Brynmarlais, Ammanford.

WALES.—Aug. 2.—For the extension of the Welsh Independent chapel at Mardy. Mr. J. Rees, architect, Hillside, Pentre.

WALWORTH.—July 30.—For erection of a second-class men's swimming-bath in connection with the new baths and

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wash-houses in Manor Place. Messrs. E. P'Anson & Son, architects, 7A Laurence Pountney Hill, E.C.

WEST BROMWICH.—July 26.—For erection of a police station, reading-room and caretaker's house at the New Park, Hill Top. Mr. Albert D. Greatorex, borough surveyor, Town Hall, West Bromwich.

WESTON-SUPER-MARE.—July 31.—For erection of two dwelling-houses and lock-up shops and alterations to the market house. Messrs. Price & Wooler, architects, Weston-super-Mare.

WOBURN SANDS.—July 30.—For enlargement of the Aspley Heath Board schools. Mr. Wm. Poole, architect, Sydney Cottage, Woburn Sands.

WOOD GREEN.—For erection of the new higher-grade schools, for the Tottenham School Board. Mr. A. M. Butler, architect, 16 Finsbury Circus, E.C.

WORKSOP.—July 30.—For erection of two semi-detached villas and outbuildings in Sherwood Road; also for three dwelling-houses, with shops and outbuildings, in Carlton Road. Mr. William Allen, Victoria Square, Worksop.

WREXHAM.—July 26.—For erection of shop and stores in Argyle Street. Messrs. Davies & Moss, architects, 11 Regent Street, Wrexham.

UXBRIDGE.—July 28.—For additions to premises, Laundry Yard. Mr. William L. Eves, 54 High Street, Uxbridge.

YARMOUTH.—July 26.—For erection of a classroom, offices, &c., at the Burgh Castle National Schools. Mr. Arthur S. Hewitt, architect, 15 King Street, Yarmouth.

YORKS.—July 26.—For erection of proposed Primitive Methodist chapel at Camblesforth. Mr. T. S. Ullathorne, architect, Selsby.

YORK.—July 24.—For erection of stores, Railway Street. Messrs. Athron & Beck, architects and surveyors, Dolphin Chambers, Doncaster.

MR. J. H. PHILLIPS, of Cardiff, has gained first prize in the competition for the Free Library and Institute, Tonbridge (Kent).

THE Westminster Vestry have decided to take up the wood pavement in Victoria Street, Millbank Street and Chapter Street, and to relay them with compressed asphalt. The work is to be carried out by the Limmer Asphalt Paving Company, Limited, of 2 Moorgate Street, E.C.

TENDERS.

ABERDARE.

For erection of thirty-five houses and drainage at Cae Smith, Abernant. Messrs. WATKINS & DAVIES, architects, 4 Canon Street, Aberdare.

J. D. Wilkins	£8,799	17	6
Williams & James	8,662	10	0
J. Jones	8,400	0	0
W. Budding	8,225	0	0
F. MILLS, 70 Commercial Street, Mountain Ash (accepted)	7,875	0	0

ABERTILLERY.

For erection of a school at Abertillery to accommodate 250 girls, for the Aberysthuth School Board. Mr. GEORGE ROSSER, architect, Victoria Buildings, Abercarn. Quantities by Mr. R. L. ROBERTS, Holly House, Newbridge.

Williams & Thomas	£2,355	0	0
Lawson & Co.	2,190	0	0
Rowland & Lloyd	2,175	0	0
J. Jenkins	2,157	0	0
J. Monks & Co.	2,146	0	0
C. F. Morgan	2,095	0	0
A. P. WILLIAMS, Abertillery (accepted)	2,073	15	0

BISHOP STORTFORD.

For repairs to engines at the sewage pumping station and waterworks.

C. S. Mallett & Co.	£155	2	6
Lennox, Reynolds & Fyfe	102	0	0
A. Robinson	87	8	6
G. HOPKINS (accepted)	84	10	0

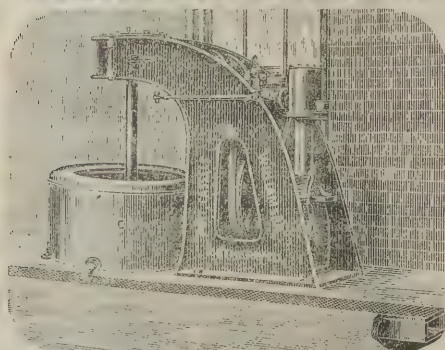
BRADFORD.

For erection of twelve through houses in Barkerend Road. Mr. G. C. GAMBLE, architect, Parkinson's Chambers, Market Street, Bradford.

Accepted tenders.

J. Hainsworth & Sons, mason.
W. Killett, joiner.
W. Crabtree, slater.
E. Watton, plumber.
D. Hainsworth, plasterer.
Total, £2,740.

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For erection of a three-storey warehouse, &c., at Dudley Hill. Mr. T. LEADLEY, architect, 3 Coleridge Place, Bradford.

Accepted tenders.

G. Hullah, mason.

H. Waterhouse & Sons, joiner.

J. Booth & Son, plumber.

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Hill & Nelson, slater.

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For excavations and laying about 150 yards of 12-inch and 9-inch pipe sewers, connections, and ventilating pipes. Mr. E. C. BUCHANAN TUDOR, surveyor.

E. TURNER, Snaith (*accepted*).**EDINBURGH.**

For providing and laying about 7,000 yards of 4-inch and smaller sizes of cast-iron piping, and constructing storage tank for water supply to Bellsquarry water district, for the Calder district committee of Midlothian County Council. Messrs. BELFRAGE & CARFRAE, engineers, 1 Erskine Place, Edinburgh.

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R. Robertson 2,427 0 0

J. Kendall 2,047 4 9

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For erection of a fire-station, Thames Street. Mr. JOHN KEMP, surveyor.

H. March £478 11 0

J. WRIGHT, Hampton (*accepted*) 435 15 0**HANLEY.**

For erection of a mixed junior school at Clarence Street. Messrs. R. SCRIVENER & SONS, architects, Howard Place, Hanley.

J. Bagnall £3,500 0 0

W. Bennett 3,500 0 0

T. Godwin 3,400 0 0

A. Ogden 3,381 10 0

G. Ellis 3,349 0 0

C. CORNES (*accepted*) 3,250 0 0

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H. Shepphard	80	2	0
Rayment & Son	80	0	0
EKINS & CO. (<i>accepted</i>)	72	0	0

HORSHAM.

For erection of a house and shops, New Street. Mr. C. H. BURSTOW, architect, 40 North Street, Horsham.

J. Hillman & Murrell	£684	0	0
H. Spooner	675	0	0
G. POTTER, Horsham (<i>accepted</i>)	592	0	0

For repairs to mill, cottages, buildings, &c., on Broadbridge Farm. Mr. C. H. BURSTOW, architect, 40 North Street, Horsham.

F. Marks	£550	0	0
Potter Bros.	330	0	0
J. Holland	263	3	6
H. Spooner	225	0	0
M. ETHERIDGE, Bishopric, Horsham (<i>accepted</i>)	225	0	0

For additions to the Good Intent beerhouse, London Road. Mr. C. H. BURSTOW, architect, 40 North Street, Horsham.

Pannett Bros.	£153	10	0
G. Potter	142	15	0
J. HILLMAN & MURRELL, Clarence Road (<i>accepted</i>)	142	10	0

For sanitary and plumber's work at the Black Horse Hotel, West Street. Mr. C. H. BURSTOW, architect, 40 North Street, Horsham.

H. C. Attwater	£78	10	0
J. GLAYSHER, London Road (<i>accepted</i>)	65	10	0

KENT.

For enlarging gasholders, &c., at the Darenth Hospital.

Westwood & Wright	£1,875	0	0
WILEY & CO., Exeter (<i>accepted</i>)	1,525	0	0

KIDDERMINSTER.

For construction of an electric tramway, from Kidderminster to Stourport.

G. LAW, Kidderminster (<i>accepted</i>)	£24,000	0	0
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LEE.

For rebuilding the Rose of Lee public-house, Lee, Kent. Mr. W. J. INGRAM, architect.

Prestage	£9,248	0	0
Courtney & Fairburn	9,227	0	0
Whitehead	9,199	0	0
Spencer & Co.	8,793	0	0
W. Shurmur	8,719	0	0
F. & H. Higgs	8,677	0	0
Rowe	8,600	0	0
Lascelles & Co.	8,598	0	0
Lily & Lily	7,997	0	0
Beer & Gash	7,871	0	0

LEEDS.

For heating apparatus at the Hunslet Hall Road Board school. HOLMES & CO., Briggate, Leeds (*accepted*)

£337	0	0
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For alterations to three shops and houses, Quarry Hill. Mr. J. W. THACKRAY, architect, Leeds.

C. FARRER (<i>accepted</i>)	£306	7	0
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For erection of pair of semi-detached houses, Vinery Terrace Road. Mr. J. W. THACKRAY, architect, Leeds.

Accepted tenders.

Wood & Smith, joiner	£248	10	0
J. Carr, bricklayer (labour only)	148	0	0
T. Blackburn, plasterer	70	0	0
H. Boston, plumber	62	0	0
W. Shevill, slater	48	5	0
Pearson & Son, painter	20	0	0

For alteration of two houses into shops and houses, Kirkstall Road. Mr. J. W. THACKRAY, architect, Leeds.

C. FARRER (<i>accepted</i>)	£94	0	0
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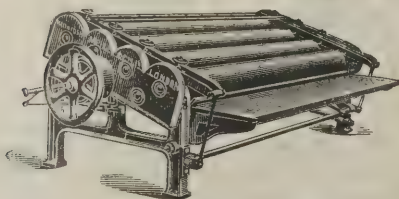
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For extension of the electric supply works at Oldham Place station.

J. HENSHAW & SONS (<i>accepted</i>)	£1,069	0	0
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For rebuilding the Prince of Wales public-house, High Street.	
Messrs. GORDON, LOWTHER & GUNTON, architects.	
Antill & Son	£3,850 0 0
Allen & Son	3,830 0 0
Snegin Bros.	3,677 0 0
Jarvis & Sons	3,596 0 0
Lascelles & Sons	3,449 0 0
W. Shurmur	3,446 0 0
Edwards & Medway	3,347 0 0
C. Cox	3,178 0 0

LLANDUDNO.

For drainage and sanitary alterations to the convalescent homes. Mr. J. EDWARD WILLCOX, engineer, Union Chambers, Birmingham.	
H. Law	£670 0 0
J. Jameson	650 2 8
S. Turner	649 9 8
J. & S. ROBERTS, Llandudno (accepted)	639 3 6

LINGTON.

For erection of six houses, Cromatie Street. Messrs. R. SCRIVENER & SONS, architects, Hanley.	
H. P. Embrey	£1,384 0 0
Tompkinson & Betteley	1,378 0 0
P. H. Bennion	1,359 0 0
YOUNG & SON, Lington (accepted)	1,147 0 0

LONDON.

For supplying and fixing cooking apparatus, &c., at the Grove Hospital.	
W. Summerscales & Sons, Limited	£2,420 0 0
C. S. Mallett & Co.	2,073 0 0
Joel & Potter, Limited	1,850 0 0
Hayward Bros. & Eckstein, Limited	1,802 0 0
Purcell & Nobbs	1,793 0 0
Clements, Jeakes & Co.	1,700 0 0
Comyn Ching & Co.	1,680 0 0
Carron Company	1,680 0 0
J. F. Clarke & Sons	1,660 0 0
J. & F. May	1,420 0 0
Morwood, Sons & Co.	1,252 0 0
J. W. Brooke	1,190 0 0
GODDARD, MASSEY & WARNER, Nottingham (accepted)	935 0 0

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For kitchen fittings at the Western Hospital.	
Clements, Jeakes & Co.	£1,810 0 0
Benham & Sons, Limited	1,492 0 0
J. & F. May	1,290 0 0
J. W. Brooke	1,056 0 0
MORWOOD, SONS & CO., Southampton Row, W.C. (accepted)	927 0 0
For cold-water supply, hot-water and radiation heating steam-pipes, &c., at the Grove Hospital.	
W. J. Fraser & Co.	£20,943 0 0
Purcell & Nobbs	19,734 0 0
J. F. Clarke & Sons	19,000 0 0
J. & F. May	18,300 0 0
Z. D. Berry & Sons	17,450 0 0
Joel & Potter, Limited	17,357 0 0
WENHAM & WATERS, LIMITED, Croydon (accepted)	16,850 0 0
For alterations and additions to the Queen's Hotel, Manchester Road, Poplar, E., for Mrs. J. Marner. Mr. FRED. A. ASHTON, architect, 177 Romford Road, Stratford, E.	
A. E. Symes	£1,585 0 0
C. Simmons	1,580 0 0
W. Watson	1,390 0 0
W. J. Maddison	1,380 0 0
G. Veale	1,375 0 0
Spencer & Co.	1,368 0 0
J. & H. COCKS (accepted)	1,350 0 0
For additions to warehouse at Wick Lane, Old Ford, for Messrs. Allan Cockshut & Co. Mr. F. M. HUGHES, architect.	
Holland & Hannan	£7,777 0 0
Holloway Bros.	7,240 0 0
Harris & Wardrop	7,197 0 0
W. Shurmur	7,147 0 0
Perry & Co.	6,842 0 0
For new wing, &c., to the Convent, Clarendon Square, W.	
W. Watson	£13,250 0 0
Patman & Fotheringham	12,276 0 0
W. Shurmur	11,575 0 0
Smith & Sons	11,394 0 0
Coxhead	11,377 0 0
B. E. Nightingale	11,255 0 0
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For stables, &c., at Gainsborough Road, Hackney Wick, for the Acme Wood Block Company. Messrs. BARNES, WILLIAMS & Co., architects.

White & Co.	£649	0	0
Outhwaite	634	0	0
Kiddle & Son	610	0	0
Britton	606	0	0
W. Shurmur	585	0	0
Jarvis & Son	565	0	0

For rebuilding the Sir Robert Peel public-house, Walworth Road. Mr. W. J. INGRAM, architect.

Lang & Son	£2,529	0	0
F. & H. Higgs	2,450	0	0
Beer & Gash	2,359	0	0
Whitehead	2,340	0	0
Rowe	2,320	0	0
Long	2,314	0	0
Lily & Lily	2,259	0	0
Courtney & Fairburn	2,199	0	0
W. Shurmur	2,195	0	0
Maxwell	2,146	0	0

For factory at Dalston Lane. Mr. A. E. HUGHES, architect.

H. L. Holloway	£12,100	0	0
Adamson	11,449	0	0
E. Lawrence & Son	11,250	0	0
Faulkner	11,137	0	0
Williams	10,986	0	0
W. Downs	10,983	0	0
W. Dabbs	10,524	0	0
Chessum & Son	9,936	0	0
W. Shurmur	9,889	0	0

For alterations to the Prince Arthur public-house, Poplar. Mr. ASHTON, architect.

A. E. Symes	£2,175	0	0
W. Shurmur	2,170	0	0
W. Watson	2,145	0	0
J. & H. Cocks	2,095	0	0
S. Salt	1,893	0	0
Brown, Kruse & Co.	1,835	0	0
C. Simmons	1,773	0	0
W. J. Maddison	1,725	0	0

LONDON—continued.

For alterations, &c., to the White Hart public-house, Upton Park. Mr. F. A. ASHTON, architect.

A. E. Symes	£2,675	0	0
J. & H. Cocks	2,502	0	0
W. Shurmur	2,470	0	0
W. Watson	2,420	0	0
Hearle & Farrow	2,300	0	0
W. J. Maddison	2,255	0	0
C. Simmons	2,200	0	0

For erection of premises for the Argus Printing Company, Temple Avenue, E.C. Mr. C. VAL HUNTER, architect.

Larke & Son	£22,100	0	0
J. Greenwood	21,650	0	0
W. H. Lascelles & Son	21,335	0	0
Foster & Dicksee	20,990	0	0
Howell Williams	20,975	0	0
Holloway	20,387	0	0
W. Downs	19,992	0	0
W. Shurmur	19,909	0	0
F. & H. Higgs	19,855	0	0
Patman & Fotheringham	19,821	0	0
E. Lawrence & Son	19,777	0	0
Holliday & Greenwood	19,569	0	0
Jerrard & Son	19,547	0	0

For erection of warehouse at Shacklewell Lane, Stoke Newington, for Messrs. Lloyd, Attree & Smith. Mr. J. R. VINING, architect.

Thomerson & Son	£9,460	0	0
F. & H. Higgs	8,990	0	0
Foster & Dicksee	8,988	0	0
Holliday & Greenwood	8,888	0	0
Johnson & Co.	8,600	0	0
Turtle & Appleton	8,575	0	0
Jarvis & Son	7,975	0	0
Patman & Fotheringham	7,780	0	0
McCormick & Co.	7,777	0	0
W. Downs	7,714	0	0
W. Shurmur	7,557	0	0
Bowyer	7,538	0	0
E. Lawrence & Son	7,474	0	0
J. Grover & Son	7,288	0	0
W. Wall	7,275	0	0

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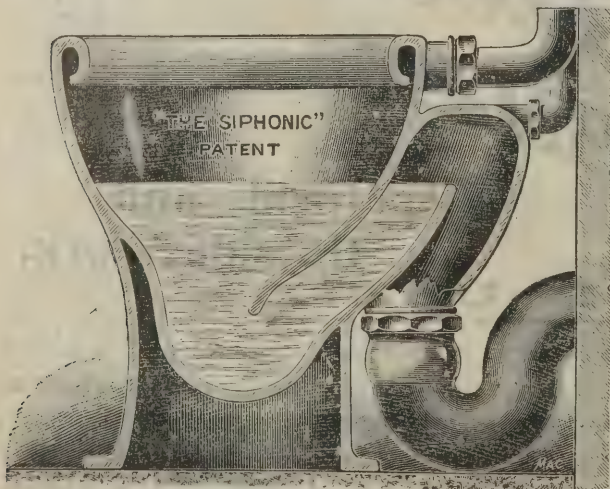
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For alterations at No. 28 Bishopsgate Street Within, E.C.		
Mr. F. HAMMOND, architect.		
Ashby Bros.	£715	0 0
Dixon	710	0 0
Shurmur	707	0 0
Larke	674	0 0

LONDON SCHOOL BOARD.

For painting interior and exterior, City, Swan Street.		
F. T. Chinchin	£318	15 0
A. W. DERBY (accepted)	278	0 0
For interior and exterior painting, Chelsea, Munster Road.		
W. Hornett	£695	0 0
F. Chidley	531	3 6
W. BROWN (accepted)	322	16 0
For interior painting, Chelsea, Saunder's Road.		
E. T. Folley	£630	0 0
G. Neal	375	0 0
W. R. & A. Hide	239	15 0
G. H. SEALY (accepted)	238	0 0
W. Brown	187	10 0
For cleaning interior of J.M. School and painting interior and exterior of S.M. School, Pakeman Street, Finsbury.		
E. Lawrance & Sons	£408	0 0
T. Cruwys	407	0 0
STEVENS BROS. (accepted)	370	0 0
For interior and exterior painting, Blackwall Lane, Greenwich.		
C. Foreman	£435	0 0
E. Proctor	336	0 0
W. Banks	334	11 6
W. HOLDING & SON (accepted)	329	0 0
For interior painting, Burrage Grove, Greenwich.		
W. Banks	£425	0 0
Thomas & Edge	399	0 0
C. Foreman	379	0 0
E. PROCTOR (accepted)	330	0 0
For interior and exterior painting, Halstow Road, Greenwich.		
H. Somerford & Son	£507	0 0
C. Foreman	473	0 0
W. Holding & Son	392	0 0
W. BANKS (accepted)	360	14 0

LONDON SCHOOL BOARD—continued.

For interior and exterior painting, High Street, Greenwich.		
C. Foreman	£562	0 0
Thomas & Edge	541	0 0
W. Banks	459	11 6
E. PROCTOR (accepted)	400	0 0
For interior painting, Sydenham Hill Road, Greenwich.		
A. Black & Son	£430	0 0
E. P. Bulled & Co.	293	0 0
W. Akers & Co.	289	0 0
G. Kemp	279	0 0
J. & C. BOWYER (accepted)	256	0 0
For interior cleaning, Hackney divisional offices, Hackney.		
G. Barker	£79	0 0
G. Wales	52	16 0
W. SILK & SON (accepted)	49	0 0
For exterior painting, Sydney Road, Hackney.		
G. Wales	£348	0 0
W. Silk & Son	247	0 0
STEVENS BROS. (accepted)	228	0 0
A. W. Derby	227	0 0
For interior painting, Wenlock Road, Hackney.		
McCormick & Sons	£454	0 0
Perkins & Co.	404	0 0
T. Nicholson	368	0 0
J. Grover & Son	358	10 0
STEVENS BROS. (accepted)	351	0 0
For interior and exterior painting, Sayer Street, East Lambeth.		
W. V. Goad	£598	0 0
F. R. Blaxton	424	17 6
B. E. NIGHTINGALE (accepted)	340	0 0
For interior painting, Surrey Square, East Lambeth.		
Holliday & Greenwood	£454	0 0
D. Charteris	390	0 0
B. E. Nightingale	368	0 0
F. R. BLAXTON (accepted)	302	17 6
For interior cleaning (old portion) and interior painting (new portion), Victory Place, East Lambeth.		
B. E. NIGHTINGALE (accepted)	£217	0 0
For interior painting, Wood's Road, East Lambeth.		
MAXWELL BROS., LIMITED (accepted)	£504	0 0

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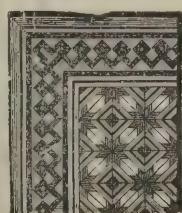
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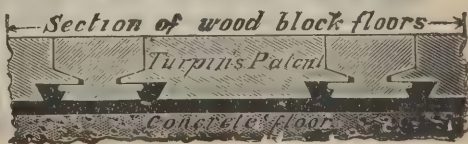
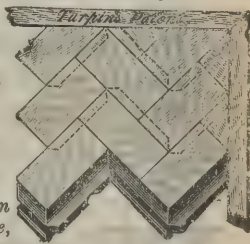
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For exterior painting, Latchmere School, West Lambeth.	
H. J. & G. Mallett	£270 0 0
Holloway Bros.	250 0 0
E. B. Tucker	249 0 0
H. BROWN (accepted)	195 0 0
For interior and exterior painting, Westminster Bridge Road, Southwark.	
F. G. MINTER (accepted)	£107 10 0
G. Foxley	102 10 0
Portland Place, Tower Hamlets.	
W. G. Beaumont & Son	£546 0 0
G. Wales	540 0 0
A. W. Derby	477 0 0
A. E. SYMES (accepted)	389 0 0
For painting, Haggerston Road.	
McCormick & Sons	£570 0 0
W. Shurmur	553 0 0
G. Parker	546 0 0
J. GROVER & SONS (accepted)	533 0 0
For painting, London Fields.	
McCormick & Son	£717 0 0
F. Britton	583 4 6
C. Willmott	578 14 0
G. Parker	520 0 0
Silk & Son	500 0 0
J. MORRISON (accepted)	498 0 0
For painting, High Street, Bromley, E.	
W. G. Beaumont & Son	£330 0 0
D. Gibb & Co.	310 0 0
A. W. Derby	302 0 0
J. T. ROBEY (accepted)	300 0 0
For painting, Heber Road.	
Holliday & Greenwood	£777 0 0
RICE & SON (accepted)	495 0 0

MORLEY.

For erection of three lock-up shops in Queen Street. Mr. T. A. BUTTERY, architect, Morley.	
Accepted tenders.	
D. Marsden, Morley, mason and joiner	£192 0 0
W. Naylor, Morley, plumber	35 10 0
J. Atkinson & Son, Leeds, slater	19 10 0
D. Wilby, Birstall, plasterer	19 0 0

MORLEY—continued.

For erection of Primitive Methodist chapel, Bridge Street, Morley. Mr. T. A. BUTTERY, architect, Queen Street, Morley.	
Accepted tenders.	
J. & J. Sugden, Morley, mason	£646 15 0
G. Elliot, Hanging Heaton, joiner	350 0 0
E. Wilson, Morley, plasterer	100 0 0
Sharp & Harper, Leeds, slater	53 0 0
W. Auty, Morley, plumber	45 10 3

PATRICROFT.

For flagging, paving and surface-water draining in Billy Lane, Rake Lane and New Rake Lane, in the township of Clifton. Mr. C. C. HOOLEY, surveyor, Union Offices, Patricroft.	
W. ARMSTRONG, Walkden, near Bolton (accepted).	

PAULTON.

For alterations to the Red Lion Inn. Mr. WILLIAM F. BIRD, architect, Midsomer Norton.	
Stock & Haines	£522 0 0
S. Lovell	343 2 0
J. Bird	324 0 0
J. GAIT & SON, Ston Easton, Bath (accepted)	286 0 0

POPLAR.

For erection of four shops at Crisp Street. Messrs. J. & S. F. CLARKSON, architects.	
Turnbull & Son	£4,814 0 0
Harris & Wardrop	4,565 0 0
Atherton & Dolman	4,531 0 0
McCormick	3,523 0 0
W. Shurmur	3,492 0 0
J. E. Toad	3,400 0 0
For warehouse at Brunswick Street, Hackney Road. Mr. J. HAMILTON, architect.	
Gnewin Bros.	£558 0 0
W. Shurmur	363 0 0
Barrett & Power	335 0 0
Jarvis & Son	333 0 0
J. Beale	309 0 0

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PLAISTOW.

For new premises for the Stratford Co-operative Society. Mr B. PITE, architect.			
Atkins & Green	£2,400	0	0
W. Watson	2,380	0	0
W. Beale	2,363	0	0
Barrett & Power	2,343	0	0
Gregar & Son	2,330	0	0
J. A. Reed	2,306	0	0
Co-operative Builders	2,296	0	0
W. Shurmur	2,294	0	0
Pattison	2,270	0	0
Thomerson & Son	2,219	0	0
Harris & Wardrop	2,144	0	0

PLUMSTEAD.

For widening Wickham Lane. Mr. W. C. Gow, surveyor.			
W. A. Wheeler	£1,335	19	3
E. Proctor	1,239	0	0
T. Adams	1,094	18	7
Mowlem & Co.	1,013	0	0
Fry Bros.	996	0	0
KENT ROAD CO., Gravesend (accepted)	898	4	1
H. Bentham	826	5	4

PORTSMOUTH.

For additions to St. Agatha's School, for the Rev. G. H. Tremenheer. Mr. J. HENRY BALL, architect, 2 Clement's Inn, Strand. Quantities by Mr. W. THORNICRAFT, 6 South Square, Gray's Inn.			
W. R. LIGHT & SON, Portsmouth (accepted)	£1,791	0	0

SNARESBROOK.

For erection of residence and stabling, &c. Messrs. GORDON LOWTHER & GUNTON, architects.			
J. Williams	£3,893	0	0
Munday & Co.	3,799	0	0
Patman & Fotheringham	3,698	0	0
Sabey & Sons	3,643	0	0
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W. Shurmur	3,553	0	0
Joliffe & Son	3,250	0	0
Snegin Bros.	3,248	0	0

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SOUTH BANK.

For alterations to and redraining, &c., at the South Bank police station. Mr. WALKER STEAD, county surveyor, Northallerton.			
W. Radge	£45	15	0
J. Wynn	37	5	0
A. ATKINSON & CO., Stockton (accepted)	37	11	10

SOWERBY.

For painting and decorating of chapel and school.			
J. LUMB, Triangle, Halifax (accepted)	£116	10	0

SWINDON.

For alterations and additions to the White Horse Hotel, Cricklade. Messrs. DREW & SONS, architects, Victoria Street, Swindon.			
J. WILLIAMS, Swindon (accepted)			

TAMWORTH.

For painting the joint isolation hospital.			
Dimbleby	£139	0	0
Dent & Son *	99	0	0
* Accepted as revised.			

TOOTING.

For repairs to the chapels, lodges, boundary walls, &c., at the cemetery.			
C. Godbolt	£538	0	0
Frampton & Co.	440	0	0
H. & G. Mallett	438	0	0
Maxwell Bros.	423	0	0
G. Boothman	370	0	0
Coleman & Co.	370	0	0
HAM & SONS, Denmark Hill (accepted)	275	0	0

TOTTENHAM.

For building thirteen houses on the Steele Estate.			
H. KNIGHT & SON, Tottenham (accepted)	£2,925	0	0

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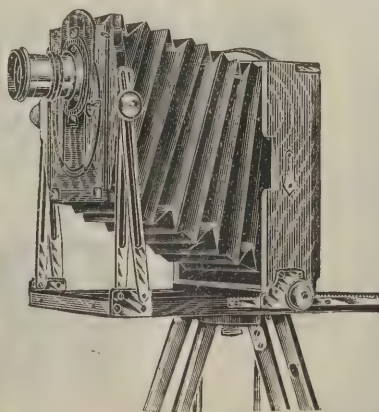
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SUCCESS. Without Trouble.



FIG. 2.—Taken with Sanderson's Camera, with a reserve of rising front in hand.



TOWER & GATEWAY, CHRIST COLLEGE, CAMBRIDGE.

Taken under Test conditions. A difficult subject, owing to its height and narrowness of the street.

Fig. 2 was taken with SANDERSON'S PATENT CAMERA, the Tripod remaining perfectly level, there being no necessity to tilt it, as is usual with other cameras. No difficulty was experienced in properly composing the subject owing to the great range of the Patent Rising and Swing Front, which reduces the adjustments to a minimum, and does away with the necessity of the orthodox Swing Back.

To accomplish the above it was necessary to raise the lens (a 6-in. Zeiss on a 10×8 plate) above its covering power, but by bringing SANDERSON'S PATENT SWING FRONT into play, which enables the axis of the lens to be directed to the bottom of the plate, perfect covering power and illumination was immediately obtained, as in Fig. 2.

Fig. 3 represents the best possible result that could be obtained with the same lens on a first-class modern Camera, furnished with the usual Swing Back, Rising and Swing Front, &c., these movements having been strained to their utmost limits, and the Tripod tilted to a dangerous degree.

FOLLOWING TEST.
mense value one would be to you.
temper, and plates.

FAILURE. With all the old Troubles.

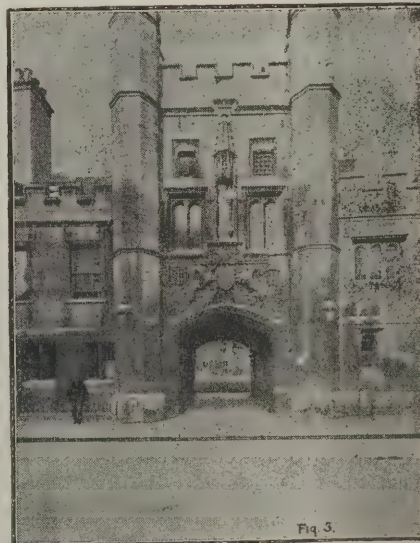


FIG. 3.—Taken with ordinary camera after straining movements to the utmost.

The above results point to the perfection of SANDERSON'S PATENT CAMERA for work of this description more forcibly than any arguments for or against its principles.

A Descriptive Pamphlet may be obtained on application to the Sole Licensees and Manufacturers—

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WALES.

For erection of a chapel at Porth.

Williams & Thomas	£2,835	0	0
Thomas & Farr	2,440	0	0
Moore & Elworthy	2,380	0	0
Jones & Humphreys	2,085	0	0
G. Thomas & J. Morgans	2,070	0	0
J. Rees	2,060	0	0
C. JENKINS & SONS, Porth (accepted)	2,040	0	0
Mathias & Edwards	2,020	0	0
D. Richards	2,010	0	0

WALTHAMSTOW.

For erection of church and schools at Hoe Street, Walthamstow.
Messrs. GORDON, LOWTHER & GUNTON, architects.

Castle	£5,845	9	0
E. Lawrence & Son	5,505	0	0
Edwards & Medway	5,397	0	0
W. Dabbs	5,397	0	0
Snegin Bros.	5,382	0	0
Bateman	5,347	0	0
S. J. Scott	5,347	0	0
W. Shurmur	5,346	0	0
J. Chessum & Son	5,300	0	0
Coxhead	5,134	0	0

For residence at Prospect Hill. Mr. J. WILLIAMS DUNFORD, architect.

G. Burrage	£1,972	0	0
J. A. Reed	1,944	0	0
W. Shurmur	1,944	0	0
E. Fuller & Son	1,940	0	0
W. Lawrence	1,899	0	0

WATERFORD.

For erection of thirty-five cottages for the labouring classes at Lisguggan Little, and for the erection of thirty-six cottages for the labouring classes at Doyle's Lane and Newport's Lane.

No. 1.

P. Costen, Waterford	£3,650	0	0
G. NOLAN, Waterford (accepted)	3,476	6	11

No. 2.

P. Costen	3,880	0	0
G. NOLAN (accepted)	3,853	0	6

WALSALL.

For sewerage, making and part completing Moat Road, extending from Pleck Road to a point about 25 feet beyond the Belle Vue Hotel, Moat Road, in a westerly direction.

J. ATKINS, Ryecroft, Walsall (accepted) £976 3 0

WATFORD.

For erection of branch bank, for the London and South-Western Bank, Limited. Messrs. PRIDMORE & ANDERSON, architects, Watford. Quantities by Mr. R. J. STAMP.

Yerbury	£4,890	0	0
Brightman	4,885	0	0
Godson & Son	4,874	0	0
Andrews & Son	4,860	0	0
Tennant	4,796	0	0
Judge	4,767	0	0
Waterman	4,744	0	0
Turners, Limited	4,694	0	0
Eames	4,690	0	0
Lamble	4,663	0	0
Beer & Gash	4,591	0	0
WIGGS (accepted)	4,499	0	0

BANK HOLIDAY ON THE CONTINENT.—For holiday-makers spending a few days abroad, the Great Eastern Railway Company have arranged cheap trips to Brussels and its exhibition by the accelerated Harwich-Antwerp service. Two of the company's finest and quickest twin-screw steamers have been placed on this service, which until September 12 will be on Sundays as well as week-days. On Saturday, July 31, special cheap return tickets, *via* Harwich, Antwerp and Brussels, will be issued to Berne, available for a fortnight. By the company's Harwich-Hook of Holland route, short inexpensive holidays can be spent in Holland and Germany, special facilities being offered for visiting the Hague, Amsterdam, Cologne and the Rhine, &c. Passengers leaving London in the evening, and the chief northern and midland towns in the afternoon, are due at Antwerp and Brussels and the Dutch towns the next morning, and Cologne about noon. Two of the General Steam Navigation Company's fast passenger steamers will leave Harwich on July 28 and 31 for Hamburg, returning August 1 and 4.

EWART'S COPPER "CROWN" VENTILATOR

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TRADE NOTES.

THE Wrenthorpe schools, near Wakefield, are being ventilated by means of Shorland's patent exhaust roof ventilators and special inlet panels.

WE have much pleasure in announcing that the Smethwick Ventilating Company, of High Park Road, Smethwick, have just supplied their patent cowls for use at the Grand Hotel, Birmingham.

IN our reference to the recent opening of the Lambeth Baths by the Prince of Wales, we omitted to mention Messrs. Matthews & Yates, Limited, ventilating, heating and electrical engineers, of Cyclone Works, Swinton, Manchester, as supplying the ventilating arrangements for these buildings. They have supplied two large electric fans and three electric blowers. The former are arranged for general ventilation, and the latter are fitted to take away the steam from the washing-troughs, &c.

ELLAM'S Duplicator for circular work of every description will be found extremely simple, rapid and cleanly; it is always ready for immediate use, and necessitates no soaking, washing, nor other tedious process. Hundreds of copies can be made from one writing, the last being as good as the first. There is no awkward wheel to use in writing, but a plain steel style. For duplicating typewriting it is invaluable, making copies in any colour ink, which are indistinguishable from original letters written on the typewriter.

BUILDING AND BUILDERS.

MEMORIAL-STONES of a new Independent Methodist chapel were laid on the 15th inst. at Stockingford, Nuneaton.

THE foundation-stones of a new masonic hall on the Crumlin Road, Belfast, were laid on the 10th inst. The site is in every respect a suitable one. It occupies a central position, and is of such extent as to allow of the erection of a very commodious building.

THE foundation-stone of a new building in connection with the Middlesex Hospital, in Nassau Street, has been laid by Princess Christian of Schleswig-Holstein. The new wing is designed to accommodate thirty-six female patients, with the necessary staff of nurses and attendants, and will be provided with all modern sanitary and medical improvements.

At a meeting of the Birmingham baths and parks committee it was decided to recommend the Council to proceed at once with the erection of the promised baths for Small Heath, at an estimated cost of 25,000*l*. The site for the baths has for some time been acquired, and adjoins the Free Library in Little Green Lanes. It is intended to provide first and second class swimming baths, private baths, &c., on the same scale as at Monument Road, and to make similar provision for ladies to that which is made at the other bathing establishments.

THE Guildhall School of Music having entirely outgrown its present habitation, it has been found necessary to secure a site in the rear, on which the Corporation is about to erect an important extension of the school buildings, the foundation-stone of which was laid with much ceremony on Wednesday last by Mr. Deputy Pearce Morrison, chairman of the music committee of the Corporation. The designs for the new building have been prepared by Mr. Andrew Murray, the City surveyor.

THE public health committee of the Edinburgh Town Council on Tuesday resolved to recommend acceptance of separate tenders for each branch of the work at the New City Hospital, amounting to about 89,000*l*. At the last meeting of Council the tender of Mr. Colin Macandrew, amounting to over 93,000*l*., was recommended for acceptance for carrying out the whole of the work, but the matter was recommitted owing to some alleged irregularity in the opening of the tenders.

VARIETIES.

MESSRS. BERRY & CAMPBELL, 17 Ridge Road, Hornsey, have secured an order for heating the new premises of Messrs. Berry & Roberts, manufacturing stationers, Baches Street, N.

THE opening services in the new St. Agnes's Roman Catholic Church, Darmond's Green, West Kirby, were held on the 18th inst.

IN consequence of Mr. R. G. Pinder's severe illness he has been obliged to retire from the partnership of Pinder & Fogerty, architects, as from January 1, 1897. The business will in future be carried on by Mr. J. F. Fogerty.

MESSRS. F. R. & C. H. LUKE, of Edinburgh, have obtained a consignment of slates from North America, the first which has been received in Leith. The importation is one of the consequences of the unfortunate strike at the Penrhyn Quarries.

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A NEW road and railway swing bridge over the River Nene, erected by the Midland and Great Northern Joint Railway Companies at Sutton, Lincolnshire, is now open for traffic. The bridge, which has been three years in construction, cost 80,000*l.*, and replaces the structure built by Robert Stephenson 46 years ago. The new bridge is worked by hydraulic power.

A NEW church, dedicated to St. Olaf, at Balholm Sogne Fjord, Norway, has just been opened for the use of English visitors. The site is vested in the Society for the Propagation of the Gospel. The Rev. J. B. Wilson, vicar of Shooters' Hill, is acting as chaplain.

THE memorial of the late Archbishop Benson in Canterbury Cathedral is to take the form of a canopied tomb beneath the north-west tower, close to the site of the place of burial. In consequence, the tablets bearing the names of the priors and deans of the cathedral, which were to have been placed by the side of the list of archbishops, will have to be erected in the corresponding position in the south-west tower.

A BUILDING of pleasing elevation has been erected at the corner of Carmelite and Tallis Streets for the National Press Agency. It is in French Renaissance style, and the material used for the frontage is a red brick with dressings of warm terra-cotta. At the corner of the street, which contains the main entrance, are two towers surmounted with domes. The ornamental terra-cotta columns and archway which form the entrance support an oriel window. On the first floor is a series of circular bay windows, and on the third floor an arcade crowned with a handsome cornice. The trade entrance is in Carmelite Street, and from this a fireproof staircase leads to the upper storeys. All the floors are of steel and concrete and the columns are protected against fire, whilst hydrants are placed upon every floor, and all the windows facing the adjoining premises are protected with rolled steel shutters. The building is fitted throughout with the electric-light, and great attention has been paid to the sanitary arrangements. The architect is Mr. Edwin T. Hall, F.R.I.B.A., of 57 Moorgate Street, and the contractor is Mr. Howell J. Williams, of Bermondsey.

NEW CATALOGUES.

WE have received a copy of Messrs. Downie & Adams's—of 24 Newman Street, Oxford Street—illustrated price list of incandescent electric-lamps. The numerous designs illustrated give

a wide scope for choice, and display considerable originality and a praiseworthy desire to get away from the old forms which have become monotonous.

MR. JOHN P. WHITE, of the Pyghtle Works, Bedford, is sending out two new catalogues of the chimneypieces and overmantels for which his firm has established a reputation. The illustrations, which are mostly from photographs, give accurate ideas of the appearance of the mantels, &c., when fitted, and these range from the elaborately built-up ingle-nook, suited to the hall of a large mansion, to the simple fitting for a modest bedroom; and the diversity is, of course, greatly increased by the different kinds of wood used, and still more so by the variety of materials which can be employed in the finishing or "fitting-up." Many of the designs are either wholly or in part the conception of artists of acknowledged reputation, Messrs. Voysey, Quennell, Lethaby, Cooper, and others, for instance, having contributed some specially happy notions.

THE DEVELOPMENT OF BRITISH TRADE.

THE Board of Trade have appointed a committee consisting of the following gentlemen, viz. Sir Courtenay Boyle, K.C.B. (chairman), the Hon. Sir H. Stafford Northcote, C.B., M.P., Sir Henry Bergne, K.C.M.G., Mr. S. E. Spring-Rice, C.B., Mr. A. E. Bateman, C.M.G., to consider and advise as to the best means of bringing to the knowledge of the home trades the information furnished by Consuls and commercial Attachés, and by Agents-General and other representatives of colonial Governments and of India as to the supply and demand and other conditions of the markets in their respective districts, and as to the opportunities which they afford for the introduction and development of British trade. Also to report whether it is, in their opinion, desirable that consuls and agents should be instructed to remit home from time to time samples of goods most in demand in such markets, and if they shall be of that opinion, to advise what (if any) arrangements should be made for the exhibition of such samples in London, or for their circulation with the aid of chambers of commerce to the provincial trade centres, with information as to price and other conditions under which they are supplied.

Mr. G. J. Stanley, of the Board of Trade, will act as secretary to the committee.

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OBSERVATION TOWER, GREAT YARMOUTH.

ANOTHER permanent addition to the sea-side attractions of Great Yarmouth was made on Monday by the opening of a revolving observation tower erected on the north beach near the Royal Aquarium. The structure is 125 feet in height, it is built entirely of steel and stands on concrete foundations. Including the machinery it weighs about 125 tons. A circular platform built round the tower and constructed to accommodate about 160 passengers is raised to the summit and lowered by means of steam power. As it ascends the platform revolves by electric power at the rate of one revolution in three minutes. There is another platform at the summit to which access is obtained from the revolving apparatus and which is hoisted to an additional height of about 20 feet. From this elevation a magnificent view is obtained. At night the structure is illuminated by fifty incandescent electric lights and by three arc lights. At the base of the tower are spacious bars and dining-rooms. A company of nearly 200 guests were invited to luncheon by the proprietor of the tower, Mr. T. Warwick, in commemoration of the opening. Mr. Warwick presided and was supported by the Mayor of Yarmouth, several members of the Corporation and many of the leading residents of the borough. The party were invited to make the first ascent, which was very satisfactorily accomplished. The Mayor then declared the tower open, and in the course of the afternoon and evening hundreds of visitors ascended it.

SEAFORD BAY.

THE sea is causing so much damage along Seaford Bay that a meeting of public authorities and landowners was held in the County Hall on Monday, the 19th inst., to consider the recommendations of Mr. E. B. Elliot Clark, C.E., for the prevention of denudation of the coast. It is concluded by the engineer that neither a wall without groynes, nor groynes without a wall, nor both without the deposition of shingle in bare places, will be sufficient to permanently resist further and serious encroachment, and any new wall left ungroyned must disappear like that previously constructed from the Newhaven east pier to the Buckle Inn. And the report lays it down as an absolute law that without a shingle bank in front of it, a wall alone along the foreshore of Seaford Bay will not maintain its position. The cause of the railway company's wall falling was due to insufficient shingle, and the portions of the foreshore near the coastguard station provided a good chalk foundation for a wall, which might for some years withstand further encroachments, but the foundation would in course of time be undermined. After pointing out that the manner in which the sea removes the shingle has an important influence on the nature of the design of the sea defences, the report states that in the case of the foreshore between Newhaven and Seaford the natural defence, viz. a sloping beach, is alone insufficient owing to the back land being from 8 to 10 feet below the fall of the beach in many places, and nothing short of a wall will stop the breaking down of the beach crest. The foundations of such wall may rest upon shingle with perfect safety if protected by a shingle bank on the sea-side, and such shingle can only be permanently retained by the construction of groynes. The erection of a wall and groynes alone at places on the beach bare of shingle would be to court disaster. At such bare places it would be necessary to artificially supply such a quantity of beach as will maintain a minimum foreshore in front of a wall during heavy weather.

The report states that the works proposed will consist of a wall along the entire length of the foreshore, to be protected in a line as near as possible with the centre or "full" of the beach, groynes on the foreshore and an artificial supply of shingle in bare places. The wall would for the most part rest upon shingle, and the base of the wall must be carried to such a height as will prevent the water, both from the sea and land springs, accumulating behind it. The wall in front of the Coastguard station to the termination of the cliff near the Buckle Inn will be carried at the base of the cliff so as to give a minimum roadway of 25 feet, and such portion of the wall would be 11 feet in height except at the narrowest place, where the wall would be carried up to the level of the roadway. At the Buckle Inn it would be necessary to raise the roadway for some distance, as the top of the wall will be above the present road. The proposed wall would be carried behind the timber-sheathed bank constructed recently from the Buckle Inn to the Tide Mills, but that portion of the wall may not be required to be erected for the present. The wall would then continue on the full of the beach westward to Newhaven, and form a junction with the existing wall of the railway company. Portions of the wall in the most exposed parts should be faced with flints, and the whole of the remainder of the wall except the foundations, which should be in blocks, should be in mass Portland cement concrete. Shingle should be brought from the east side of the Newhaven Pier to place on the bare places, and such removals of the shingle from the Newhaven Pier would be a positive benefit to

the harbour navigation. The groynes should be placed at a uniform distance of 250 feet apart, except at the east and west ends, where they should be a little further, and they should be of a uniform length of 200 feet at right angles to the general line of the foreshore, and the existing Seaford east groyne should be raised and lengthened. The groynes are estimated to be timber except at certain points where they should be of concrete. In conclusion the report points out that the removal of shingle from the foreshore at any point should absolutely cease, and in regard to the maintenance of the beach wall and groynes some competent person should periodically examine them and report necessary repairs to some authority. Plans, diagrams and estimates accompany the report.

THE NORTHERN POLYTECHNIC.

THE Lord Mayor, accompanied by the Lady Mayoress, last week visited the north of London for the purpose of opening the great hall of the recently-erected Northern Polytechnic in the Holloway Road. The buildings are erected in two blocks, the principal one having an important frontage to the main thoroughfare, while the other frontage is to a street some 200 feet to the rear. These two blocks are connected by a corridor, on the north side of which is the great hall, while on the south side is a plot of ground covering nearly twice the area of the hall, on which are afterwards to be erected the remaining buildings of the institute. Each of the main blocks consists of three floors. In front the ground floor is taken up by the entrance-hall, the principal's-room and the secretary's offices. Above are the drawing office, the engineering department and the physical lecture theatre and laboratory. The second block contains the brickwork shop, the smithy, the carpenters' shop, and the mechanical and chemical laboratories. On the ground floor beside the hall are the gymnasium and a large room to be fitted up as a common room. The great hall is a lofty and finely proportioned building approached from the Holloway Road by means of a handsome vestibule. It measures some 100 feet by 55 feet, will seat over 1,200 persons and is fitted with a large orchestral platform. The roof is elliptical and is covered with fibrous plaster divided into panels with ornamental centres, every alternate panel containing an electric light. When lighted up the effect is very good, and the general illumination excellent. In the daytime the hall is lighted by circular-headed windows, supported by stone columns, each bay containing three windows enclosed in a setting of moulded bricks, whilst the floor is of solid cubes, and has a gradual slope from the entrance to the front of the platform. The gallery has a separate entrance from the Holloway Road, and an emergency exit to the rear. In the front there are three spacious doorways, with three on the north side as exits, leading into a corridor connecting the body of the hall with the orchestra platform. Beneath the platform is a large retiring-room, with other rooms for artistes, speakers, &c., and suitable lavatories are also provided close by. The heating is by steam, conveyed in pipes along channels each side of the hall. The ventilation has been the subject of careful consideration, and is so arranged that fresh air enters the steam-heated channels from the outside, passes warmed into the building, and is drawn away through the ceiling openings to exhaust ventilators on the roof of the hall, whilst an additional supply of fresh air is also obtained by openings the full width of the side windows, forming a sill made of iron. The architect was Mr. Charles Bell, and the work has been carried out by Messrs. Macfarlane Brothers, of Holloway. Messrs. Clarke & Sons, of Moorgate Street, supplied the heating plant, and Messrs. Kite & Co. the ventilating arrangements, and the plaster ceiling was made by Mr. Tanner, Holloway. Something like 40,000l. has been subscribed for the freehold, cost of building, furniture, &c., and of this a great deal has been voted by the various City bodies.

SOCIETY OF ENGINEERS.

A PARTY of the members of the Society of Engineers on Tuesday, July 20, visited the ironworks of Messrs. Easton Anderson & Goolden, Limited, of Erith. Among those present were Mr. G. Maxwell Lawford, president; Messrs. W. Worby Beaumont and J. Corry Fell, vice-presidents; Mr. C. Gandon, past president; Messrs. J. Patten Barber, Joseph Bernays, D. B. Butler and Percy Griffith, members of council; and Mr. G. A. Pryce Cuxson, secretary.

The Erith Ironworks were commenced in 1864 by the firm of Easton, Amos & Anderson, and were laid out by Sir William Anderson, K.C.B., D.C.L., F.R.S., &c., then a member of the firm, and now Director-General of Ordnance Factories. Designed at first as an offshoot from the principal works at the Grove, Southwark, gradual extensions were carried out from time to time, until in 1873 the Grove Works were finally closed, and the machinery and tools moved down to Erith.

The works stand on a plot of ground about 17 acres in extent, and having a frontage of about 800 feet to the river Thames, and the various shops are arranged side by side, the general direction being perpendicular to the river bank, so as to allow of the shop travellers working out on a gantry over barges lying in the river. A railway siding extends from the South-Eastern Railway into the works, so that easy communication both by water and rail is insured. The works are entered through the offices, which are placed at the south-west corner of the property, and which consist of a clerks' office, with manager's and other rooms on the ground floor, and an extensive and airy drawing office occupies nearly the whole of the first floor, the remainder being taken up by estimating and electrical offices; above is a photographic room. The various shops lie between the offices and the river. Commencing from the west side there are covered stores for stock, 95 feet by 43 feet, and sheds for patterns covering an area of 150 feet by 90 feet. Next to these lies a pattern shop 100 feet by 50 feet with a packing store at one end, and an electrical shop in two bays with a store close by. The dimensions of the electrical shop are 150 feet by 100 feet, and room is left at the river end for extensions. East of these shops is a large open yard, and again east of this is the main building, consisting of six equal spans of 43 feet by 600 feet. The two western spans are occupied by an iron foundry 240 feet long, a brass foundry and smiths' shop. The next two spans are given up to machine and erecting shops, the roof in the latter being carried up so as to allow for the erection of lofty engines, the high traveller rails being 39 feet above floor level. The two bays next to these are devoted to boiler and bridge building; beyond this is another extensive yard, in which is a gantry used for the erection of caisson and other large work not easily dealt with in the shops. Beyond this is a field which is utilised as a ground for testing gun carriages and is provided with suitable butts, &c. A large dining hall is provided for the accommodation of the workmen.

The works are well provided with railway tracks and materials can be transferred from one department to another at a low cost.

One of the principal businesses in which the company is engaged is pumping machinery of all sorts. Formerly they used to make large numbers of beam engines for this purpose. Of late years they have been developing the direct-acting inverted triple expansion type, a notable installation being at the new waterworks at Leicester, where three such engines of

large size are to be found. Horizontal 3-throw pumps especially suitable for mine pumping are largely made for driving by electric motors or other means. Centrifugal pumps were made on Mr. Appold's principle for the Great Exhibition of 1851, and the manufacture of all sizes has been continued ever since. Another small though important branch of this trade is hydraulic rams, which were introduced by the founder of the company into this country about 1827, since which time immense numbers have been made and fixed. Of late years a new and very efficient pattern has been adopted as a result of much experimenting.

Cranes and lifting machinery, especially of large sizes, for hydraulic, electric or steam power have been constantly manufactured at Erith. Among notable examples may be mentioned the 160-ton sheerlegs for Sydney Harbour, 150-ton travelling crane for Woolwich Arsenal, and a 150-ton travelling hydraulic crane for Shoburyness. Steam-engines for driving purposes and air-compressors are among the products.

The company have just brought out a new Corliss gear, the invention of their chief draughtsman, Mr. J. Bjornstad, which is very simple and efficient. They have also introduced a new high speed engine (called the "Erith" engine), chiefly for direct driving of dynamos, which promises to have a good future before it.

A special branch of industry which has provided a good deal of work in the last few years is the machinery for the manufacture of cordite. A large quantity of the machinery in use by the Government has been made by the Company, or else at the Royal Arsenal from their designs, and all, or very nearly all, that used by private manufacturers in this country and abroad.

An ingenious machine, invented some years ago by Sir William Anderson, K.C.B., for winding the wire on wire guns, is made by the company, and a number have been supplied to those engaged in this branch of engineering. It is very simple and compact, and yet enables the stress on the wire to be regulated and controlled with the greatest nicety.

The Niagara Pulveriser is a different class of machine from any of the foregoing. As its name implies, it is for the reduction of substances to powder, and can be used for almost any material. It is expected to be much used in the future for crushing quartz in gold-mining operations.

Of late years an extensive electrical department has been added to the works, and which received an additional impetus when the old company of Easton & Anderson, Limited, was

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amalgamated with the well-known electrical firm of W. T. Goolden & Co. The principal work in this department is the manufacture of dynamos and motors of all sizes and for both continuous and alternating currents. The newest type of dynamo which is being manufactured is that having four or more poles and slotted armatures with a special drum winding. The difficulties hitherto experienced with slotted armatures have prevented their adoption in spite of the great advantages they possess, but the company have overcome these difficulties, and their new machine, designed by their electrical engineer, Mr. V. A. Fynn, is an undoubted success, and is probably the best machine on the market. They have also introduced lately a new alternator possessing many features of interest, and which has given remarkably good results in efficiency, and, what is of the greatest importance, is almost completely noiseless, thus overcoming one of the great drawbacks in the use of alternate current machinery, the unpleasant hum of the machines.

Electric mining machinery forms a large part of their work. Messrs. W. T. Goolden & Co. were one of the pioneer firms in this branch of industry, and were the introducers of the system of enclosing motors for use in fiery coal-mines, thus rendering the application of electricity more universally applicable than it would otherwise have been; the special applications have been principally made in the direction of electric pumping, hauling, drilling and coal-cutting.

A great number of electric lifts have been made and several are at present in hand, among them one for the South London Electric Railway to take the place of one of the existing hydraulic lifts. The system adopted is one that is patented, and which does away with the cumbersome barrel that is usually used, besides enabling four ropes to be used to suspend both the cage and the balance weights.

The boiler department must not be overlooked. Here all kinds of boilers are made, but principally Lancashire and Cornish land boilers. A specialty in this way is the Cornish multitubular boiler specially designed for export, having a maximum of evaporative power combined with a minimum of shipping measurement, while yet not sacrificing good and economical steam-producing properties. This boiler has met great favour in the South African goldfields, where it was first introduced, and a very large number are at work there at the present time.

The company has in the past carried out some very important works, among which may be mentioned three large

sugar mills for the Khedive Ismail of Egypt, and the waterworks for the cities of Antwerp and Seville, including all the pipe and main laying and the whole of the buildings, reservoirs and other works.

GROVE ACADEMY, BROUGHTY FERRY.

THE extensions which have just been carried out upon this building, and which have been rendered necessary by the steadily increasing number of scholars, complete the original design—although differing from it in certain respects—and constitute it a handsome and well-equipped school. The addition consists in the erection of an east wing, which now takes the site formerly occupied by the old Grove Academy. The entrance is in Church Street—a large, elegant porch giving access to a broad and spacious central corridor. On the ground floor of this wing there are four classrooms, each capable of accommodating from forty to fifty pupils, and so arranged that by means of sliding partitions two of the rooms may, if desired, be transformed into one large apartment. Accommodation has been found on the same level for the rector's room and for a boys' lavatory and cloak-room. On the basement floor a room has been set apart for the use of the assistant teachers; another is to be utilised as the school library, of which the Corbett Library forms a nucleus, while a third apartment is reserved for the janitor. On the first floor are situated the art-room, laboratory and a new music-room. The art-room occupies the north-eastern portion of the wing. lofty and well-lighted both by roof lights and wall windows, it measures about 50 feet in length and 25 feet in breadth, and is divided by a movable partition. The northern portion is set aside for modelling and shading from the east, and the larger section for ordinary class work, being seated for about sixty pupils. The department is equipped in most efficient style, and is furnished with one or two unique features. Behind a sliding blackboard at the back of the lecturer's platform is a sloping lantern screen made of Keene's cement, the lantern used being of the oxy-hydrogen type, and having been purchased by the Police Commission for the use of the technical classes. On one of the walls there is a broad band of Keene's cement 20 feet long and 2 feet 6 inches deep, which will serve the purpose of a permanent blackboard. Then there are cases for the holding of casts, cabinets for the accommodation of canvases, and cupboards for

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the storage of class diagrams. The south-east end of the first floor is occupied by the new laboratory, with benches for thirty-two pupils, fitted up according to the directions of Mr. Blair, H.M. Inspector of Science and Art. The lecture-table occupies the west end, and the space immediately in front is seated for lecture purposes. The old laboratory has been included in the gymnasium, which is thus much more commodious than formerly; while the old art department is now utilised as a classroom. The boys' playground has also been improved by the laying of granolithic. The architects for the work were Messrs. James Maclaren & Sons.

RAILWAYS IN JAPAN.

THE following report on the progress of railways in Japan has been prepared by Mr. Lowther for the Foreign Office:—

No great advance has been made in construction of Government lines since the report of 1895. The total length of Government lines in operation as then given was 580 miles 69 chains. In the last Government report, issued 1896, the total length opened is given as 593 miles 2 chains, showing an increase of lines opened to traffic of 12 miles 13 chains during the year, and during the same period 34 miles of railway were begun.

In 1895 there were 1,538 miles of private lines open to traffic. This has been increased by 159 miles to 1,697 miles, which gives the total amount actually in operation. Further lines of railway extending over 984 miles have been laid down, but are not yet opened, showing an increase of 470 miles over the previous year of lines laid down. Beyond this charters have been granted for lines to extend over 476 miles.

The most important Government line which has been partly built is that between Hachioji and Nagoya, passing by Shiojiri and thence west by Tajimi to Nagoya. This will be an alternative line to the present main line between Tokio, Osaka and Kyoto, the principal centres of Japan.

The other important line undertaken by the Government is that branching off at Fukushima from the Japan Railway Company's line, which runs north from Tokio, and touching the west coast at Akita, which it may be important some day to be in touch with, and thence running north to Aomori, likewise the terminus of the Japan Railway Company's line. There is further an extension of the line on the west coast from Kanagasaki to Toyama and another further south, running

along the coast from Yonago to Tottori and then inland, joining the main line to Kobe at Himeji; also a small piece of line in Kiushiu running from Yatsushiro to Kagoshima. There is also a short line connecting the dockyard at Kure with the main line. The majority of these lines are only just begun, and will require some years to be completed, as will be seen by reference to the extract from the Budget of 1897-98 quoted below.

Besides this it has been quite lately decided that a line should be undertaken running from Matsumoto northwards by Takayama to Toyama, crossing a pass in the Hida range which is over 6,000 feet high. This railway, if it is built, will be very costly, and it is difficult to see how it can be remunerative, while its strategic value would hardly appear sufficient to compensate for the large outlay. As a further part of this system it has been proposed to connect Gifu with Tajimi on the line from Shiojiri to Nagoya. In Shikoku it is also proposed to build a line from Tokushima to Yawatahama *via* Kochi, and a branch to Susaki.

The lines of the private companies are principally branch lines, connecting the present systems, but there is a tendency to connect the west coast with the east, which up till recently has been absent owing to the difficulties of crossing the mountains, which form the backbone, as it were, of the country.

The total amount included in the Budget 1896-97 to be expended in the construction of new railways is 1,286,666*l.*, and a further provision is made as a continuing expenditure up to 1902-3.

Taking the Fukushima-Aomori line, which will cover a distance of some 300 miles, and the amount set down to be expended on it about 1,110,000*l.*, we arrive at the result that it will cost about 3,700*l.* a mile. In the report of 1895 it was stated that the estimate of the lines to be built was set down at about 3,500*l.* a mile. It is, however, doubtful whether even the larger of these sums will suffice for the purpose, the price of labour having risen since 1895 about 30 per cent.

A further sum of 2,062,450*l.* is also estimated for railways in the Hokkaido, to be spread over twelve years. The doubling of the main Tokaido line, that is from Tokio to Kobe (only very small portions of this being at present doubled), has actually been commenced, but owing to financial considerations it is not expected that it will be entirely open to traffic until 1904. The only difficulty is the tunnelling, for which no provision was made when the line was originally built. The landowners have proved rather obstructive. Nothing has been done towards

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connecting the two main lines which run into Tokio, or in the matter of a central station. The question of altering the gauge provoked a good deal of discussion for some time, but appears to have been dropped again now.

Complaints against the management both of Government and private lines have been abundant. The permanent way of the main Government line, it is asserted, does not receive the attention it deserves. No improvement in the velocity of trains has taken place—indeed, rather the reverse. A passenger train now occupies 61 minutes going from Tokio to Yokohama, a distance of 18 miles, and the fastest trains take 45 minutes. In the course of last summer the majority of lines suffered considerably from the floods, and punctuality became the exception rather than the rule.

Two more of the foreign engineers on the Government lines have received notice that their contracts will not be renewed, and their places will be filled by Japanese.

Very little new work on railways has been so far undertaken in Formosa, although the railway between Kelung and Taipeh has been relaid. The locomotives and rolling stock are of such antiquated patterns that they are not of much use, and their quantity is very inadequate. It is the intention of the Government to leave the construction of railways in Formosa to private enterprise, and the Diet has voted a sum of 1,289,250*l.* as a subsidy to the company, equal to 6 per cent. of the capital. This payment is to be spread over fifteen years.

In the report of 1895-96 it was pointed out that British manufacturers had hitherto practically had a monopoly in furnishing rails, locomotives, rolling stock, &c., but that it would require renewed exertions on their part to continue to be the purveyors in this line. Whether from an absence of such energy or from other causes, it is a fact that the tendency has latterly been for other countries to furnish such commodities.

In September 1896 a tender was granted to Messrs. Mitsui by the Government Railway Department for 13,000 tons of rails. They subsequently placed the order with Messrs. Carnegie, of Pittsburg, at a price alleged to be 10 per cent. under that quoted by English makers. Some time previous to this contract being let there existed a syndicate of American rail-makers to keep up the price of rails for home consumption and also for export. English makers advanced their prices in sympathy with this movement, but it is asserted that, in spite of the syndicate, rails were exported by certain makers in America at prices lower than those quoted as the syndicate prices, and thus many orders went to America, but,

with the advent of the McKinley régime and the prospect of increased tariffs, it is not improbable that Japanese orders may again be placed in England.

The difficulties surrounding the system of tender have, to a certain extent, militated against orders being placed in England. The conditions of tender, purchase and contract have latterly been radically altered. Up to the end of 1895 Government requisitions and indents were sent *en bloc* to London, and the materials required were purchased by Government agents under very rigid inspection and supervision. Since the end of 1895 all requisitions have been issued from the head railway office at Shinbashi, and this will probably continue to be the system adopted. In most cases a nominal fee is charged for specifications, and the following conditions must be complied with:—1. Applicants for specifications and forms of tender must be Japanese subjects. 2. They must give proof of having been in business for at least two years. 3. They must satisfy the departmental authorities that they are able financially to carry out the contract. 4. With the tender, an accompanying deposit of 6 per cent. of the amount of the tender must be made. 5. In the event of the tender being accepted, such deposit must be increased to 10 per cent.

These stringent regulations naturally reduce competition within extremely narrow limits; in fact, only some three or four Japanese firms can compete successfully. Take, for instance, the contract for rails referred to above, which would probably amount to 90,000*l.* The required deposit would be 9,000*l.*, which is practically abstracted from the capital of a business firm during the time the contract is being executed, probably from nine to twelve months, and this sum may also be forfeited under certain conditions.

In the report of 1896 it was also pointed out that a very large proportion of the locomotives on Japanese railways were of English make. The proportion appears to have been at a comparatively recent date—English, 224; American, 6. Some of the latter were purchased in 1890, but did not give satisfaction, the finish being unsatisfactory and the consumption of coal greater than on the English engines. However, some more were ordered in 1894, with a like result. With this experience, it is not to be wondered at that the Japanese should prefer to purchase English-made locomotives, but we do not have a monopoly in this line.

In October 1896 tenders were considered for eighteen locomotives. Three Japanese firms and one foreign (French) firm tendered through a Japanese subject. The locomotives

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were to be of English make, six well-known manufacturers being selected. The contract was let to the French firm at 48,000*l.*, while the amount of other tenders ranged from 7 per cent. to over 50 per cent. higher. Subsequently, owing to the specified English makers being so busy, and the contractor, therefore, unable to fulfil the necessary conditions as to delivery within a specified date, the contract was thrown up, and the deposit money, 10 per cent., forfeited.

Now fresh tenders for the same eighteen locomotives are being considered, but the number of approved makers has been increased to nine. Probably owing to English makers finding it difficult to adhere exactly to a special date of delivery, which, in view of the fact that a considerable impetus has latterly been given to railway enterprise in Japan, is rather short, orders are now going to America. Some sixty or seventy locomotives have recently been ordered in America by the Government railways and the Japan Railway Company.

The building of locomotives at Kobe, in Japan, continues, but facilities do not exist for building on a large scale. The total number built in those works now reaches nine. The last one turned out is a goods engine similar to those used on the London and North-Western Railway. All the locomotives have been built at Kobe under the superintendence of Mr. R. F. Trevithick, M.I.C.E.

The Government apparently find the system of importing the material and setting up here satisfactory, as the material for six engines is about to be ordered from England and built in Tokio. The cost of the locomotive referred to above as having been built at Kobe amounted to 18,237 *dols.*, or about 2,026*l.* This may be considered the total cost of the locomotive ready for traffic, but no estimate is made for wear and tear of machinery or interest of buildings, for which about 2,000 *dols.* must be added, bringing the cost of the engine to 2,248*l.*

In 1894 twelve locomotives somewhat similar to that mentioned above were purchased from Beyer, Peacock & Co., the cost of which was 2,680*l.* 5*s.* 10*d.*, as against 2,248*l.* mentioned above, an advantage in building in Japan of over 400*l.* per locomotive.

Under the most favourable circumstances it is not likely that an English locomotive could be imported and placed in Kobe station ready for traffic under at least 2,200*l.* The foreign advisers of the Railway Department have frequently pointed out to their employers the advantage to be derived from building in Japan, but at present insufficient facilities exist for turning out any large number of locomotives.

PATENTS.

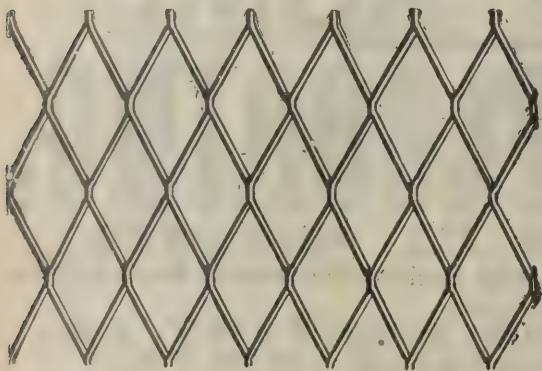
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APPLICATIONS FOR PATENTS.

- 15932. Lewis Elstein, for "An improved means for ventilating rooms, buildings and the like."
- 15998. Moses James Adams, for "Improvements in closets."
- 16005. David Booth, for "Improvements in or in connection with taps for sanitary or drain-pipes."
- 16007. Frederick John Borland and Edwin Moorhouse, for "Improvements in or connected with electrical ceiling roses."
- 16017. John Yeadon, for "Improvements in or appertaining to vessels for obtaining water or other liquids for washing floors or the like."
- 16027. Alfred Grayson, for "The double dovetail fixing-bricks."
- 16056. George W. Meserve, for "Improvements relating to the plastering of walls."
- 16079. Richard Lloyd Gurden and Harry Williams, for "Improvements in or relating to brick-making machines."
- 16103. Edward William Ives, for "An improved method of extracting the precipitated sludge from the bottom of flat-bottom tanks used in the purification of sewage and manufacturers' waste waters."
- 16183. Adamson George Wild, for "Improvements in hinges."
- 16235. William Phillips Thompson, for "Improvements in window-sashes."
- 16260. Emile Paul Abel Huguss, for "Improvements in cement building materials."

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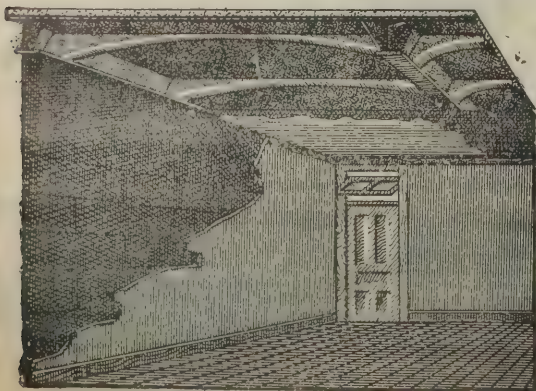
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CARMARTHEN.—Aug. 6.—For building a new farmhouse at Croft. Mr. T. P. M. George, Rhydgarnwen.

CHESHIRE.—Aug. 4.—For erection of a caretaker's house at the Nurseries, near Sale. Mr. R. D. Callison, estates superintendent, Town Hall, Manchester.

CHESTER.—Aug. 9.—For erection of an infectious diseases hospital, Sealand Road. Mr. H. Beswick, architect, 17 Newgate Street, Chester.

CORK.—For erection of roof, flooring upper portion of dwelling-house, building portion of front wall, cementing front, with new frames and sashes, at 6 North Mall. Mr. K. D. Roche, architect, Marlborough Street, Cork.

CORNWALL.—Aug. 7.—For erection of a new school and appurtenances, for the St. Stephen's-in-Branwell School Board. Mr. Sampson Hill, architect, Redruth.

DEAL.—Aug. 4.—For alterations and additions to Deal and Walmer Dispensary. Messrs. Fry & Gardner, High Street, Deal.

DORSET.—Aug. 9.—For erection of a new infants' school at Heatherlands, for the Kinson (U.D.) School Board. Mr. Herbert Wm. Dibben, clerk, Matlock House, Upper Parkstone.

DOVER.—Aug. 10.—For erection of two iron ladders and landings, &c., and for alterations required to four windows at the female hospital, the workhouse. Mr. Eugene Carder, clerk, 17 Market Square, Dover.

DURHAM.—Aug. 24.—For enlarging and reseating Wesleyan chapel, Trimdon Grange. Mr. W. R. Woodhead, Trimdon Grange.

EAST STONEHOUSE.—Aug. 3.—For alterations to East Street Schools, for the East Stonehouse School Board. Mr. H. J. Snell, 13 Courtenay Street, Plymouth.

ECCLES.—Aug. 9.—For erection of pavilion in the Eccles recreation ground. Mr. Geo. Wm. Bailey, town clerk, Town Hall, Eccles.

ESSEX.—Aug. 10.—For extension of drainage of the workhouse, and also for reflooring one room in workhouse, for the Guardians of Lexden and Winstree Union. Mr. John Ennals, surveyor, Copford.

EXMOUTH.—For erection of the railway hotel. Messrs. Kerley & Ellis, architects and surveyors, Exmouth.

FALMOUTH.—Aug. 13.—For reseating, renovation and decorating of the Wesleyan Chapel, Flushing. Mr. Horace W. Collins, architect, Penryn Street, Redruth.

GALWAY.—Aug. 10.—For alterations to provide accommodation for jurors and witnesses and public offices in the county-court house. Mr. James Perry, county surveyor.

GREAT YARMOUTH.—Aug. 6.—For erection of fourteen cottages, Stone Road, Southtown. Mr. Chas. G. Baker, architect, Town Hall Chambers, Great Yarmouth.

GREAT YARMOUTH.—Aug. 11.—For erection of six cottages, Church Road, Gorleston. Mr. Wm. B. Cockrill, architect and surveyor, Gorleston.

GREETLAND.—Aug. 2.—For erection of schools at Greetland. Mr. W. Clement Williams, architect, 29 Southgate, Halifax.

HEREFORD.—Aug. 6.—For erection of a laundry works at Bodenham Road. Mr. A. Lovesey, 2 Offa Street, Hereford.

HEREFORD.—Aug. 7.—For erection of residence in Hampton Park. Messrs. Nicholson & Hartree, architects, Hereford.

HEYWOOD.—Aug. 2.—For reseating and other alterations at the Unitarian church, Heywood. Mr. J. E. Mills, architect, Market Place, Heywood.



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IPSWICH.—For additions to Rose Hill Schools, for the Ipswich School Board. Mr. E. F. Bishopp, architect, 32 Museum Street, Ipswich.

IPSWICH.—Aug. 4.—For addition of a wing and the execution of other work at the East Suffolk and Ipswich Hospital. Mr. Edward Fernley Bishopp, architect, 32 Museum Street, Ipswich.

IRELAND.—Aug. 12.—For erection of a dispensary and dispensary residence at Folly Hill, Aghalee. Mr. Edwin Jas. Donaldson, clerk, Lurgan.

IRELAND.—Aug. 14.—For erection of upper part of tower and spire at the Catholic church, Clones. Mr. William Hague, architect, 50 Dawson Street, Dublin.

JARROW.—Aug. 7.—For building wall and alteration to sheds at Willington Quay. Mr. J. Petree, borough surveyor, Jarrow.

KENDAL.—Aug. 3.—For alterations to Garsdale Church. Mr. John F. Curwen, 26 Highgate, Kendal.

LEEDS.—For erection of four terrace houses (stone), Apperley Lane, Rawdon. Mr. Fred. Mitchell, architect and surveyor, 71 Albion Street, Leeds.

LIMERICK.—Aug. 3.—For erection of a water-closet in Bank Place. Mr. W. E. Corbett, city surveyor, 28 Glentworth Street.

LONDON, E.C.—For rebuilding Rose and Crown public-house, Bartholomew Close, E.C. Messrs. Dear & Winder, architects, 119 Great Russell Street, Bloomsbury, W.C.

LONDON.—Aug. 10.—For erection of infirmary for accommodation of 800 patients on land at the late Small Pox Hospital, Highgate Hill, Upper Holloway. Mr. Edwin Davey, clerk, Guardians' Offices, St. John's Road, Upper Holloway, N.

LONDON.—For alterations at the Three Tuns, Fann Street, Barbican. Mr. G. Silvester, surveyor, 46 Strand.

MIDSOMER NORTON.—Aug. 5.—For erection of a retaining wall and other works near Welton Station. Mr. W. F. Bird, Market Hall.

MORECAMBE.—Aug. 2.—For erection of a detached villa at Cross Cop. Mr. James Marshall, architect, Back Crescent, Morecambe.

NEWCASTLE (CO. DOWN).—Aug. 2.—For erection of three cottages in Newcastle, co. Down. Mr. Samuel Gelston, 133 Royal Avenue, Belfast.

NEWHAVEN.—Aug. 9.—For construction of chimney shaft 120 feet high at the Sussex Portland Cement Works, Heighton. Address, The Manager.

NEW TREDEGAR (MON.).—Aug. 3.—For building forty houses on Cwmsyflog Farm. Mr. Geo. Kenshole, architect, 26 Duffryn Terrace, New Tredegar.

PERSHORE.—Aug. 3.—For repairs and painting of the workhouse infirmary. Mr. Joseph Martin, clerk, Union Offices, Pershore.

PETERBOROUGH.—For erection of a pair of villas in Fletton Avenue. Mr. James Ruddle, architect, Boroughbury, Peterborough.

PETERBOROUGH.—For erection of a house, shop and bakehouse, Buckle Street. Mr. J. G. Stallebrass, architect, Peterborough.

PLYMOUTH.—Aug. 3.—For alterations at the Corn Exchange Hotel. Mr. B. Priestley Shires, architect, Central Exchange, Plymouth.

PLYMOUTH.—Aug. 10.—For the enlargement of the passenger station and for other works at Plymouth (Millbay), for the Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station, London.

PONTEFRAC.—For erection of a villa residence at Ferrybridge. Messrs. J. Holmes Greaves & Co., architects, Cornmarket, Pontefract.

PONTEFRAC.—Aug. 7.—For erection of a lodge at Fryston. Mr. J. G. Kelly, West View, Pontefract.

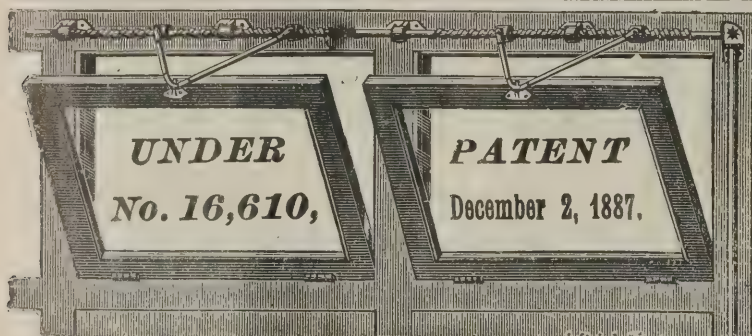
POOLE.—Aug. 3.—For alterations and other works at the workhouse, Longfleet. Mr. H. F. J. Barnes, architect, Poole.

PONTYPOOL.—Aug. 18.—For alterations to existing workhouse buildings, new steam laundry, new infectious diseases hospital and mortuary, aged couples' home and other works. Messrs. Lansdowne & Griggs, architects, Metropolitan Bank Chambers, Newport, Mon.

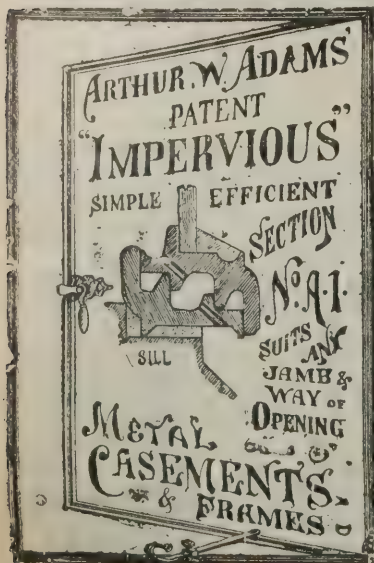
SCARBOROUGH.—Aug. 13.—For erection of eight dwelling-houses at the coastguard station. The Director of Works' Department, Admiralty, 21 Craven Street, London, W.C.

SCOTLAND.—Aug. 2.—For erection of a tower, dwelling-houses, engine-house, &c., at Blackhead, near Portpatrick. Mr. David A. Stevenson, engineer, 84 George Street, Edinburgh.

SHEFFIELD.—For alterations to Heeley and Sheffield House, Gleadless. Mr. W. T. Rhoden, architect, Buckingham Chambers, St. James's Street, Sheffield.



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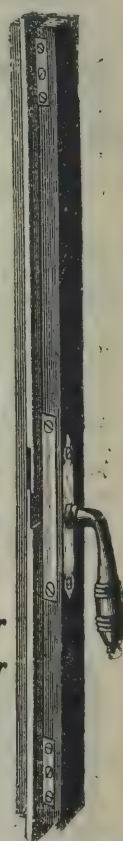
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SOUTHAMPTON.—Aug. 3.—For erection of a church house and institute at Woolston. Messrs. Colson, Farrow & Nisbett, architects, 45 Jewry Street, Winchester.

SOUTHMOLTON.—Aug. 2.—For erection of two houses in South Street, Southmolton. Mr. F. W. Petter, architect, Bridge Buildings, Barnstaple.

SOWERBY BRIDGE.—Aug. 3.—For pulling-down and rebuilding a warehouse two storeys high, at the Industrial Hall. The Chairman of the Industrial Society.

STOCKTON.—Aug. 2.—For erection of six cottages in Sheraton Street. Mr. Thos. W. T. Richardson, architect, 57 High Street, Stockton.

STOWMARKET.—Aug. 6.—For erection of a villa residence in Regent Street. Mr. Henry Geo. Bishop, architect, Market Place, Stowmarket.

SWANSEA.—For additions and alterations to St. Thomas's Church schools. Messrs. J. Buckley Wilson & Moxham, architects, 15 Castle Street, Swansea.

SWINDON.—Aug. 7.—For additions and alterations to Queenstown Club, College Street. Mr. R. J. Beswick, architect and surveyor, Swindon.

TAUNTON.—Aug. 5.—For pulling-down and rebuilding the shops and dwelling-houses at 41 and 42 High Street. Mr. J. Spencer, architect, 8 Hammet Street, Taunton.

THORNTON.—Aug. 6.—For erection of five scullery houses. Messrs. John Drake & Son, architects, Queensbury.

WALES.—Aug. 4.—For certain alterations and additions at the Board school, Glanamman. Mr. H. Herbert, architect, Brynmarlais, Ammanford.

WALES.—Aug. 2.—For the extension of the Welsh Independent chapel at Mardy. Mr. J. Rees, architect, Hillside, Pentre.

WALES.—For erection of a new hotel at Llandrindod Wells. Messrs. Swash & Bain, architects, Midland Bank Chambers.

WESTON-SUPER-MARE.—Aug. 2.—For alterations and repairs at Birkdale, Walliscote Road. Messrs. Price & Wooler, architects.

YORK.—Aug. 3.—For additional iron roofing at the cattle market, including slating, bricklaying, plumbing and joiners' work. The area of the ground to be covered is about 2,500 yards. Mr. A. Creer, city engineer, Guildhall, York.

TENDERS.

ABERDEEN.

For laying granite causeway at Leadsid Road. Mr. WILLIAM DYACK, burgh surveyor.
J. FYFE, Aberdeen (accepted) £1,403 16 2

ABRAM.

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S. COWBURN & SONS, Hindley, near Wigan (accepted) £6,072 7 2
MILL LANE MINING COMPANY, Ramford, St. Helens, earthenware pipe (accepted) 2,065 6 5

ARISAIG.

For additions and alterations to Arisaig Hotel. Mr. DUN. CAMERON, architect, Inverness.
W. BAIN, Creagorry, Beubecula, Skye (accepted) £1,500 0 0

BELFAST.

For lengthening and widening of roof of Belfast Station.
J. LYSAGHT, Limited, St. Vincent's Ironworks, Bristol (accepted).

BIRKENHEAD.

For erection of an additional wing to the Holt School of Science and Art, Leighton Road, Tranmere. Mr. CHARLES BROWNRIDE, borough surveyor.
J. H. JACKSON, Chester Street (accepted) £889 12 0

BOZEAT.

For erection of a working-men's club.
J. Hudson £506 0 0
T. & C. BERRILL, Irchester (accepted) 487 0 0

BRIGHTON.

For internal repairs, painting, &c., to Board Schools.
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Finsbury Road School—T. F. Holland, £62 10s.
Hanover Terrace School—Barber & Olliver, £190
Lewes Road School—Gates & Sons, £58 10s.
Middle Street School—W. Brown & Son, £18 15s.
Preston Road School—W. Brown & Son, £208 10s.
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S. Wood	15,385	0	0
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E. Tempest	14,893	9	4
J. Mackay	14,853	1	10
W. Jones	12,001	0	0
H. HOLLOWAY, Wolverhampton (accepted)	11,647	0	0
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J. MURPHY, Cork (accepted)	£24	10	0
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COVENTRY.

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WHITEMAN & SON, Jordan Well (accepted)	555	0	0

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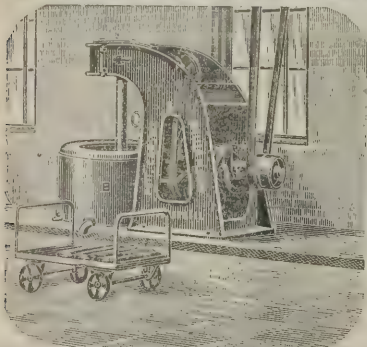
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C. Moore, plumber and glazier	202	0	0
S. Sunderland, plasterer	84	0	0
W. Crabtree, slater	64	0	0
W. H. Hillam, painter	24	10	0

HAILSHAM.

For outside repairs, painting and colouring at the union work-house.

J. T. THOMPSON, Cold Harbour, Hellingly
(accepted) £81 10 0

HEELEY.

For erection of stores and house in Gleadless and Carrfield Roads, Heeley. Messrs. HALL & FENTON, architects, Sheffield. Quantities by architects.

Accepted tenders.

J. A. Lenthall, bricklayer and mason	£1,445	0	0
C. H. Gillam, joiner	922	0	0
H. Waddilove, plumber	235	0	0
C. Chadwick & Sons, plasterer	154	8	0
J. A. Lenthall, slater	103	0	0
J. Clark, painter	54	6	10

HULL.

For erection of engineers' workshops, blacksmiths' shops, &c., at the St. Andrew's Dock, Hull. Messrs. FREEMAN, SON & GASKELL, architects, Albert Chambers, Carr Lane, Hull.

Accepted tenders.

J. R. Woods, bricklayer, &c.	£748	0	0
Wright & Son, ironfounder	288	10	0
R. Finch, joiner	240	0	0
G. F. Wells, plumber, &c.	153	0	0
Folkard & Son, slater	115	0	0
C. Crane, painter	31	14	1
Tinbell & Son, stonemason	20	10	0

IRELAND.

For erection of a dwelling-house in Newtate, Florencecourt.

B. Hughes	£116	0	0
J. DONNELLY, Enniskillen (accepted)	89	0	0

KING'S LYNN.

For erection of new pumping station at Gayton. Mr. E. J. SILCOCK, borough and water engineer.

R. M. Parkinson	£3,960	0	0
R. Dye	3,693	0	0
Collins & Barker	3,530	0	0
Medwell & Foreman	3,500	10	0
H. G. Rudrum	3,477	0	0
READ & WILDBURN, King's Lynn (accepted)	3,350	0	0

KINGSTON.

For extension at Brewery. Messrs. YETTS, STURDY & USHER, architects. Quantities by Messrs. K. L. CURTIS & SONS.

Faulkner	£6,677	0	0
Oldridge & Son	6,667	0	0
B. E. Nightingale	6,646	0	0
Wheatley & Sons, East Molesey	6,630	0	0

LEE.

For paving, kerbing, channelling, roadmaking and other works in Calydon Road, Charlton.

J. MOWLEM & Co., Westminster (accepted) . £270 0 0

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For erection of a new wing, &c., to the convent, Clarendon Square, W.

W. Watson	£13,250	0	0
Patman & Fotheringham	12,276	0	0
W. Shurmur	11,575	0	0
Smith & Sons	11,394	0	0
Coxhead	11,377	0	0
R. E. Nightingale	11,255	0	0
Minter & Co.	11,100	0	0

For electric-lighting machinery, wiring and fitting up, &c., at the Grove Hospital, for the Metropolitan Asylum Board.

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Sharp & Piper	£5,790	0	0
Laing, Wharton & Down, Limited	5,099	0	0
Fowler, Lancaster & Co.	4,985	0	0
J. H. Holmes & Co.*	£4,120 to	4,890	0
Brush Electrical Engineering Company, Limited	4,872	0	0
J. H. Pickup & Co., Limited	4,790	0	0
T. Scott Anderson	4,450	0	0
W. J. Fryer & Co., Limited	4,427	0	0
Crompton & Co., Limited	4,420	0	0
SIEMENS BROS. & CO., LIMITED, Queen Anne's Gate, S.W. (accepted)	4,180	0	0

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W. J. Fryer & Co., Limited	6,647	0	0
Sharp & Piper	6,450	0	0
Laing, Wharton & Down, Limited	6,059	0	0
T. Scott Anderson	5,700	0	0
Brush Electrical Engineering Co., Limited	5,440	0	0
Crompton & Co., Limited	5,400	0	0
MAVOR & COULSON, LIMITED (accepted)	4,950	0	0
A. H. Wood	4,720	0	0

Combined Tender.

F. B. Camden & Co.	13,973	0	0
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Sharp & Piper	12,240	0	0
J. H. Pickup & Co., Limited	11,680	0	0
Laing, Wharton & Down, Limited	11,100	0	0
W. J. Fryer & Co., Limited	11,074	0	0
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Brush Electrical Engineering Co., Limited	10,312	0	0
T. Scott Anderson	10,150	0	0
Joel & Potter, Limited	9,972	0	0
Crompton & Co., Limited	9,320	0	0
Mavor & Coulson, Limited	8,901	0	0

* According to description of engines supplied.

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Lawrence & Son	19,678	750
J. Mowlem & Co.	19,299	769
W. G. Larke & Son	17,972	860
Kirk & Randall	17,668	651
Howell J. Williams	17,665	630
Patman & Fotheringham	16,791	630
Atherton & Dolman	16,700	620
Chessum & Son	16,698	635
Colls & Son	16,535	672
PERRY & CO. (accepted)	16,050	645

LONDON—continued.

For alterations at the Oxford Arms, Cambridge Road, Bethnal Green; for the Alma Brewery, Mile End New Town. Messrs. EDWARD BROWN & SON, architects, Commercial Street, Bishopsgate.

Builders.

J. Jarvis & Sons	£945	0	0
J. V. Kiddle & Son	770	0	0
H. Hood	686	0	0
Sheffield Bros.	668	0	0
TAPERILL & DAVIS (accepted)	636	0	0

Gasfitters.

Vaughan & Brown	53	0	0
J. STEADMAN (accepted)	49	17	6

Pewterers.

R. Davis & Sons	48	10	0
B. J. GRIMES & SON (accepted)	48	0	0

For alterations at the Star tavern, St. John's Wood, for Mr James Newport. EDWARD BROWN & SON, architects Commercial Street, Bishopsgate.

Builders.

Sheffield Bros.	£494	0	0
Taperill & Davis	465	0	0
J. V. KIDDLE & SON (accepted)	407	0	0
C. M. Henry	396	0	0

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F. Young & Co.	82	9	0
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G. S. S. Williams & Son	1,203	0	0
E. Lawrance & Sons	1,202	0	0
J. Smith & Sons	1,155	0	0
J. F. Ford *	1,140	0	0

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T. Boyce	5,760	0	0
J. & M. Patrick	5,711	0	0
C. Cox	5,682	0	0
J. Grover	5,670	0	0
G. S. S. Williams & Son	5,650	0	0
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J. F. Clarke & Sons	£600	0	0
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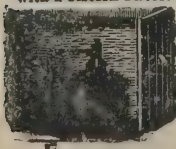
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Stevens & Sons	400	0	0
W. G. Cannon & Sons	379	0	0
J. Fraser & Son	349	10	0
J. & F. May	335	0	0
Dargue, Griffiths & Co., Limited	315	0	0
Wenham & Waters, Limited	315	0	0
Maguire & Gatchell, Limited	289	10	0
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G. Davis	245	0	0
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Maguire & Gatchell, Limited	538	12	0
W. G. Cannon & Sons	520	0	0
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J. Matthews	2,298	0	0
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CLARKE & SON, Middlewich (accepted)	2,020	0	0

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Fuller & Son, Walthamstow	£360	0	0
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For erection of thirteen cottages and forge. Mr. W. I. CHAMBERS, architect, London, W.C.

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C. Thompson	4,030	0	0
S. Wright	3,810	0	0
E. Faggetter	3,810	0	0
New English Homes Construction Company	3,800	0	0
R. Smith	3,660	0	0
Martin, Wells & Co.	3,615	0	0
A. Gower	3,250	0	0
J. Faggetter	3,228	0	0
C. Field	3,150	0	0
J. P. Groome	2,975	0	0
Loe & Howard	2,765	0	0
Architect's estimate	3,230	0	0

PENYGRAIG.

For construction of the substructure of a mission church. Messrs. GRIFFITHS & JONES, architects, Pontypridd and Tonypandy.

T. DAVIES, Penygraig (accepted).

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For erection of warehouse, 3 New Inn Broadway, New Inn Yard. Mr. W. H. PUNNETT, architect.

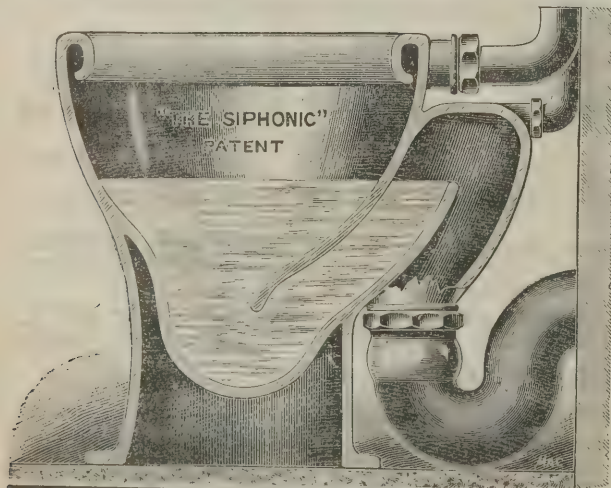
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A. Tress, excavation, drainage, brickwork, mason, slating and plastering	£1,512	0	0
H. Boddy, carpenter and joiner	473	0	0
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W. E. Dixon, founder and smith	71	14	0
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W. Green, Pendleton	34	15	0
C. H. Broughton, Salford	26	0	0
D. Lea, Manchester	21	16	0
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For erection of a constable's quarters and two cells at Minehead.
Mr. W. J. WILLCOX, county surveyor.

C. Wibley, Bath	£1,884	10	0
H. S. Cook, Shepton Mallett	1,575	0	0
H. J. Spiller, Taunton	1,530	0	0
Hughes & Weekes, Bristol	1,490	5	0
J. Hine & Son, Dunster	1,431	0	0
J. Hurford	1,380	0	0
W. Harrison	1,370	0	0
T. Smith	1,360	0	0
T. Burgess	1,337	14	3
Hayward & Wooster, Bath	1,337	0	0
F. Huish, Street	1,188	0	0

WALES.

For erection of a technical and intermediate school at
Gowerton, for the County Council. Messrs. GRIFFITHS &
JONES, architects, Pontypridd and Tonypany.

BENNETT BROS., Swansea (*accepted*).

For erection of a town hall, Conway. Mr. T. B. FARRINGTON,
architect.

E. THORP & SONS, Lloyd Street, Llandudno (*accepted*).

WALTHAMSTOW.

For erection of a pair of semi-detached villas for Mr. John
Hitchman. Mr. J. WILLIAMS DUNFORD, architect,
100c Queen Victoria Street, E.C.

James Steed, Camden Town* £1,500 0 0

* Lowest without basements, accepted.

For three shop fronts and other work at St. James Street, for
Mr. Geo. Whitehead. Mr. J. WILLIAMS DUNFORD, archi-
tect, 100c Queen Victoria Street, E.C.

W. SHURMUR, Clapton (*accepted*) £437 0 0

WEST CORNWALL.

For rebuilding the culvert at Fairmoor.

J. PAUL, Bissick (*accepted*) £70 0 0

TRADE NOTES.

THE St. Augustine's Schools, Bristol, are being warmed and
ventilated by means of Shorland's patent Manchester grates.

ELECTRIC NOTES.

THE cleaning and lighting and electric-lighting committees
of the Edinburgh Town Council have resolved to recommend
the Magistrates and Council to authorise the introduction of
the electric light into Portobello.

THE first installation of electric light for public lighting
purposes in the Isle of Man was recently inaugurated at
Onchan, the enterprising town to the north of Douglas. Five
arc lamps of 1,000 candle-power each have been erected at
different points in Onchan in the leading thoroughfares, and
the light is supplied from the Douglas generating station. The
lighting is eminently satisfactory.

At the Wakefield City Council meeting Councillor Bolton
reported that operations at the electric-light works at Calder
Vale were going on satisfactorily. The chimney shaft was
143 feet above the ground, and 37 feet had still to be added.
The preparation of the engine beds was so far advanced that
Messrs. Fowler, of Leeds, would soon commence fixing the
engines, one of which would be in readiness in time to enable
the Corporation to carry out their agreement with the West
Riding County Council for supplying the electric light to their
offices.

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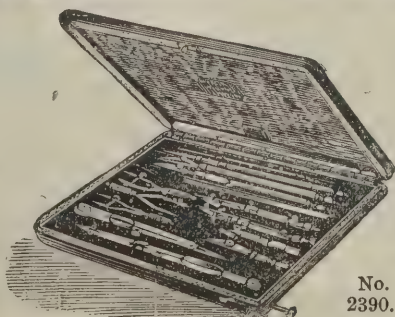


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NEW PARLIAMENTARY BUILDINGS, SYDNEY, NEW SOUTH WALES.—FIRST FLOOR PLAN.—SECOND FLOOR PLAN.—GROUND FLOOR PLAN.—BASEMENT PLAN.

BUILDING AND BUILDERS.

A CHURCH to seat 500 is about to be erected in St. Mark's parish, Newport.

It is intended to erect a church in Clydach, Swansea Valley, at a cost of 2,800*l*.

A CHURCH is to be erected at Rhosrobin, a mining district near Wrexham, at a cost of about 1,300*l*.

A WESLEYAN chapel is about to be erected at Hoylake, Cheshire, at a cost of 2,000*l*.

A NEW Primitive Methodist chapel is about to be erected at Lymm, Cheshire, at a cost of 1,300*l*, and a new chapel and school premises at St. Helens.

THE tenders for constructing the proposed new Congregational church in the north-west ward at Scarborough have been decided upon. The seating will be for 500 worshippers.

THE foundation-stone was laid on the 24th inst. of a new church at North Brixton which is to replace Christ Church, which is found to be beyond repair. The new building, with parochial hall and infants' school, will cost 17,300*l*.

THE postal authorities have agreed upon a site for a new post office at Stranraer. It is in Charlotte Street, and the building which is standing thereon will be pulled down, and new premises erected to plans approved by the postal authorities.

THE foundation-stone of a synagogue at Leicester has been laid by Sir Israel Hart, past mayor, who was the first Jew to be elected to that office, and a commemoration-stone in honour of the Queen's Diamond Jubilee was also laid by his worship the present Mayor.

A PHILANTHROPIST who prefers to remain anonymous offers to contribute 10,000*l*. towards the provision of a large

general hospital for the parishes of Lambeth, Camberwell and Battersea. It is stipulated that the contract for the erection of the hospital shall be entered into not later than August 1899, and that no medical school shall at any time be formed or carried on in connection with the institution. The idea is that the control and administration of the hospital shall be vested in the three parishes referred to.

AT a public meeting held at the end of last January in Portsmouth it was decided to celebrate the Diamond Jubilee by the rebuilding of the hospital, and to raise within the year, if possible, 10,000*l*. This was estimated to be sufficient to pay for the first two blocks, which would give accommodation for eighty patients. Subsequently it was ascertained that the proposed work could not be carried out for less than 15,000*l*, but in less than six months a sum of 276*l*. in excess of the 15,000*l*. has been raised.

VARIETIES.

THE designs of Mr. A. M. Butler, architect, 16 Finsbury Circus, have been adopted for the new higher-grade schools to be erected at Wood Green for the Tottenham School Board.

PRINCESS HENRY OF BATTENBERG will to-morrow (Saturday) lay the foundation-stone of a new block at the Ventnor Consumption Hospital. The new building is being erected as a memorial to the late Prince Henry of Battenberg.

It is proposed to build an English church in Lucerne as a memorial of the sixtieth year of the reign of the Queen. The cost of the site and the building will be 7,000*l*.

A NEW bridge in King's Road, St. Pancras, over the Midland Railway, was opened on the 22nd inst. The foundation stone was laid a few months ago by Mr. Wetenhall, J.P., L.C.C., the chairman of the vestry.

THE residence of Mr. E. de Lisle, ex-M.P. for the Loughborough division, was struck by lightning during a thunderstorm which recently broke over Charnwood Forest. The north wing of the mansion was wrecked.

AN explosion occurred at the Electrical Storage Accumulator Works at Woking. The highly inflammable character of the building rendered it absolutely impossible to save any portion, though the fire was kept from spreading. A large quantity of celluloid was destroyed, together with the machinery. A number of workpeople will be thrown out of employment. The

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ANY FURTHER PARTICULARS AND PRICES ON APPLICATION

origin of the fire is unknown. The damage is estimated at 10,000/.

THE British Archæological Association meets at Conway for the week from August 19 to 25. Visits will be paid to St. Asaph, Carnarvon, Bangor, Beaumaris, Gwydir, Llandudno and Gloddaeth, the residence of Lady Augusta Mostyn. The Lord Mostyn will be the president of the meeting. Lacy Paget, Mr. de Gray Birch, Mr. C. H. Compton, Mr. Lynam and Mr. Meredith Hughes will contribute papers.

At the Mart, Tokenhouse Yard, E.C., Messrs. Fox & Bousfield, by order of the Ecclesiastical Commissioners for England, submitted on the 22nd inst. for public auction the freehold estate, with possession, forming the site of the late Church of St. Michael, Wood Street, Cheapside, containing an area of 3,700 superficial feet. The bidding was of a brisk character. It started at 18,000/., and proceeded by bids of 100/., and 500/., until the sum of 31,600/., at which price the property was knocked down.

THE Blackpool Tower was on the night of the 22nd instant the scene of a conflagration which spread dismay among the holiday visitors to the "Brighton of Lancashire." Messrs. Maxwell & Tuke, architects, of Manchester, who have since examined the tower and buildings, state, however, that no damage has been done to the main structure or entertainment portion of the buildings, the fire being confined simply to the three landings above the 380 feet platform, where certain wood-work has been destroyed, and where the heat fused the cables, causing the two balance weights which assist the hydraulic engines to raise the lifts to fall down their track inside one of the legs of the Tower.

THE new parish church at Nairn was opened on the 23rd inst. The site is at the corner of Seabank Road, at the west end of Nairn, and the edifice has been erected at a cost of 9,000/., by voluntary subscriptions. The style of architecture is of the Early English transition period, and is from plans by Mr. Starforth, Edinburgh. Its main external feature is a massive square tower about 100 feet high, in which is the main entrance. On either side of the main tower are two smaller towers, which give access to the galleries. Two large gables on either side give massiveness and beauty to the structure. The stone used is the old red sandstone of the district, and where the masonry is plain it consists of bold hammer-dressed rubble, which looks well. The interior of the church is transeptal in design, but has the unique feature of being really

circular in form. Two handsome memorial windows have been presented to the church.

THE Battenburg Memorial Chapel in St. Mildred's, the parish church of Whippingham, Isle of Wight, is nearly completed. The base of the new sarcophagus is composed of dove marble, and the panels above, of pure white statuary marble, bear the arms and the orders of the prince and princess. The top is adorned with appropriate scriptural texts and the Latin words "In te Domine spero." The altar-table, constructed of dove and statuary marble, is approached by polished steps. Above the table is to be erected the figure of an angel with outstretched wings, which will stand about 8 feet high and occupy the major portion of the east end. Princess Louise, Marchioness of Lorne, is now engaged upon this work.

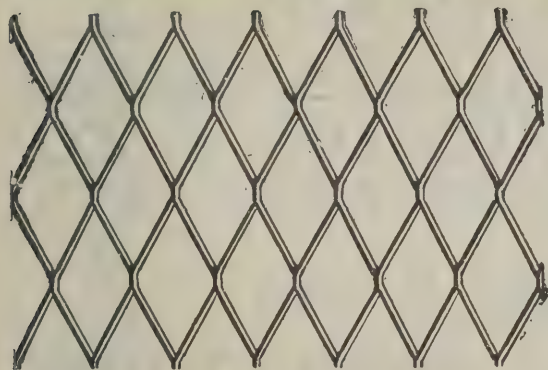
IN excavating the foundation of new buildings in Northgate Street, Chester, the workmen have unearthed further relics belonging undoubtedly to the period of the Roman occupation. The most important is the base of a column similar to that previously found, but in a line with it from east to west. This seems to prove that the original building must have faced either north or south and not have run in a line with the existing street. A fragment of a Roman altar was unearthed, bearing the letters G E N I O . . . on the first line; on the second V V . . . ; and on the third T V E T. So far as can be judged it is a portion of an altar dedicated by a veteran of the 20th Legion, Valeria Victrix. An interesting relic has also been found in the form of a piece of carving with a human face, surmounted by a Roman headdress cut on it. From the shape and bedding of the stone it is believed that it had been one of the corbels of the building. About seventy copper coins have also been found belonging to the early part of the present century.

BUILDERS' BENEVOLENT INSTITUTION.

THE fiftieth annual meeting of the Builders' Benevolent Institution was held on Thursday, July 22, at the offices, 35 Southampton Row, Bloomsbury. Mr. W. Scrivener (vice-president) occupied the chair, supported by Messrs. Thomas Stirling, Thomas Hall, E. S. Rider, C. Ansell, F. Foxley, E. V. New and others.

Major Brutton (the secretary) read the annual report, which stated that the income during the past year had been sufficient

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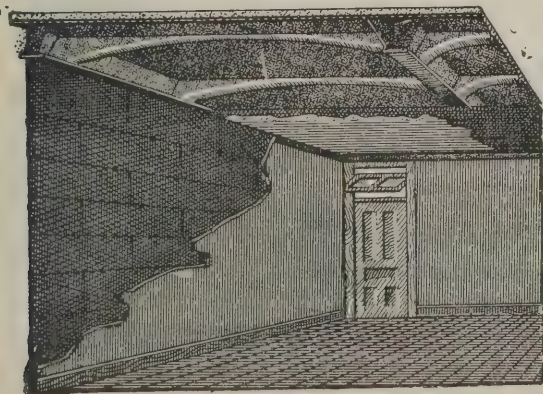
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for the maintenance of the pensioners, and, believing it would meet with the approval of the subscribers, the committee admitted the whole of the thirteen eligible candidates to participate in the benefits of the Institution. Although the large increase in the number of pensioners entailed much responsibility, the committee were of opinion that the necessary income would be forthcoming to meet the increased expenditure, particularly as the advanced age of the applicants required immediate relief. Much of the success of the year had been owing to the energy of the president, Mr. Henry Holloway, to whom the committee offered their hearty acknowledgments and gratitude. The subscribers were asked to kindly bear in mind that the present was the fiftieth year since the foundation of the charity—indeed, its jubilee—so that a largely increased contribution might be hoped for on so special an event. The committee desired to offer their thanks to the stewards of the annual dinner and to the honorary auditors. Much regret was felt at the loss by death of Sir William Lawrence and Sir James Clarke Lawrence, Bart., both past presidents of the Institution, the latter being also a trustee. The committee announced that Mr. Charles Wall would be the president for the ensuing year, and that the annual dinner would take place in Carpenters' Hall on Thursday, November 25.

On the motion of Mr. New, seconded by Mr. Foxley, the report and balance-sheet were unanimously agreed to.

Mr. T. Stirling next moved:—"That the committee be empowered to give temporary relief in cases of urgency to selected but unsuccessful candidates for the charity, to an amount not exceeding 5% to any one candidate." At the close of the elections there had often been a good deal of disappointment among the unsuccessful candidates, and it had been considered that this would be a generous course to pursue.

Mr. New seconded the resolution, which was agreed to *mem. con.*

On the motion of Mr. Hall, seconded by Mr. Stirling, a cordial vote of thanks was passed to Mr. Henry Holloway for his kind support and services during his year of office.

Thanks were also given to the trustees, to the treasurer, Mr. George Plucknett, J.P., and to the committee, the retiring members being reappointed, with the addition of Mr. Henry Holloway. Thanks were also passed to the auditors.

Mr. Stirling proposed Mr. Charles Wall as president for the ensuing year, which was seconded by Mr. Hall, and carried by acclamation.

A vote of thanks to the chairman closed the proceedings.

THE KILLIN SEWAGE WORKS, PERTHSHIRE.

THIS popular resort is now drained by a new system of sewers, provided with manholes, flushing tanks and all the most recent sanitary improvements. The sewage is treated by the "International" process in works situated to the south of the railway in a park owned by Lord Breadalbane. The effluent passes by an open concrete channel into Loch Tay. There is no pumping; the sewers are designed to deliver the sewage to the purification works entirely by gravitation. Great satisfaction is felt at the completion and success of this installation. The works are of a model character and beautifully situated in this charming locality on the shores of Loch Tay, which is now in the important matter of drainage placed in the first rank in Scotland.

The completion is to be commemorated by a ceremonial today, when the works will be formally declared open by the Convener of the County Council of Perth, Colonel Hope Drummond, accompanied by the members of the western district committee of Perthshire County Council.

The works have been designed and carried out by Mr. Woulfe Brenan, C.E., of Ovan; the contractor was Mr. Bremner, of Fortingall, Aberfeldy; and Mr. R. Cameron, of Edinburgh, was clerk of works.

CITY AND GUILDS INSTITUTE.

AT a meeting of the council of the City and Guilds of London Institute, held on July 26, the diploma of "Associate of the City and Guilds of London Institute" was conferred on the following matriculated students who have this year successfully completed a full course of instruction at the City and Guilds Central Technical College:—*Civil and Mechanical Engineering*—H. W. Hanbury (Siemen's medal), J. E. Cornish, W. P. Unwin, H. D. Drury, J. B. Willis, M. Jacomb-Hood, J. C. Malin, A. W. Lewis, R. S. Solomon, H. J. Williams, T. Rich, C. E. Shackle. *Applied Physics and Electrical Engineering*—E. W. Marchant, B. Sc. (Siemen's medal and premium), W. L. Waters, F. S. Spiers, B.Sc., F. Twyman, E. G. Brown, S. S. Grant, C. Lean, H. M. Kirkby, R. M. Sayers, W. E. Barker, W. M. Nelson, S. L. Smith, H. R. Mott, T. A. Kerr. *Applied Chemistry*—F. Silvester, G. Lessels, A. N. Crosskey, F. J. Jessop, H. J. Winch, E. R. Nind, E. W. Devas.

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THE JUBILEE OF THE INSTITUTION OF MECHANICAL ENGINEERS.

ON Tuesday the members of the Institution of Mechanical Engineers met in the Technical Institute, Birmingham, when Mr. E. Windor Richards delivered the following address:—

He said the Institution, which in 1847 commenced in this city its life of usefulness, that day revisited its birthplace to celebrate the fiftieth year of its existence. He expressed his high appreciation and grateful acknowledgment of the immense influence for good which had been exercised by Her Majesty throughout the sixty years of her glorious and beneficent reign, and during which their Institution had so greatly prospered, and said that an address had been presented by the Council to the Queen-Empress. He recalled to members the original ideas of those who initiated the Institution, which were the following:—To promote the science and practice of mechanical engineering and all branches of mechanical construction, and to give an impulse to inventions likely to be useful to the members of the Institution and to the world at large; and also to enable mechanical engineers to meet and to correspond, and to facilitate the interchange of ideas respecting improvements in the various branches of mechanical science, and the publication and communication of information upon such subjects. Had they attained the object for which the Institution was formed? To answer this vital question it would be necessary for him to review rapidly for their consideration some of the work done by the Institution during the times of the several presidents, and to give some brief notes on the origin and history of the Institution. On Wednesday, January 27, 1847, a general meeting was held at the Queen's Hotel, Birmingham, for the purpose of forming the Institution. Mr. McConnell, of Wolverton, occupying the chair, read a list of gentlemen who had sent answers to a circular inviting their co-operation and their consent to become members of the Institution. On his proposal, seconded by Mr. Buckle, it was resolved "That the Institution be established and composed of the gentlemen whose names he had announced." Mr. George Stephenson was elected the first president. He sketched the proceedings at these early meetings of the Institution in Birmingham, and went on to speak of the various presidents from the time of the inauguration of the Institution, of the inventions they had made, and of their effect upon the

various industries to which they were applied. During 1848 and 1849 the meetings were held in the Philosophical Institution, Cannon Street, Birmingham, and it was there that the president occupied the chair for the last time on Wednesday, July 26, 1848, when his paper on the fallacies of the rotary engine was read and discussed. His death took place only seventeen days later. In 1850 a house was taken in, Newhall Street, where for fourteen years afterwards the meetings were mostly held. The proposal of holding the summer meeting of the Institution in the leading centres of engineering throughout the kingdom originated in 1856 with Mr. James Fenton, who was consulting engineer to the Lowmoor Iron Company from 1851 to 1863; and through his energetic exertions the proposal was realised in September of the same year, by a meeting held for the first time in Glasgow, under the presidency of Mr. Joseph Whitworth. As one result of this new step the number of members in the Institution, which for the seven preceding years had remained at almost a dead level of just over two hundred, now began at once to increase at a rate of growth which had since continued to progress steadily up to the present date, when they had 2,360 members. During the presidency of Sir Joseph Whitworth in 1856-57 Henry Bessemer's discovery was announced, by which it was claimed that by blowing cold air into and through molten metal malleable iron and steel could be produced without fuel. This statement startled the whole engineering and metallurgical world, and was received by manufacturers of wrought iron with mingled feelings of panic and unbelief. The production of Bessemer steel had now attained to a yearly quantity of nearly 2,000,000 tons of ingots in Great Britain, and of 5,000,000 tons in America. Sir Henry Bessemer was now in his eighty-fourth year; and he might be justly proud that by his invention, conceived and matured during the reign of her Majesty, the world was producing about 10,500,000 tons of Bessemer steel annually. Sir William Siemens, president 1872-73, and whose name was associated with that of his brother Frederick as inventors of the regenerative system for melting iron and steel, read a paper in Birmingham in July 1862, on the gas furnace. No one could possibly have foreseen the really marvellous developments brought about by this invention, by which the process of steel-making known as the Siemens or ore process, and that of Siemens-Martin or pig and scrap process, were made possible. At the time of his presidency of this Institution twenty-five years ago the production of Siemens-Martin steel was 40,000 tons for the

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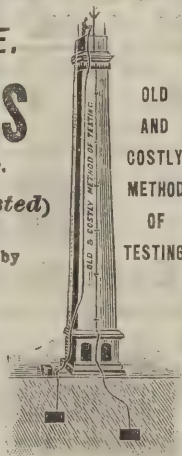
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whole of 1872, and the price of ship-plates about 17 $\frac{1}{2}$ per ton; whilst last year the production in Great Britain had reached nearly 2,354,000 tons, the price of ship-plates being brought down to 5 $\frac{1}{2}$ s. to 5 $\frac{1}{2}$ 10s. per ton. The total production of open-hearth steel in all countries in 1896 was nearly 7,000,000 tons. In 1879 the quantity of ship-plates made by this process was 20,000 tons, as compared with 9,000 tons made by the Bessemer process, and it was at that time predicted that open-hearth steel would take possession of the field for ship and boiler plates, while the Bessemer process would supply the great bulk of the material required for railway purposes. It would appear as if this prophecy would soon be realised, for they found that in 1896 the production of plates and angles by the Siemens process was about 1,000,000 tons and by the Bessemer about 60,000 tons, while by Bessemer about 1,000,000 tons of rails were made and by the Siemens 40,000 tons. Sir Frederick Bramwell, who was president in 1874-75, in his address at the Cardiff meeting strongly directed attention to what he correctly termed the cruelly and wickedly wasteful manner they were rapidly using up the principal source of the wealth and power of the country, namely, coal. At that time 120,000,000 of tons were being raised in the United Kingdom, and to-day nearly 200,000,000. These grave words of warning did not receive the attention they deserved, and he could repeat them to-day with even greater emphasis; but he (the president) feared no words of warning, however clearly and solemnly they might ring out by even this great and observant authority, would avail with those who worked collieries "with no other object than that of obtaining the utmost profit out of them." At the summer meeting held in Bristol in 1877, the president (Mr. Thomas Hawksley) in his address took a gloomy view of the relations existing between employers and employed, asserting that our labour was too dear for successful competition with foreign countries—too dear in respect of the quantity of work performed, and too dear in respect of the obstructions and restrictions which the modern workman thought fit to place upon his employment and employer. After a lapse of twenty years these words seemed even more applicable to the present state of those relations than they were at the time they were written. To complete the list of the half-century of presidents, it was necessary that he should add the name of Edward Windsor Richards, 1896-97. All that need be said of him was that he greatly desired to be of service and further the interests of the Institution. He had the earnest hope and belief that when the centenary was

celebrated the then president would be able to congratulate the members on the progress made in the second half of the century, and that it would be as great as or greater than that of the first half, and that the home built at this time for the purpose of drawing the members into closer companionship might have greatly contributed to that increased success. The Institution house was now making rapid progress, and the architect held out the hope that the lecture theatre would be available for the next spring meeting. The review of the work of the Institution was sufficient to prove that they had carried out the objects for which the Institution was formed, and they could justly claim that they had contributed largely to the general happiness and material prosperity, not only of the people of Great Britain, but of the whole civilised world. Although they had reached their jubilee year, they were still in their youth, full of vigour and full of determination to keep abreast with all progress affecting their profession.

THE POST OFFICE SITES BILL.

THIS Bill, as amended by the select committee, has just been issued. As originally introduced by Mr. Hanbury and Mr. Akers-Douglas the Bill proposed that certain disused burial-grounds attached to the parishes of Christ Church, Newgate Street, St. Botolph Without, Aldersgate, and St. Leonard, Foster Lane, generally known as the Postmen's Park, should be maintained as a public garden, and that for that purpose the Postmaster-General should pay to the London Parochial Trustees the sum of 100 $\frac{1}{2}$ per annum and the said trustees should pay to the vicar and churchwardens the sum of 200 $\frac{1}{2}$ per annum so long as the public garden was maintained in good order. The London Parochial Trustees have power to build upon or lease for building purposes a plot of land lying between the garden and Little Britain, and as the garden was largely used by the *employés* of the Post Office and would be seriously injured if the Little Britain land should be built upon, the vicar and churchwardens, in consideration of the same being maintained as an open space and part of the said public garden, agreed to assign to the Postmaster-General the 200 $\frac{1}{2}$ per annum payable to them by the London Parochial Trustees. This portion of the Bill was struck out by the select committee, and the Bill now simply provides for the acquisition of lands by the Post Office in London, Brighton, Norwich, Plymouth, Southampton,

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THE MARCHIONESS OF LORNE AS AN ARCHITECT.

THE Princess Louise, Marchioness of Lorne, is familiar to the public as an amateur painter, and as one who can handle the sculptor's chisel. Her Royal Highness, says the *St. James's Gazette*, has now turned her attention to the more practical art of architecture, and workmen are at present engaged in completing a building designed by the Marchioness (with the assistance of a young London architect) and erected on the Argyll ducal estate in Scotland. The plans designed by her Royal Highness were for the extension of the little hostelry at Roseneath, a sylvan shaded resort most charmingly situated on the western bank of one of the long blue lochs that open off the Firth of Clyde. Roseneath is one of the quietest retreats on the Clyde. Few trippers profane its walks, and house-letting accommodation is limited in the extreme. On this account the Marchioness and the Marquess of Lorne have for some years past found in Roseneath a delightfully quiet recruiting-ground at the close of the London season, and the little inn has been their home. The enlargement designed by the Marchioness is being carried out to provide a wing for the distinguished couple when they visit the district. The wing will include some half a dozen bedrooms, public rooms, a spacious hall and offices, and the plans have been drawn up with an architectural success so great that the work may in coming years be looked back upon as the pioneer design in the opening up of a new field for the ever-widening work of womankind. The drawing-room is a handsome apartment, and its large windows face the picturesque waters of the Gareloch and Ben Lomond, while a spy window has been inserted, no doubt for the purpose of commanding a pretty peep of the western sunsets and the Argyll hills. There is also an alcoved fireplace with arched stone mantelpiece. In the dining-room the windows have Mediaeval arches and iron mullions, with casements and small panes. A gun-room is also provided, and, as becometh a lady architect, the kitchen is a culinary poem in red-tiles. Internally

perfect in design, externally the building is straggling and far from pretty. It has many quaint features, however, in the form of knobbed rhones, spouts instead of rain-conductors, and basket windows. The design is royal and also unique, and the inn when finished will be by no means a conventional one. So close is the interest taken in the work connected with the rearranged hostelry by Her Royal Highness that she intends herself to paint the device on the sign that is to hang in old-time fashion over the doorway of the public entrance to the building, and the walls of the new apartments are to be artistically decorated according to the Marchioness's own scheme of treatment.

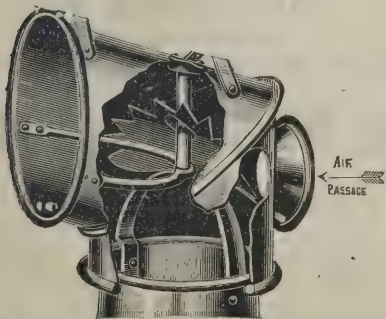
ROCK-CUT TOMBS, TEMPLES AND HABITATIONS.*

DURING the early period of Egyptian civilisation, its monarchs erected for themselves immense tombs, partially excavated in the rock, covering large areas and terminating in a point—in short, the everlasting pyramids. During the next or Theban period their attention was directed to the construction of immense temples, the walls and passages of which were covered with exquisite sculpture illustrating the exploits of the kings, their names, genealogical records, as well as many of the incidents of their everyday life, by which the students of this interesting subject have been enabled to present us with a definite idea of the laws and customs of this wonderful people. A little distance from the city of ancient Thebes, and hidden from the city by a range of the Libyan hills, is a valley now designated as the "Valley of the tombs of the kings." This valley is a bare, rugged ravine scooped in the rock by an extinct torrent, the baked cliffs reflecting the noonday sun till the gorge resembles a heated oven. The tombs in this one valley number twenty-five (there are, hundreds in other parts of the mountain), and from Amenoph III. to the end of the twentieth dynasty, not a single royal tomb but that of Horus is missing. Both in Egypt and in Nubia the Egyptians were in the habit of excavating monuments from the living rock, but with this curious distinction, that, with scarcely an exception, all the excavations in Egypt proper are tombs, and no important example of a rock-cut temple has yet been discovered. In Nubia, on the other hand, all the excavations are temples, and no tombs of importance are to be found any-

* A paper by Mr. Cyrus K. Porter, published in *Stone*.

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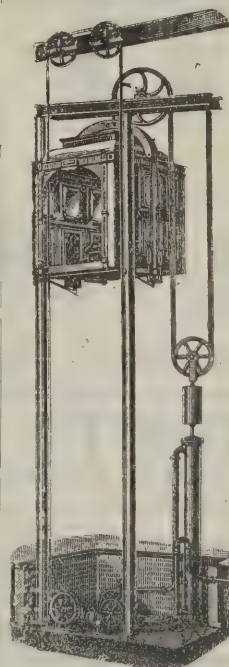
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where. This distinction may hereafter lead to important historical deductions, inasmuch as on the western side of India there are an infinite number of rock-cut temples, but no tombs of any sort.

Every circumstance seems to point out the fact that if there were any connection between Africa and India it was with the provinces in the upper part of the valley of the Nile and not with Egypt proper. This, however, is a subject that can hardly be considered here, though it may be useful to bear in mind the analogy here alluded to.

A recent traveller thus describes the "Valley of the tombs of the kings," to which I have referred:—"The valley is a singularly impressive site for a burial ground. Steep cliffs shut it in on every side; not a blade of grass nor a living thing can be seen; nothing but burning rock on the right hand or on the left. Here and there a steep slope leads down to a gloomy cavern's mouth. We enter a long tunnel-like passage, lofty and wide, but growing more intensely dark at every step. Candles show us that the walls are covered with pictures, and as we enter the larger chamber, or chambers, to which the passage leads, the eye becomes accustomed to the partial light, and the design of the artist becomes clear. It is the progress of the soul through the under world that we are witnessing in these pictures which line the dimly-lighted walls."

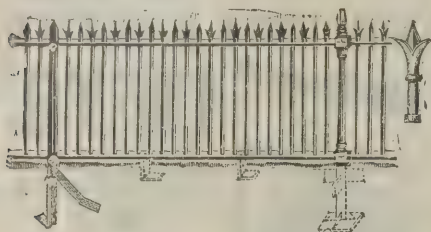
The following description from Mariette's "Monuments of Upper Egypt" may throw some light on the symbolic significance of the pictures above alluded to. This noted Egyptologist says:—

"Immediately on entering the tomb the visitor finds himself transported to a new world. The almost joyous pictures of Sakkarah and Beni Hassan have altogether disappeared. The defunct is no more to be seen at home in the midst of his family. No more making of furniture, no more building of ships, no more extensive farmyards with cattle, oxen, antelopes, wild goats, geese, ducks, demoiselle cranes marching in procession before the stewards. All has become, so to speak, fantastical and chimerical. Even the gods themselves assume strange forms. Long serpents glide hither and thither around the rooms or stand erect in the doorways. Some convicted malefactors are being decapitated and others are precipitated into the flames. Well might a visitor feel a kind of horror creeping over him if he did not realise that after all underneath all these strange representations lies the most consoling of all dogmas, that which vouchsafes eternal happiness after the many trials of this life. It has been said before that according

to their kings the honour of burial, the Egyptians passed judgment upon them. This legend must, of course, be understood in an allegorical sense. The judgment of the soul after being separated from the body and the many trials which it will be called upon to overcome by the aid of such virtues as it has evinced while on earth, constitute the subject matter of the almost endless representations which cover the walls of the tomb from the entrance to the extreme end of the last chamber. The serpents standing erect over each portal darting out venom are the guardians of the gates of heaven; the soul cannot pass unless justified by works of piety and benevolence. The long texts displayed over other parts of the walls are magnificent hymns to which the soul gives utterance in honour of the divinity whose glory and greatness he celebrates. When once the dead has been adjudged worthy of life eternal these ordeals are at an end; he becomes a part of the divine essence and henceforth a pure spirit; he wanders over the vast region where the stars for ever shine. The soul has no sooner left the body than we are called upon from room to room to witness its progress as it appears before the gods and becomes gradually purified, until at last in the grand hall at the end of the tomb we are present at its final admission to that life which a second death can never reach."

Of the first ten dynasties of Egyptian kings little now remains but their tombs, the monumental pyramids, and of the people they governed, only the structures and rock-cut excavations which they prepared for their final resting places.

Theban kings and their subjects erected no pyramids, and none of their tombs are structural, all are excavated from the living rock, and from Beni Hassan to the cataract, the plain of the Nile is everywhere fringed with these singular monuments, which, if taken in the aggregate, perhaps required a greater amount of labour to excavate and adorn than did even all the edifices of the plain. Certain it is that there is far more to be learned of the arts, of the habits and of the history of Egypt from these tombs than from all the other monuments. It appears to have been a custom with these kings, so soon as they ascended the throne, to begin preparing their final resting place. The excavation seems to have gone on uninterruptedly year after year, the painting and adornment being finished as the work progressed, till the hand of death arrested the king's reign and simultaneously the works of his tomb. All was then left unfinished, the cartoon of the painter and the rough work of the mason and plasterer were broken off, as if the hour of the king's demise called them too irrevocably from their labour.



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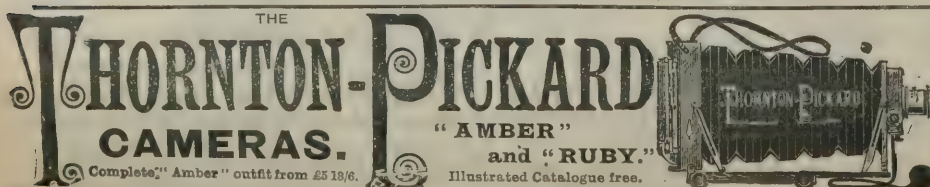
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The tomb thus becomes an index of the length of the king's reign as well as his magnificence. Of those in the valley of the kings the most splendid (says Fergusson) is the one opened by Belzoni, and now known as that of Menephthah, the builder of the hypostyle hall at Karnac. It descends in a sloping direction for about 350 feet into the mountain, the upper half of it being tolerably regular in plan and direction, but after progressing as far as the unfinished hall with two columns the direction changes, and the works begin again on a lower level, probably because they came in contact with some other tomb, or in consequence of some flaw in the rock. It now terminates in a large and splendid chamber with a covered roof, in which stood, when opened by Belzoni, the rifled sarcophagus; but a drift-way had been excavated beyond this as if it had been intended to carry the tomb still further had the king continued to reign.

The tomb of Rameses, the first king of the nineteenth dynasty, is more regular and in some respects as magnificent as the one just described. That of Amenoph is also an excavation of great beauty, and is adorned with paintings of the very best age of Egyptian art. All the tombs depend for their magnificence more on the paintings that cover the walls than on anything that can strictly be called architectural. Generally speaking, it is assumed that the entrances of these tombs were meant to be concealed and hidden from the knowledge of the people after the king's death.

It is hardly conceivable, however, that so much pains should have been taken and so much money expended on what was designed never again to testify to the magnificence of its founder.

The Egyptians were not likely to attempt a thing so nearly impossible, for though the entrance of a pyramid might be so built up as to be difficult of discovery, a cutting in the rock could never be repaired or disguised, and could only be temporarily concealed by heaping rubbish over it. Such an expedient, if resorted to, has proved futile, for all the royal tombs in the valley have been opened and rifled in a past age, and their sites and numbers were matter of public notoriety in the time of the Greeks and Romans. Many of the private tombs have architectural façades, and certainly were never meant to be concealed, so it is not fair to assume that hiding their tombs' entrances was even a peculiarity among the Thebans, though it certainly was of the early Memphite kings.

If we were to enter upon a minute description of the many beautiful and interesting objects which the research of students and archaeologists have brought to light, in reference to the rock-cut tombs of the Pharaohs, we would exhaust your patience and greatly exceed the limit allowed us. We will therefore turn our attention to the consideration of similar works which have been found in other countries. Leaving the "Valley of the tombs of the kings of Egypt" to bask in the lurid glare of an almost tropical sun, we will turn our attention to the country of another ancient people whose early history is intimately interwoven with that of ancient Egypt. I refer to the land of Judea, commonly called the "Holy Land."

It is quite likely that the children of Israel after a residence in Egypt of several generations acquired many of the habits and customs of the Egyptians; particularly may this have been the case so far as their architecture was concerned. There is no evidence that the Israelites of themselves were skilled in architecture or building; in fact the first important building erected by them, Solomon's temple, was executed by skilled workmen sent by Hiram, king of Tyre, to the assistance of his personal friend, Solomon, king of Israel.

Among the remains of ancient architecture which have been discovered recently in the neighbourhood of Jerusalem are a number of sepulchral chambers hewn out of solid rock. They are called the tombs of the kings of Judah. They vary in size from 10 to 20 feet square, and contain sarcophagi. They are entered exactly like the tombs of Beni Hassan, by a portico *in antis* about 40 feet wide. There are two columns and two pilasters in front of Greek Doric character, about 13 feet high. The most curious feature is that a broad band about 3 feet wide, richly sculptured, with foliages, runs down each side 4 or 5 feet and over the columns horizontally. Above this band, quite independent of the lower construction, is a regular Doric architrave and frieze of a character between Grecian and Roman. This is ornamented with triglyphs, rosettes and foliage. In front of the portico is a courtyard about 100 feet square.

In the valley of Jehosaphat, near Jerusalem, are three extremely curious relics; two stand alone on platforms excavated from the rock, and the third is scarfed into the rock itself. The first is called the tomb of Absalom. It is a square building with a solid wall, in which are engaged Ionic columns about 13 feet high. Over this is a Doric entablature with triglyphs and an altar surmounted by a very curious sort of hollow-sided cupola of trumpet-mouthed section and a terminal. The whole, including the flight of steps, is about 60 feet high. Another similar building of about the same size is commonly called the tomb of the prophet Zechariah. This is surmounted by a simple pyramidal roof. Beneath it is

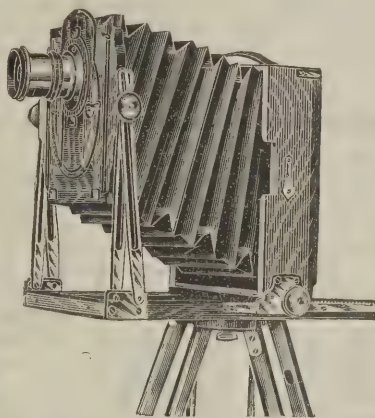
a handsome doorway leading to a sepulchral chamber. Over the ordinary classic entablature is the regular Egyptian cornice, or torus, surmounted by a bold quarter hollow and fillet exactly like those on the propylons of Egypt. The third building is entirely rock-cut and consists of a large façade about 90 feet wide and 100 feet high. This is reported to be the place to which the Apostles retired before the siege of Jerusalem. Below is a plain face about 45 feet high, on each side of which are wings with two pilasters both running up to the top of the building. Between these is a portico about 40 feet wide with columns and pilasters of nearly pure Grecian Doric.

These buildings could not lay claim to any great antiquity; from their architecture they are probably of the time of Herod, while the Egyptian cornices show that the traditional ornaments of that people had not been entirely forgotten.

(To be continued.)

SANDERSON'S UNIVERSAL SWING-FRONT CAMERA.

It is not a little surprising that the photographic camera, after an existence of very nearly sixty years, still leaves considerable scope for improvement as an instrument of precision. Of those who practise photography, few have so much reason for realising its deficiencies as those whose concern lies in the production of views of architectural subjects. For this class of work it is easy to understand what the theoretically perfect camera should be able to do. Starting from the necessary fact that the focal plane must be maintained in strict parallelism with the anterior end of the camera, it is essential that such control be had over that part of the instrument which carries the objective that it should be within the power of the operator to direct the axis of the lens to any part of the focal plane or sensitive surface at will.



Very little reflection will apprise our readers that the ordinary camera of the usual construction only complies with this demand or theory in a perfunctory fashion. In the first place, nearly every camera is so constructed that the maximum amount of elevation or depression which it is possible to give to the lens front falls far short of what is frequently required in cases where, for example, it is imperative at close quarters to cut off the foreground and include as much of the top part of the subject as may be desired. In extremities of this kind it is frequently compulsory to tilt the camera upwards, which necessitates that the back of the camera, that carries the focal plane, should be swung so that the distortion of the image which would otherwise be produced is corrected. It will be manifest that this system not only debars the photographer from including the maximum amount of subject on the plate, but, in virtue of the fact that he is restricted in the extent to which the lens may be moved up or down, it is frequently found that the full covering power of the objective cannot be availed of.

Sanderson's Universal swing-front camera completely remedies these deficiencies of the ordinary type of camera. The principle involved in its construction throws the whole of the work to be done upon that part of the camera which is obviously the point from which the movements of the lens should be made, viz. the front. The back of the camera is not required to swing, and thus it is always fixed at right angles to the baseboard. It necessarily follows from this that, the screen or focal plane being always vertical, an efficient method of raising, lowering and tilting the lens is all that is required to make the camera both theoretically and practically perfect.

This end is attained in a manner at once simple and ingenious. The front of the Sanderson camera is fitted with a movable panel carrying the lens, which is immediately screwed on to a revolving disc. The motion of the front is controlled by milled head screws running in pivoted slotted arms affixed to the baseboard, and thus the lens may be lifted or depressed to the utmost extent, while clearly it may also be extended in a forward direction, so as to admit of lesser or varying focal

lengths being employed. Moreover, the same movement of the milled head screws in the slotted brass struts allows of the lens being swung to any extent, so that, whatever its position in relation to the focal plane, may be the full covering power of the objective is utilised. The operator can effect all these adjustments with his head under the focussing cloth, the disengaged hands operating the front of the camera.

To architectural photographers especially the Sanderson camera should be welcome, as it solves a difficulty that has always existed in practical photography. It is surprising that it should have been left so late ere an attempt was made to improve the photographic camera in the direction in which it has long urgently called for improvement.

We may mention that the Sanderson camera was recently subjected to a very severe practical test in the presence of some of the foremost photographic experts of the day. A difficult architectural subject at close quarters was chosen at Cambridge for the purposes of the test, and with the best types of ordinary cameras in skilful hands pitted against it, the Sanderson camera demonstrated that its universality of swing front movement was not only needed for the inclusion of the maximum amount of the subject in the plate, but the image was absolutely undistorted, and the full covering power of the lens was utilised. In these crucial respects: the other cameras failed to do the work with anything like the completeness of the Sanderson—excessive amounts of foreground, distortion of the perpendiculars and inability to utilise the full covering power of the lenses used characterising the results. It amounts to this, that for practical purposes the Sanderson camera possesses every possible movement, and thus where it is most needed, viz. in architectural work, a branch of photography which by its nature presents the greatest difficulties to the photographer, it easily demonstrates its superiority over other and older forms of cameras.

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"EXTRAORDINARY TRAFFIC" ON ROADS.

THE case of the Kent County Council against Lord Gerard will no doubt rank as one of the most tantalising lawsuits of recent times. If British law oscillated so strangely as a general rule, the British law-makers might be painfully surprised one morning to find themselves being hurried out of their homes and strung up one by one as reparation to an outraged public. Happily, cases like the present are exceedingly rare. Lord Gerard has a mansion at Eastwell Park. He began to rebuild it. For this purpose large quantities of building and other materials were hauled over the public roads by traction engines. The roads were cut up all the length of the way. Hundreds of pounds of damage must have been done. The County Council sued Lord Gerard for compensation. Lord Gerard held that the contractors were liable. The magistrates gave a decision against Lord Gerard, the Quarter Sessions reversed the decision of the magistrates, then the Queen's Bench reversed the Quarter Sessions, then the Court of Appeal reversed the Queen's Bench, then the House of Lords, after much painful excogitation, decided to uphold the Court of Appeal.

STEEP GRADE RAILWAY AT BRIGHTON DYKE.

A RAILWAY or tramway running up and down the precipitous face of the Devil's Dyke near Brighton was opened on Saturday. There are already established at the highest point of the dyke an aerial railway running from hill-top to hill-top, and a number of other contrivances, in which the excursionist appears to take delight, for securing locomotion under novel conditions. The steep-grade railway, however, claims some amount of utility in affording rapid communication between the Brighton Railway Company's branch terminus at the head of the dyke, and the villages lying in the plain at the foot of the dyke hills. It is of the same type as the cliff railways at Scarborough and elsewhere, although the engineer, Mr. C. O. Blaber, has introduced some new features in the details of construction. The whole length of the line is 840 feet, the "lift" being 395 feet. From the top there is a run of 240 feet at a gradient of 1 in 1.8, the second and steepest part being 1 in 1.5 and the last and lowest gradient 1 in 2.9. The vertical curves between the different gradients have about 1,000 feet radius. There being a scarcity of water as well as of solid fuel at the head of the Dyke, the hauling power is obtained from a Hornsby-Ackroyd oil-engine. The haulage ropes are two 2-inch steel wire cables, and the cars, each seating 14 persons, are fitted with powerful brakes by which a car running down hill would be promptly stopped before any great momentum had been obtained. The brakes are also designed to prevent the cars from leaving the track. There is a powerful brake on the shaft of the main hauling pulley, worked by a foot lever, as well as from the platform. Spring buffers are provided at the lower end of the line, but there is an obvious need

of buffers also at the top. The opening ceremony was performed by Sir H. Howorth, M.P., who turned the lever which set the cars going. There were also present during the day General and Mrs. Penny, the Hon. F. Byng, Mr. F. A. Darlington, secretary of the company, and a large number of visitors.

EXTRAS ON CONTRACTS.

THERE is nothing which seems to give more annoyance to the average engineer or the architect, says the *Engineering Record*, than the inevitable "extras" on contracts. We cannot but feel, however, that this is to a large extent unnecessary, for if the matter is properly considered the much-abhorred "extra" will be found to lose most of its terrors. We have heard a prominent mechanical engineer boast of having put in a large and conspicuous steam plant on which the total bills of extras "did not exceed 1½ per cent." It was added, however, that the specifications on the piping alone covered forty-eight typewritten pages. In this lay the secret of the small percentage, but it is doubtful if it was not accomplished at considerable expense to the plant.

It is of course commendable to have as much as possible of the entire work included in the original specifications and contracts, but in their desire to obtain this result engineers are accustomed to fill their specifications with all sorts of general clauses and indefinite requirements which are intended to cover "all possible contingencies" which may arise, and also to throw the final responsibility for the satisfactory working of the plant upon the contractor. It appears to us that this is a mistaken principle. An engineer who is entrusted with the design and superintendence of work should not hesitate to take some of the responsibility for its success upon himself; and it is much better—more to the interest of economical construction—to make all specifications concise, definite and explicit on every point which they are intended to include than to permit any general or indefinite clauses. In every work there are almost invariably some parts which can be let to much better advantage after the remainder is wholly or nearly completed, even if at such times they have to be let as extras. For instance, in steam-plant construction the piping between the boilers and engines cannot be laid out or satisfactorily contracted for before the machinery itself is decided upon, and the pipe covering cannot be let to advantage before the piping is all arranged. It is, moreover, often, if not generally, the case that a portion of such work can be laid out definitely and a contract let for it at the outset. The remainder, which cannot be definitely arranged until certain contingent details are decided upon, can in reality be dealt with to much better advantage as an extra.

The general clauses which are put into specifications to cover contingencies are the source of misunderstandings and disputes between the engineer and his contractor, and they engender that spirit of antagonism between them which necessarily results harmfully to the work in hand. A contractor in making his estimates must of necessity "figure himself safe" on all parts which are not definitely and distinctly specified, and allow a conservative margin for quantities of material and labour on those which are not properly laid out and shown on the plans. In putting up such work any chance for disagreement tends to result in cheapening its character.

In preparing his plans and specifications and in letting the first contracts the engineer or architect should know from his own study of the work where "extras" will be encountered, and he should make careful statements and estimates of them for the benefit of his clients. Such parts of the work can then wait till near the time of completion and be let as extras, when full information is available based on locations and measurements of the work actually installed. The engineer should in all cases be sufficiently familiar with the current prices of material and labour, and the amount of the latter required, as to know himself the fair price for the extras when he comes to let them. When work is let on plans and specifications which are concise and definite in detail, contractors can invariably give much closer and more accurate figures. The treatment of extras in a fair-minded and equitable spirit invariably tends towards a high standard of workmanship, and results in the greatest economy to the work itself.

THE NEW DOCKS AT BUENOS AYRES.

THE port works of Buenos Ayres, recently opened, have cost the Argentine National Government 7,000,000*l.* in gold. They have been constructed by English contractors and engineers, and are the largest, newest and the best-equipped docks on the American continent.

These works were authorised in 1882 during the presidency of General Roca. Preliminary plans were prepared by Sir John Hawkshaw's firm, and in 1884 a concession for the works

was granted to the late Mr. Madero, whose name is closely identified with the docks. The work chiefly consisted in the conversion of the flat, muddy banks of the River Plate for a distance of three miles in front of the city of Buenos Ayres into a succession of basins, locks and docks, the whole of the works being enclosed in long, massive stone walls, reclaiming a vast area of valuable building land. The docks are approached by means of two newly-dredged channels, one to the south basin, the other to the north basin, these two channels converging in the River Plate some six or seven miles from the city.

Upon the advice of the late Sir John Hawkshaw these important works were entrusted to the late Mr. Thomas A. Walker, who was then just completing the Severn Tunnel. Mr. Walker entered into a contract to construct the works in 1885, and after the preparation of the various detailed plans the works were started in the spring of 1887.

The works were so designed that each basin or dock could be opened, and thus earn money, as finished. The South Basin, covering 35 acres of water space, was opened in January 1889, Dock No. 1 in January 1890, Dock No. 2 in September 1890, the third dock in 1893, the fourth in 1896, and the North Basin last March.

The docks and their equipment as originally designed were intended to cost 4,000,000*l*. There have, however, been very great additions to the original scheme. Numerous warehouses of enormous dimensions, all of which are crowded with goods and produce, have been erected; two graving docks, now the largest in South America, have been built, for preparing warships and ordinary steamships; the hydraulic machinery has been increased and many miles of additional railways laid. The result is that the works have cost upwards of 7,000,000*l*.; but this cost compares very favourably with the cost per acre of the docks at Liverpool, London and Antwerp.

Apart from the important impetus which the improved shipping and warehouse facilities have given to the general trade of the Argentine Republic, the docks, crowded as they already are, show at present a net return of nearly 4 per cent. upon the outlay.

Unfortunately, neither the Argentine concessionaire, Mr. Madero, nor the English contractor, Mr. Walker, lived to see the completion and the financial success of their work. Mr. Walker died in November 1889, being then engaged in constructing not only the Buenos Ayres harbour works, but the Manchester Ship Canal, the Barry docks and railways, the Preston docks, besides other undertakings—a herculean work

for one man. Since that date the various works have been carried out by Mr. Walker's executors, special powers being obtained from Parliament for this purpose; but the Buenos Ayres works have been in charge of Mr. Charles Walker, the late Mr. Walker's nephew, who has resided at Buenos Ayres, to whom, as also to Mr. Dobson, the resident engineer, and Messrs. Hawkshaw & Hayter's partner, the main share of the credit, so far as the construction is concerned, is due.

The whole of the hydraulic machinery for the docks was supplied by Sir W. Armstrong, Mitchell & Co., of Newcastle.

THE UGANDA RAILWAY.

A REPORT on the progress of the Mombasa-Victoria (Uganda) Railway during 1896-97 states that the work began on December 11, 1895, and was somewhat impeded during the early months of 1896 by the disturbed state of the country, and by the consequent inability of the Protectorate to furnish efficient guards. The general arrangement decided on at the start was somewhat as follows:—

1. The preparation of the base.
2. An advance survey division to examine the country and stake out the railway for construction.
3. Mountain survey divisions, which have been sent forward to thoroughly investigate the difficult country at Kibwezi, in Kikuyu, and onwards towards Lake Victoria.
4. A surfacing division to prepare the ground for a surface line.
5. A plate-laying division to lay the rails and get the road in order, fit for the passage of material trains on a surface line.
6. The permanent works divisions to carry out the permanent earthworks and structures necessary for the completed railway.

On landing the staff found no accommodation of any sort available either for themselves, for labourers, or for stores. The first need was to run up huts which would give shelter. The next was to provide some kind of dépôt for the expected stores. The third was to make provision for unloading steamers, the first of which was expected to arrive in May 1896. Three lighters were bought from the Protectorate officials, and a temporary jetty was constructed on the Kilindini Harbour side of the island. The stores left by the Imperial British East Africa Company were inspected and taken over, but these

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proved of very small value for a railway project, being mostly odds and ends such as accumulate at any central store, chiefly because there is no demand for them, and it was not until the first shipload of stores was received that much real progress could be made. Before a mile of the railway could be laid it was necessary to perfect the arrangements at the base. The open level space on the island, and its proximity to the excellent harbour of Kilindini, pointed it out as the best position for the storeyard, repairing shops and terminus of the railway. These great advantages and the broken nature of the ground on the mainland determined the chief engineer to make the island his base, and 372 acres of land were acquired here, mostly from private owners. On this open space has been laid out a station, with room to stack the permanent-way material and bridgework for the 700 miles of line. Temporary offices and quarters for the superior and subordinate staff have been erected, made of timber or galvanised iron, and raised off the ground for sanitary reasons. The first works undertaken, besides the construction of a jetty for landing stores and sheds for sheltering perishable stores when landed, were the connection of the island with the mainland by a timber viaduct. The water supply was a source of the gravest anxiety. It became imperative to procure and erect condensing machinery in case of the failure of reservoirs and springs, and plant capable of producing 12,000 gallons of fresh water per day was erected. Houses, hospitals and erecting shops for rolling-stock, workshops, &c., were the next necessities, and these have been completed or are far advanced.

Up to the thirty-fifth mile the roughness of the ground has precluded the laying of the surface-line contemplated. The permanent formation has had to be prepared in the usual manner, and the progress of the rails has had to wait on earth-works in alternate cuttings and embankments ranging up to 45 feet in depth and height; hence the progress of the work on this section has been slower than would have been the case had it been possible to adhere to the general plan of operations. Two engines and twenty-five waggons were procured from the Indian metre-gauge railways for an early start; four more engines and 100 waggons have recently come from the same source; while eight engines, about 100 waggons, ten third-class carriages and twelve brake-vans have been delivered from England for use in construction. More are under supply. During the months of November and December, 1896, and January and February, 1897, the health of the staff and of the labourers was very bad. The effect of turning up of the soil,

which in tropical countries almost invariably results in great increase of malaria, has in the present case been aggravated by unusual and unseasonably heavy rains, which continued through November and December, 1896, and January, 1897. Ulcers have been very prevalent among the Indian coolies, and over 50 per cent. of them have been down with malarious fever. The whole European staff has from time to time suffered severely from the latter. The total expenditure up to March 31, 1897, was 390,838*l.* Of this amount 211,580*l.* represents the cost of material from England, including freight, and the remainder expenditure in India and Africa.

PATENTS.

This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

- 16416. Hugo Beien, for "Improvement in door-latches."
- 16461. Hubert Edward Seaward Edmond, for "An improved window-frame and sash for cleaning, ventilating and general purposes."
- 16464. James Bazeley Potter, for "Improvements in grates or stoves."
- 16506. Joseph Smith, Henry Smith and Samuel Skerrett, for "An improved drop-down bar and coal-saver for fireplaces."
- 16596. Casel Heinrich Andres Cordes, for "An improved method of attaching sash-lines to window-frames."
- 16674. Mark Gentry and Hartley Grunwell, for "Improvements in machinery for pressing bricks."
- 16675. Thomas Callow and Lewis Peter Ford, for "Improvements in materials for firebricks, gannister and the like."
- 16498. Arthur William Latham, for "A new or improved window-sash fastener."

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The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.

Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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For Advertisement Scale, see page xv.

CONTRACTS OPEN.

BAILDON.—For erection of residence. Messrs. Isitt, Adkin & Hill, Prudential Buildings, Bradford.

BARNET.—For additions to Victoria Cottage Hospital. Mr. C. P. Ayres, architect, 14A High Street, Watford.

BEWDLEY.—Aug. 12.—For erecting a small house and farm buildings at The Plump, two miles from Bewdley. Mr. T. R. Baker, Bark Hill, Bewdley.

BOSTON.—Aug. 10.—For alterations and additions to a house on a farm in Boston West. Mr. W. H. Wheeler, Market Place, Boston.

BRADFORD.—Aug. 12.—For alterations to premises in Bridge Street and Vicar Lane. Messrs. Rycroft & Firth, architects, Bank Buildings, Manchester Road, Bradford.

BRADFORD.—Aug. 9.—For erection of four terrace houses, stabling, &c., at High Street, Great Horton. Mr. Samuel Robinson, architect and surveyor, Cheapside, Bradford.

BRIDLINGTON QUAY.—Aug. 10.—For erection of 9, 13, 17, 21 or 25 houses north side Richmond Street. Mr. J. Earnshaw, architect, Wellington Road, Bridlington Quay.

CARDIFF.—Aug. 28.—For erection of a truant industrial school on a site near the Dinas Powis station, on the Barry Railway. Mr. W. H. Dashwood Caple, architect, 1 St. John's Square, Cardiff.

CARDIFF.—Aug. 11.—For converting 46 Cowbridge Road, Cardiff, into business premises. Mr. W. H. Dashwood Caple, architect, 1 St. John's Square, Cardiff.

CARDIFF.—Aug. 11.—For alterations to 16 George Street, Docks, Cardiff. Mr. W. H. Dashwood Caple, architect, 1 St. John's Square, Cardiff.

CARLISLE.—For alterations to Golden Fleece Inn, St. Nicholas. Mr. George Armstrong, architect, 45 Lowther Street, Carlisle.

CARLISLE.—Aug. 14.—For erection of house and cottage at Curthwaite Mill, near Carlisle. Mr. George Armstrong, architect, 45 Lowther Street, Carlisle.

CHATHAM.—For rebuilding of Alexandra Inn. Mr. Boucher, architect, High Street, Rochester.

CHESTER.—Aug. 9.—For erection of an infectious diseases hospital, Sealand Road. Mr. H. Beswick, architect, 17 Newgate Street, Chester.

COCKERMOUTH.—Aug. 16.—For providing and erecting a toilet-house in the park for the Urban District Council. Mr. John Fearon, clerk.

CORNWALL.—Aug. 14.—For erection of school at Carnkie for the Illogan School Board, and for alterations and additions to the existing premises. Mr. Sampson Hill, architect, Green Lane.

CROXDALE.—Aug. 9.—For erection of Wesleyan church. Mr. J. B. Foster, Station Terrace, Croxdale.

DEWSBURY.—Aug. 30.—For erection of twenty-eight houses, outbuildings and boundary walls at Hill Head, Malkroyd Lane. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

DORSET.—Aug. 9.—For erection of a new infants' school at Heatherlands, for the Kinson (U.D.) School Board. Mr. Herbert Wm. Dibben, clerk, Matlock House, Upper Parkstone.

DOVER.—Aug. 10.—For erection of two iron ladders and landings, &c., and for alterations required to four windows at the female hospital, the workhouse. Mr. Eugene Carder, clerk, 17 Market Square, Dover.

DUKINFIELD.—For extensions and alterations to the Victoria British Schools. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

DURHAM.—Aug. 24.—For enlarging and reseating Wesleyan chapel, Trimdon Grange. Mr. W. R. Woodhead, Trimdon Grange.

DURHAM.—For building a cement concrete retaining wall, about 42 yards long, in the River Skerne, near the Sedgfield Asylum. County Surveyor's Office, Durham.

ECCLES.—Aug. 9.—For erection of pavilion in the Eccles recreation ground. Mr. Geo. Wm. Bailey, town clerk, Town Hall, Eccles.

ESSEX.—Aug. 10.—For extension of drainage of the workhouse, and also for reflooring one room in workhouse, for the Guardians of Lexden and Winstree Union. Mr. John Ennals, surveyor, Copford.

FALMOUTH.—Aug. 13.—For reseating, renovation and decorating of the Wesleyan Chapel, Flushing. Mr. Horace W. Collins, architect, Penryn Street, Redruth.

FERRYHILL.—Aug. 11.—For works required at four farmsteads near Ferryhill. Mr. F. H. Livesey, architect, Market-Place, Bishop Auckland.

GALWAY.—Aug. 10.—For alterations to provide accommodation for jurors and witnesses and public offices in the county-court house. Mr. James Perry, county surveyor.

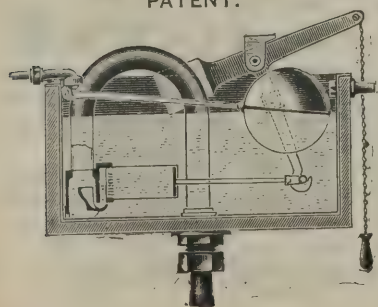
GLAMORGAN.—Aug. 11.—For erection of detached villa at Quaker's Yard. Mr. G. A. Bickenhead, architect and surveyor, Caledonian Chambers, Cardiff.

GLAMORGAN.—Aug. 11.—For erection of twenty or more cottages on the Goitrecoed Estate, Quaker's Yard. Mr. William Dowdeswell, architect, Treharris.

GREAT YARMOUTH.—Aug. 11.—For erection of six cottages, Church Road, Gorleston. Mr. Wm. B. Cockrill, architect and surveyor, Gorleston.

ARCHITECTS PLEASE NOTE.

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GRIMSBY.—Aug. 9.—For erection of club and shop in Rutland Street. Messrs. Mitchell, Son & Co., surveyors, 112 Cleethorpe Road.

HANDSWORTH.—Aug. 9.—For repairs, painting, papering, &c, at the Council House. Mr. Wm. Henman, architect, 31 Cannon Street, Birmingham.

IRELAND.—Aug. 16.—For erection of two one-storey cottages at Ballyhaise station, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

IRELAND.—Aug. 12.—For erection of a dispensary and dispensary residence at Folly Hill, Aghalee. Mr. E. J. Donaldson, clerk, Lurgan.

IRELAND.—Aug. 9.—For fencing of plots and erection of labourers' cottages thereon, in various electoral divisions, for the Guardians of Cavan Union. Mr. Joseph D. Grier, clerk, Cavan.

IRELAND.—Aug. 14.—For erection of upper part of tower and spire at the Catholic church, Clones. Mr. William Hague, architect, 50 Dawson Street, Dublin.

KEIGHLEY.—Aug. 9.—For plastering of the Butterfield Hall, Victoria Park. Mr. W. H. Hopkinson, borough engineer.

KNARESBOROUGH.—For erection of a detached house, Boroughbridge Road. Mr. Arthur A. Gibson, architect, 8 Cambridge Crescent, Harrogate.

LEXDEN.—Aug. 10.—For extension of drainage of workhouse, and for reflooring one room in workhouse, for the Guardians of Lexden and Winstree Union. Mr. John Ennals, surveyor, Copford.

LIVERPOOL.—Aug. 24.—For erection of chimney shaft in connection with new refuse destructor to be erected on the site of Cobb's Quarry, Everton. Town Clerk, Municipal Buildings, Liverpool.

LONDON.—Aug. 10.—For erection of infirmary for accommodation of 800 patients on land at the late Small Pox Hospital, Highgate Hill, Upper Holloway. Mr. Edwin Davey, clerk, Guardians' Offices, St. John's Road, Upper Holloway, N.

MERTHYR VALE.—Aug. 9.—For two cottages to be built at Aberfan. Mr. William Dowdeswell, architect, Treharris.

MIDDLESBROUGH.—Aug. 9.—For extensive additions to the Seaman's Mission buildings in Queen's Square and Gosford Street. Mr. J. Mitchell Bottomley, architect, 28 Albert Road, Middlesbrough.

NEWHAVEN.—Aug. 9.—For construction of a chimney shaft 120 feet high at the Sussex Portland Cement Works, Heighton. The Manager.

OSSETT.—Aug. 12.—For building a church at Gawthorpe. Mr. Tom H. Farrar, architect, Fountain Street, Halifax.

PETERBOROUGH.—For erection of house, shop and bakehouse, Buckle Street. Mr. J. G. Stallebrass, architect, Peterborough.

PLYMOUTH.—Aug. 10.—For the enlargement of the passenger station and for other works at Plymouth (Millbay), for the Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station, London.

PONTYPOOL.—Aug. 18.—For alterations to existing workhouse buildings, new steam laundry, new infectious diseases hospital and mortuary, aged couples' home and other works. Messrs. Lansdowne & Griggs, architects, Metropolitan Bank Chambers, Newport, Mon.

RUNCORN.—Aug. 12.—For enlargement of the Board-room at the workhouse, Dutton. Mr. Samuel Davies, Devonshire Buildings, Runcorn.

SCARBOROUGH.—Aug. 13.—For erection of eight dwelling-houses at the coastguard station. The Director of Works' Department, Admiralty, 21 Craven Street, London, W.C.

SCOTLAND.—Aug. 9.—For erection of distillery at Towiemore, Auchindachy. Mr. John Alcock, architect and surveyor, Keith.

SHOTLEY BRIDGE.—For alterations and additions to Wheat Sheaf inn. Mr. Edwin Bowman, architect, County Chambers, 52 Westgate Road, Newcastle.

SOMERSET.—Aug. 12.—For erection of a villa residence near the church at High Ham. Mr. Jos. Spire, architect, &c., Glastonbury.

SOUTHEND-ON-SEA.—Aug. 10.—For erection of a Primitive Methodist chapel and schoolrooms, Pleasant Road. Rev. W. Wray, 33 St. Paul's Road, Kennington Park, London, S.E.

SWINTON.—For rebuilding Swinton parish church. Mr. E. Isle Hubbard, architect and surveyor, Moorgate Street, Rotherham.

TEWKESBURY.—Aug. 14.—For a new door for and to other-wise thoroughly repair the flood-gate at Deerhurst. Mr. S. J. Gillett, surveyor, Deerhurst.

WALES.—Aug. 9.—For about 300 cubic yards of rubble fence wall, with short lengths of gravel path and drain. Surveyor, Town Hall, Mountain Ash.

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WALES.—Aug. 9.—For additions and alterations at the Llanspyddid Board School. Messrs. W. & T. Williams, architects, Brecon.

TENDERS.

ABERDARE.

For erection of thirty-five houses and drainage at Cae Smith, Abernant. Messrs. WATKINS & DAVIES, architects, 4 Canon Street, Aberdare.

J. D. Wilkins	£251	8	6
Williams & James	247	0	0
J. Jones	240	10	0
W. BUDDING, Pontyminster (accepted)	235	0	0
Hopkins & Prosser	232	0	0

ALNWICK.

For excavating, providing and laying-down complete 250 lineal yards of 4½-inch and 220 yards of 4-inch cast-iron coated socket pipes near Shilbottle Colliery.

J. WARDMAN, Bilton, Lexbury (accepted)	£88	12	6
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BARNSELY.

For erecting two houses and outbuildings in Beech Street. Mr. HERBERT CRAWSHAW, architect, 13 Regent Street, Barnsley.

Accepted tenders.

J. Taylor, mason.
W. Goodyear, joiner.
W. Dawber & Sons, slater.
Rogers & Squire, plumber.
C. Dryden, plasterer.
E. R. Fletcher, painter.

BILSBY.

For reconstructing, retunnelling and repairing the outfall tunnel. Mr. W. HOODLESS, surveyor of sewers, Hogsthorpe, near Alford.

J. Wilson	£585	3	6
B. HIBBITT, Alford (accepted)	524	16	0
Surveyor's estimate	566	16	3

BISHOP AUCKLAND.

For erection of police station at Birtley, and widening Newton Cap Bridge, over the Wear, at Bishop Auckland. Mr. WILLIAM CROZIER, county surveyor, Durham. Quantities by Mr. J. E. MILLER, Sunderland.

Birtley Police Station.

Draper & Sons	£839	10	0
F. Caldcleugh	32	0	0
T. Hunter	794	5	0
Davison & Bolam	731	2	4
BURNETT & SON, Birtley (accepted)	701	5	3

Newton Cap Bridge (Design No. 1).

J. Manley	2,473	4	0
T. Hilton	1,668	16	0
G. H. Bell	1,625	0	0

No tender accepted.

Newton Cap Bridge (Design No. 2).

G. H. Bell	961	19	0
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Only one tender, not accepted.

BLACKBURN.

For reconstruction of the offices for the improved sanitation of wards Nos. 8 and 10, Blackburn and East Lancashire Infirmary. Messrs. SIMPSON & DUCKWORTH, architects, Richmond Chambers, Blackburn.

John Catterall	£413	0	0
James Parker	397	0	0
J. Fecitt & Sons	376	0	0
James Sharples	370	0	0
W. H. Law	366	0	0
Wm. Edmundson	350	0	0
T. P. WILLSON & SONS, Lower Darwen, Blackburn (accepted)	342	0	0

BRADFORD.

For erection of a residence and stabling in Otley Road. Mr. JAS. LEDINGHAM, architect, District Bank Chambers, Bradford.

Accepted tenders.

J. Thornton & Co., mason.
Spencer & Brigg, joiner.
C. H. Pearson, plumber.
T. Nelson, slater.
J. Black & Sons, plasterer.
F. Copley, painter.

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Accepted tenders.

C. White, copper lamps and repairing framework of same.
G. Hodgson, lamp-pillar tops and lamp brackets, and for repairing same.
W. Hodgson & Son, glazing and repairing of lamps.

BRIDLINGTON.

For erection of three houses. Mr. J. EARNSHAW, architect, Bridlington Quay.

R. Bailey	£660	0	0
T. Wood	639	15	0
E. Wilson	578	1	5
J. RENNARD, Bridlington Quay (accepted)	575	0	0

BRISTOL.

For fittings, Royal Exchange Assurance New Office, Corn Street, Bristol. Messrs. R. MILVERTON DRAKE & JOHN M. PIZEY, architects, Bristol.

No. 1 Contract.

T. H. Brown	£502	0	0
C. A. Hayes	497	0	0
SMITH & CO. (accepted)	357	10	0

No. 2 Contract.

SMITH & CO. (accepted)	175	0	0
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BRIXHAM.

For erection of a villa residence at Brixham. Messrs. E. APPLETON & SON, architects. Quantities by Mr. C. SEWELL APPLETON.

H. WEBBER & SONS, Paignton (accepted).

BROMLEY.

For sewerage, levelling, paving, metalling, channelling and making-good a portion of the Highland Road.

Chittenden & Simmons	£845	6	8
E. Peill & Sons	765	3	10
Lawrence & Thacker	718	6	10
MOWLEM & CO. (accepted)	712	0	0

BROUGHTON.

For alterations to baths and building boundary walls.
J. & J. LEE, Stockport (accepted).

CALVERLEY.

For improvement of Woodhall Road, Calverley.

Wild & Denison	£188	12	0
H. ACKROYD, Back Lane, Calverley (accepted)	184	10	0
Surveyor's estimate	192	13	6

CHELTENHAM.

For erection of a Kursaal and municipal offices on the Winter Garden site. Mr. E. R. ROBSON, architect, 9 Bridge Street, Westminster, S.W.

Municipal buildings.

Norris & Sons	£24,800	0	0
Foster & Dicksee	24,633	0	0
J. Bentley	24,269	0	0
J. Thompson	22,749	0	0
A. C. & S. Billings	22,129	0	0
Collins & Godfrey	21,350	0	0
J. Parnell & Son	21,269	0	0
A. Estcourt & Son	21,019	0	0

Kursaal.

Norris & Sons	£23,000	0	0
Foster & Dicksee	22,928	0	0
J. Bentley	22,862	0	0
J. Thompson	21,985	0	0
Collins & Godfrey	21,540	0	0
A. Estcourt & Son	21,341	0	0
J. Parnell & Son	21,202	0	0

Winter Garden.

Norris & Sons	£4,700	0	0
Collins & Godfrey	4,400	0	0
J. Parnell & Son	4,379	0	0
Foster & Dicksee	4,264	0	0
J. Bentley	4,249	0	0
A. Estcourt & Son	4,240	0	0
J. Thompson	4,236	0	0

COVENTRY.

For erection of a waiting-room and alterations to the hot-water supply at the public baths.

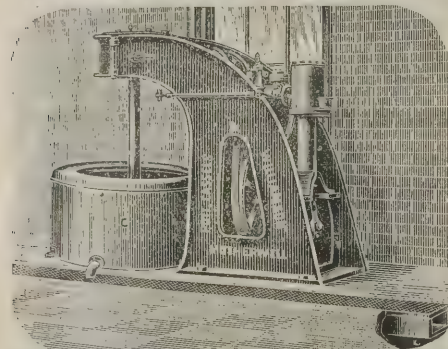
C. W. BARBER (accepted)	£195	0	0
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For erection of a smallpox hospital at Pinley.

J. ISAACS & SONS (accepted)	£4,169	0	0
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For improving the heating of the swimming and slipper baths at the public baths.

MESSINGER & CO. (accepted)	£185	0	0
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CROOK.

For erection of a police station. Mr. WILLIAM CROZIER, county surveyor. Quantities by Mr. J. E. MILLER, Sunderland.
Draper & Sons £2,351 16 0
Marshall & Son 1,904 3 6
T. Walton 1,866 10 0
T. Manners 1,838 8 0
G. H. BELL, Bishop Auckland (accepted) 1,835 8 0

DENTON.

For erection of river wall at the outfall works. Messrs. LOMAX & LOMAX, engineers.
J. & J. LEE, Stockport (accepted).

DOVER.

For construction of about 3,600 feet of cast-iron pipe sewers, and about 3,680 feet of stoneware pipe sewers in London Road, Crabble, Ladywell, Dour Street, &c.; and about 4,317 feet of surface-water drains in Elms Road, Folkestone Road, Shakespeare Road, Northampton Street and Commercial Quay; and laying and jointing only of about 600 feet of pipes in Belgrave Road. Mr. HENRY E. STILGOE, engineer, Town Hall.

Sewers.

G. Bell £5,669 5 5
S. Saunders 5,443 17 3
J. Jackson 4,666 9 8
F. Osmond 4,908 16 6
W. H. SAUNDERS & Co., Southampton (accepted) 4,640 0 0
Engineer's estimate 4,950 0 0

Surface drains.

S. Saunders 2,265 0 0
F. Osmond 2,172 12 3
W. H. Saunders & Co. 2,080 0 0
G. Bell 1,966 0 0
G. Munro 1,900 0 0
J. JACKSON (accepted) 1,819 2 4
Engineer's estimate 1,650 0 0

ENNISKILLEN.

For erection of new town hall, for the Town Commissioners. Messrs. ANTHONY SCOTT & SON, architects, Drogheda and Navan.
JAMES HARVEY, Enniskillen (accepted) £8,500 0 0

GATESHEAD-ON-TYNE.

For erection of St. Chad's parish hall, schools, &c. Mr. EUGENE E. CLEPHAN, architect, St. Nicholas Chambers, Newcastle-on-Tyne.
J. & W. Lowery £1,803 18 0
Middlemas Bros. 1,633 0 0
T. & R. Lamb 1,623 15 3
John Ross 1,578 1 1
Isaac Bewley 1,490 5 2
TURNER BROS., Bensham Road, Gateshead-on-Tyne (accepted conditionally) 1,430 6 9

GODLEY.

For construction of straining-well, forebay and valve-chambers at the reservoir.
J. & J. LEE, Stockport (accepted).

HAMMERSMITH.

For erection of a coroner's court and mortuary.
Hayward £5,213 0 0
Lilly & Lilly 4,508 0 0
G. Wimpey & Co. 4,328 0 0
T. W. Thomas 3,743 0 0

HARROW.

For erection of cookery-room at Harrow Weald Old Schools. Messrs. HOUSTON & HOUSTON, architects, 5 York Buildings, Adelphi, W.C.
A. J. Batchelor £430 0 0
Bailey 385 0 0
Haynes 375 0 0
Rackham, Harrow Weald* 355 0 0
* Accepted subject to sanction of Education Department.

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For sewerage works, for the Urban District Council.
G. BELL, 29 Corporation Street, Manchester (accepted) £1,814 6 6

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HERTS.

For structural alterations at the St. Pancras Schools, Leavesden, near Watford. Mr. C. P. AYRES, architect, 14 High Street, Watford.	
Kimberley, Banbury	£1,426 0 0
Brightman	1,395 0 0
Waterman	1,313 0 0
Darvill	1,290 0 0
Neal	1,290 0 0
Eames	1,251 0 0
Clark	1,205 0 0
T. Turner, Limited	1,197 0 0

HORNCASTLE.

For repair of Hemingby Bridge.	
WALTER & HENSMAN, Horncastle (accepted)	£77 10 0

IRELAND.

For construction of a reservoir at Farrandaw Lake, filter-bed, clear-water tank and small tank for ball cock; for laying pipes, bends, junctions, fountains, hydrants, valves, &c., and all work and material required for the supply of water to the village of Castletownshend. Mr. R. EVANS, engineer, 53 South Mall, Cork.	
J. White	£920 0 0
J. Burchill	780 0 0
D. COLLINS, Farrandaw, Castletownshend, co. Cork (accepted)	734 0 0

For laying pipes between the town of Mullingar and Lough Sheever, and for the construction of wells.

J. Cunningham	£2,428 8 6
W. Baird	2,193 3 1
R. MULLALLY, Mullingar (accepted)	2,649 7 0
Note.—Mr. Mullally's tender included 300 <i>l.</i> for possible contingencies in the way of pumping water out of pipe track, but if not required would be deducted if certified by Guardians' engineer.	

KEIGHTLEY.

For whitewashing ceilings and distempering walls at Keighley Institute.	
A. H. Tatham	£46 0 0
R. Lonsdale	39 0 0

KENT.

For erection of a new schoolroom at Great Chart.

Mancktelow Bros.	£763 0 0
C. Howland	670 0 0
G. F. Davis	657 18 0
H. Knock	570 0 0
H. Padgham	559 0 0
J. & S. CLARK, Lenham (accepted)	537 6 0

KINGSWOOD.

For provision of an eight-day striking clock and bell and four 3 feet 6 inches skeleton dials in Jubilee clock tower now in course of erection. Mr. MACKAY, architect, Kingswood.

KEMP & Co., Bristol (accepted).

LEITH.

For providing and erecting condenser at the gasworks.

STEEL PIPE COMPANY, Kirkcaldy (accepted)	£795 0 0
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LONDON.

For erection of entrance lodge at the infirmary, Dartmouth Park Hill, Highgate, N. Messrs. SEGRAVE, BROWETT & TAYLOR, architects, 9 Warwick Court, High Holborn.

H. Green	£625 0 0
Gardner & Hazle	582 0 0
W. Thompson	577 0 0
Coulsell Bros.	573 0 0
Barrett & Power	559 0 0
T. Sobey	513 0 0
J. W. DIXON, Highgate (accepted)	500 0 0
A. Harris	497 0 0

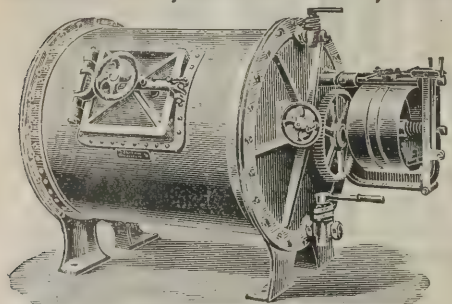
For construction of about 165 lineal feet of 12-inch pipe-sewer and 170 lineal feet of 9-inch pipe-sewer in Harman Street, and about 162 lineal feet of 12-inch pipe-sewer and 162 lineal feet of 9-inch pipe-sewer in Essex Street, and works in connection therewith. Mr. J. RUSH DIXON, surveyor.

J. Gloag	£1,244 3 1
Pedrette & Co.	1,111 12 11
C. Killingback	939 11 11
J. Jackson	884 8 11
H. Cox	766 0 5
T. ADAMS, Wood Green (accepted)	759 5 10

For laying tarred limestone paving in Cirencester Street, Harrow Road, area about 2,500 superficial yards, for the Paddington Vestry. Mr. GEORGE WESTON, surveyor.

MARCH & Co., Bromley, 4*s.* per yard super (accepted).

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For additional heating, Blackwall Lane School, Greenwich Marsh.			
J. Defries & Sons, Limited	£144	10	0
J. Fraser & Son	38	0	0
J. & F. May	37	10	0
J. Wontner-Smith, Gray & Co.	28	3	0
Duffield & Co.	27	0	0
Vaughan & Brown, Limited	24	0	0
J. C. & J. S. Ellis, Limited	23	10	0
Strode & Co.*	23	0	0

For additional heating, Larkhall Lane School, Clapham.			
H. C. Price Lea & Co.	£49	0	0
J. F. Clarke & Sons	41	0	0
Vaughan & Brown, Limited	38	0	0
J. Defries & Sons, Limited	37	10	0
Strong & Collings	35	0	0
Comyn Ching & Co.	34	15	0
W. Simmons	31	10	0
Stevens & Sons	30	0	0
J. C. & J. S. Ellis, Limited	30	0	0
Duffield & Co.*	23	0	0

For adaptation of house, No. 108 Lancaster Road, for a special school and a housewifery centre, Portobello Road site, North Kensington.			
G. Chase & Son	£827	0	0
R. A. Yerbury & Sons	375	0	0
T. Cruwys	360	0	0
H. Eady	344	5	0
Marchant & Hirst	279	0	0
F. T. Chinchin	262	18	0
W. R. & A. Hide*	258	15	0

For enlarging iron building, &c., Knee Hill School, Plumstead.			
T. Cruwys	£380	0	0
J. Lysaght, Limited	290	0	0
Croggon & Co., Limited	235	0	0
T. J. Hawkins	202	10	0
J. Mitson	196	5	0
W. Harbrow*	187	0	0

* Recommended for acceptance.

LONDON SCHOOL BOARD—continued.

For new boundary wall in Leven Road, Bromley Hall Road site.			
A. W. Derby	£273	0	0
G. Munday & Sons	232	0	0
J. F. Holliday	225	0	0
D. Gibb & Co.	215	0	0
J. T. Robey	193	0	0
G. Wales*	183	0	0

For special school, manual centre, &c., Enfield Road School, De Beauvoir Town.			
Dove Bros.	£4,614	0	0
J. Grover & Son	4,532	0	0
E. Lawrance & Sons	4,389	0	0
Treasure & Son*	4,297	0	0

For enclosing, &c., additional land and executing works on site, Page's Walk, Bermondsey.			
Rice & Son	£1,003	0	0
W. Akers & Co.	871	0	0
F. G. Minter	850	0	0
J. Garrett & Son	843	0	0
D. Charteris	816	0	0
T. Nicholson	792	0	0
Thomas & Cooper	776	10	0
J. F. Ford	755	0	0
Jones & Groves	750	0	0
W. V. Goad	675	0	0
H. Leney*	675	0	0

For erecting iron buildings, Santley Street site, West Lambeth			
D. Charteris	£1,125	0	0
Humphreys, Limited	1,114	0	0
W. Harbrow	1,075	0	0
T. Cruwys	1,050	0	0
T. J. Hawkins	1,020	0	0
J. Mitson	998	17	0
Croggon & Co., Limited*	937	10	0

For additional fittings and furniture, &c., Clerkenwell Close Stores.			
Illingworth, Ingham & Co.	£426	0	0
W. H. Lascelles & Co.*	415	0	0

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For fire apparatus, Gordon House Industrial Home for Girls.	
Merryweather & Sons, Limited	£198 5 8
Shand, Mason & Co.*	176 10 6
For coverings to loading stages, Clerkenwell Close Stores.	
Kirk & Randall	£230 0 0
Hayward Bros. & Eckstein, Limited	195 0 0
F. Braby & Co., Limited*	159 0 0
For additional heating apparatus, Pope Street School, Eltham.	
H. C. Price Lea & Co.	£115 0 0
J. & F. May	87 0 0
J. Gray	82 0 0
J. F. Clarke & Sons	79 0 0
J. Defries & Sons, Limited	75 0 0
J. Wontner-Smith, Gray & Co.	75 0 0
J. C. & J. S. Ellis, Limited	67 0 0
W. G. Cannon*	66 15 0
For additional heating, Hague Street School, Bethnal Green.	
H. C. Price Lea & Co.	£108 0 0
Comyn Ching & Co.	99 10 0
Stevens & Sons	95 0 0
W. Simmons	87 15 0
G. Davis	74 0 0
Duffield & Co.	66 0 0
J. Grundy*	62 16 6
* Recommended for acceptance.	
For providing and fixing wirework on iron railings, Graystone Place, City.	
Rownson, Drew & Co.	£11 0 0
BRABY & CO. (accepted)	9 15 0
For providing iron railing, wire netting, &c., Hart Street, Westminster.	
T. Cruwys	£23 0 0
CLARKE & HUNT (accepted)	8 10 0
For interior painting, St. John's Lane, Finsbury.	
G. S. S. Williams & Son	£223 0 0
Perkins & Co.	210 0 0
T. Nicholson	195 0 0
A. M. SPARKS (accepted)	168 0 0
F. Newton	140 0 0
W. Brown	129 0 0

LONDON SCHOOL BOARD—continued.

For interior painting (old portion) and interior cleaning (new portion), Melvin Road, Greenwich.	
G. Summers	£358 0 0
W. Akers & Co.	342 0 0
G. KEMP (accepted)	298 0 0
For exterior painting, Tottenham Road, Hackney.	
McCormick & Sons	£99 0 0
J. GROVER & SON (accepted)	98 5 0
J. Morrison	91 0 0
For exterior painting, Flint Street, East Lambeth.	
H. J. Williams	£295 0 0
W. V. Goad	238 0 0
J. F. FORD (accepted)	198 0 0
B. E. Nightingale	157 0 0
For interior painting (new portion) and interior cleaning (old portion), Bell Street, Marylebone.	
T. Cruwys	£410 0 0
E. T. Felley	404 0 0
W. Hornett	399 0 0
G. Foxley	322 8 0
F. T. CHINCHEN (accepted)	279 10 0
For interior painting, Capland Street (junior mixed), Marylebone.	
T. Cruwys	£265 0 0
W. Chappell	260 0 0
W. Hornett	259 0 0
G. Foxley	221 9 6
F. T. CHINCHEN (accepted)	184 15 0
For interior and exterior painting, Netley Street, Marylebone.	
E. T. Felley	£556 0 0
T. Cruwys	550 0 0
W. Hornett	542 0 0
Marchant & Hirst	460 0 0
G. Foxley	420 2 0
W. CHAPPELL (accepted)	395 0 0
For interior and exterior painting, Lollard Street, West Lambeth.	
E. Triggs	£655 0 0
F. R. Blaxton	532 15 0
J. F. Ford	529 0 0
G. BRITAIN (accepted)	508 18 6

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LONDON SCHOOL BOARD—continued.			
For interior painting, Bellville Road, West Lambeth.			
E. P. Buller & Co.	£429	0	0
Maxwell Bros., Limited	340	0	0
H. J. & G. MALLETT (accepted)	326	0	0
H. Brown	235	0	0
For interior painting, Jessop Road, West Lambeth.			
Lathey Bros.	£252	10	0
H. Somerford & Son	246	0	0
F. R. Blaxton	242	0	0
F. & H. F. Higgs	230	0	0
T. Hooper	198	10	0
STAR & SON (accepted)	191	10	0
Maxwell Bros., Limited	186	0	0
For interior painting, Amberley Road, Marylebone.			
W. Hornett	£288	0	0
F. Chidley	285	9	0
T. Cruwys	285	0	0
E. T. Folley	255	0	0
F. T. CHINCHEN (accepted)	252	13	0
For interior painting, Pocock Street, Southwark.			
Lathey Bros.	£393	0	0
H. J. Williams	390	0	0
E. TRIGGS (accepted)	339	0	0
For painting interior and exterior, Moreland Street, Finsbury.			
Vigor & Co.	£746	15	0
E. LAWRENCE & SONS (accepted)	670	0	0
A. M. Sparks	668	0	0
For painting interior and exterior, Trunley's Road, Greenwich.			
G. Summers	£355	0	0
W. Banks	335	17	6
E. Proctor	303	0	0
C. S. JONES (accepted)	283	15	0
For painting interior, Lewisham Bridge, Greenwich.			
S. J. Jerrard & Sons	£513	0	0
H. LENEY (accepted)	289	5	0
C. G. Jones	289	0	0
For painting interior, Lucas Street, Greenwich.			
G. Summers	£465	13	6
W. Banks	354	19	6
C. G. JONES (accepted)	282	0	0
C. S. Jones	259	0	0

LONDON SCHOOL BOARD—continued.			
For interior painting, Barrow Hill Road, Marylebone.			
G. FOXLEY (accepted)	£254	15	0
For painting interior, Columbia Road, Hackney.			
Barrett & Power	£614	0	0
T. NICHOLSON (accepted)	438	0	0
C. Willmott	353	5	0
For painting interior, Summerford Street, Hackney.			
C. WILLMOTT (accepted)	£457	10	0
For painting interior and exterior, Ilderton Road, East Lambeth.			
H. Line	£398	0	0
W. BROWN (accepted)	350	0	0
For painting interior and exterior, Magdalen Street, Southwark.			
H. LINE (accepted)	£179	0	0
For painting interior, British Street, Tower Hamlets.			
Vigor & Co.	£326	5	0
D. GIBB & CO. (accepted)	265	0	0
For painting interior, Trafalgar Square, Tower Hamlets.			
A. W. Derby	£643	0	0
H. Cude	459	0	0
Vigor & Co.	455	10	0
A. W. Malins	448	0	0
G. Wales	435	0	0
E. JACKSON & SON (accepted)	367	0	0
For painting (junior mixed), Medburn Street.			
G. Chase & Son	£235	0	0
W. Hornett	150	0	0
T. CRUWYS (accepted)	143	0	0
For interior and exterior painting, Gifford Street, Finsbury.			
McCormick & Sons	£1,136	0	0
Stevens Bros.	1,080	0	0
G. S. S. WILLIAMS & SON (accepted)	1,078	0	0

MIRFIELD.

For draining, levelling and macadamising, kerbing and making-good of Green Lane, Knowl. Mr. F. H. HARE, surveyor.			
E. Hindle	£209	16	0
Garforth Bros.	176	13	4
W. Oats	173	16	10
J. W. Schofield	168	10	8
W. & J. MILNER, Mirfield (accepted)	168	13	6

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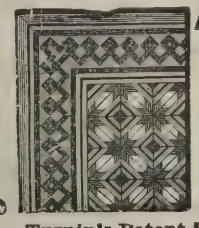
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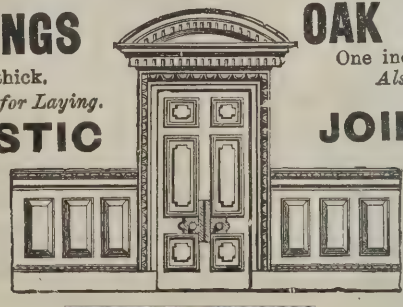
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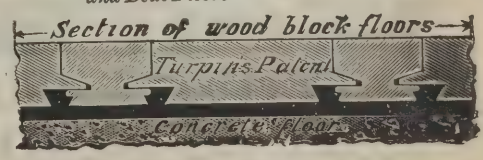
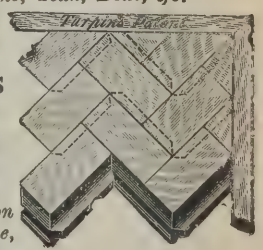
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For erecting offices for the Wilts United Dairies Company,
Limited. Mr. J. A. RANDALL, architect, Devizes.
BIGWOOD & CO. (accepted). £359 12 0

NORFOLK.

For alterations, &c., at Sporle Church.

Bardell Bros.	£1,709	5	3
Richard Chapman	1,704	16	0
J. Youngs & Son	1,671	18	0
Cornish & Gaymer	1,644	12	0
W. J. Larnar	1,559	18	0

NORTHUMBERLAND.

For converting old Congregational chapel at Amble into
freemasons' hall. Mr. GEORGE REAVELL, jun., architect,
Alnwick and Morpeth.

Accepted tenders.

J. N. Reavell, plumber	£86	16	0
R. Earnshaw, joiner	66	12	0
" mason	24	10	0
" plasterer	20	7	6
A. Robertson & Son, painter.	14	14	6
R. Earnshaw, slater	1	10	0

OVER KELLET.

For erection of a house. Mr. J. PARKINSON, architect,
67 Church Street, Lancaster.

Accepted tenders.

R. T. Constable, Carnforth, mason.
W. Wilson, Carnforth, joiner.
R. Hall & Son, Lancaster, slater.
Harrison & Moser, Lancaster, plumber.
Total, £864 9s.

ODIHAM.

For erection of new Board schools, Odiham, Hants. Messrs.
COLSON, FARROW & NISBETT, architects, 45 Jewry Street,
Winchester.

Tompsett & Co.	£3,500	0	0
G. Hooker	3,350	0	0
J. B. Seward	3,285	0	0
Liming Bros.	3,228	15	0
J. Thumwood	3,109	2	0
J. M. William & Son	3,095	0	0
C. A. Hutchings	3,035	0	0
Pool & Sons	3,000	0	0
McCarthy E. Fitt	2,947	0	0
J. J. B. COOPER & Son, Odiham (accepted)	2,899	0	0

PADDINGTON.

For erection of stable building, children's lavatory, entrance-
gate, piers and dwarf fence wall at the recreation ground.
Mr. GEORGE WESTON, surveyor.

Stable and children's lavatory.

P. WOOD (accepted)	£338	0	0
P. WOOD (accepted)	160	0	0

PAIGNTON.

For erection of a residence. Messrs. E. APPLETON & SON,
architects. Quantities by Mr. C. SEWELL APPLETON.
WEBBER & MAUNDER, Paignton (accepted).

For alterations, additions and repairs at Goodington Cot-
tages. Messrs. E. APPLETON & SON, architects. Quan-
tities by Mr. VINCENT CATTERMOLLE BROWN.

M. Bridgman	£569	0	0
R. Harris	565	0	0
H. Webber & Son	562	0	0
Webber & Maunder	526	0	0
Smaridge & Curtis	522	0	0

READING.

For erection of a pair of houses in Alexandra Road. Mr. W.
JANE, architect. Quantities by Messrs. HENRY COOPER
& SONS.

Stokes	£1,598	0	0
Margetts	1,579	0	0
Hawkins	1,579	0	0
Fitt	1,559	0	0
G. S. LEWIS & BROTHER (accepted)	1,542	0	0

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BANSTEAD ASYLUM (L.C.C.),
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For alterations to business premises. Mr. CHARLES P. AYRES, architect, Watford.

Brown	£556	0	0
Reed	450	0	0
Eames	369	0	0
HOLLAND, Rickmansworth (accepted)	342	19	0

SEVENOAKS.

For erection of a footpath bridge over the river Medway, at Leigh. Mr. THOMAS HENNEL, engineer, 6 Delahay Street, Westminster.

PUNNETT & SON, Tonbridge (accepted)	£103	0	0
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SPALDING.

For enlargement of the infants' Board schools by eighty places. Mr. W. H. MILLS, architect.

C. A. WATSON (accepted)	£610	0	0
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SUFFOLK.

For additions to the classroom at Cotton Schools. Mr. ISAAC A. CLARKE, architect, Walsham-le-Willows.

H. Middleditch	£75	0	0
S. Sebbon	68	0	0
R. Francis	67	12	6
J. CROFT, Diss (accepted)	60	0	0

SWINDON.

For construction of three settling tanks, each 60 feet by 20 feet, and four filters, each 50 feet by 30 feet, and other works at Broome. Messrs. SHOPLAND & REDMAN, engineers, Newport Street, Swindon.

W. L. Meredith	£1,842	19	9
H. Hill, King Street	1,595	2	9
B. Winchcombe	1,567	3	0
W. H. SMITH & SON, Alma Vale Road, Clifton, Bristol (accepted)	1,375	5	7

TAMWORTH.

For repairs at workhouse.

WATTON & SONS, Tamworth (accepted)	£536	14	3
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TAVISTOCK.

For construction of the works and supply of materials in connection with the Princetown drainage. Mr. G. D. BELLAMY, engineer, 6A Courtenay Street, Plymouth.

W. C. Shaddock	£2,761	0	0
J. Fisher	1,920	0	0
E. DUKE, Regent Street, Plymouth (accepted)	1,680	0	0

THRAPSTON.

For the annual painting and whitewashing of the workhouse. W. HALFORD, Thrapston (accepted) £18 10 0

TORQUAY.

For alterations and additions at the Y.M.C.A. Messrs. E. APPLETON & SON, architects.

J. SMERDON, Torquay (accepted).

For stabling in Swan Street. Messrs. E. APPLETON & SON, architects.

J. SMERDON, Torquay (accepted).

For billiard-room and alterations at Pentreve. Messrs. E. APPLETON & SON, architects. Quantities by Mr. C. SEWELL APPLETON.

J. TARR, Torquay (accepted).

UXBRIDGE.

For painting public street lamps in the district, and for painting and repair of buildings at waterworks. Mr. WILLIAM L. EVES, surveyor, 54 High Street, Uxbridge.

Briant & Son	£82	16	0
Kearley	81	11	6
Hall	80	5	11
Westacott	79	10	0
A. Cherry	78	0	0
F. Castell	75	8	0
Ward & Son	63	0	0
W. H. HUNT, Whitehall Road, The Greenway (accepted)	57	7	0

WALES.

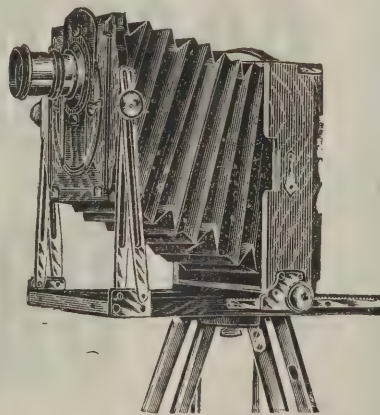
For erection of an iron girder bridge, with stone abutments and concrete foundations, to carry the road over the river at Ty Merchant, Pencoed, the waterway 20 feet wide and roadway 15 feet. Mr. EDWARD JENKINS, surveyor, Nolton Street, Bridgend.

T. Davies	£172	2	0
G. Harris	158	0	0
Finch & Co.	159	0	0
R. JONES, Coychurch, near Bridgend (accepted)	135	1	10
Dyne, Steel & Son	135	0	0

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Taken under Test conditions. A difficult subject, owing to its height and narrowness of the street.

Fig. 2 was taken with SANDERSON'S PATENT CAMERA, the Tripod remaining perfectly level, there being no necessity to tilt it, as is usual with other cameras. No difficulty was experienced in properly composing the subject owing to the great range of the Patent Rising and Swing Front, which reduces the adjustments to a minimum, and does away with the necessity of the orthodox Swing Back.

To accomplish the above it was necessary to raise the lens (a 6 in. Zeiss on a 10 x 5 plate) above its covering power, but by bringing SANDERSON'S PATENT SWING FRONT into play, which enables the axis of the lens to be directed to the bottom of the plate, perfect covering power and illumination was immediately obtained, as in Fig. 2.

Fig. 3 represents the best possible result that could be obtained with the same lens on a first-class modern Camera, furnished with the usual Swing Back, Rising and Swing Front, &c., these movements having been strained to their utmost limits, and the Tripod tilted to a dangerous degree.

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temper, and plates.

FAILURE. With all the old Troubles.



Fig. 3.

Fig. 3.—Taken with ordinary camera after straining movements to the utmost.

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WALSALL.

For painting the Butts Board Schools.

T. LAWLEY (*accepted*) £67 0 0

For erection of an infants' school to accommodate 350 children, at the Croft Street Schools, Birchills. Messrs. BAILEY & MCCONNALL, architects, Bridge Street, Walsall.

H. Lovatt £2,908 0 0

J. Harley & Son 2,875 0 0

T. Tildesley 2,860 0 0

J. Mallin 2,850 0 0

A. Lynex 2,819 0 0

H. Willcock & Co. 2,730 0 0

W. Kendrick 2,720 0 0

J. Guest & Sons 2,675 0 0

W. Wistance 2,565 0 0

J. Dallow 2,530 0 0

J. WOOTTON, Bloxwich (*accepted*) 2,439 0 0

For addition of an infants' department to the Croft Street Board Schools.

S. WOOTTON, Bloxwich (*accepted*) £2,429 0 0**WATERLOO.**

For widening Seaforth Road, including surface drainage, asphaltting, kerbing, channelling, macadamising, rebuilding walls, &c. Mr. F. SPENCER YATES, surveyor.

EXECUTRIX OF LATE W. F. CHADWICK, 19 Leeds Street, Liverpool (*accepted*) £597 10 0**WATFORD.**

For alterations to the King's Head, High Street. Mr. CHARLES P. AYRES, architect, Watford.

Reed £3,710 0 0

Judge 3,696 0 0

Waterman 3,590 0 0

BRIGHTMAN, Watford (*accepted*) 3,543 0 0

For new club-room at the George Hotel. Mr. CHARLES P. AYRES, architect, Watford.

Brightman £1,526 0 0

Judge 1,495 0 0

REED, Watford (*accepted*) 1,478 0 0

For alterations to 159 High Street. Mr. CHARLES P. AYRES, architect, Watford.

Brightman £533 0 0

Barnes & Williams 482 0 0

JUDGE, Watford (*accepted*) 480 0 0**WATFORD—continued.**

For erection of stores in the St. Albans Road. Mr. CHARLES P. AYRES, architect, Watford.

A.

Darvill £2,890 0 0 £205 0 0

Brightman 2,830 0 0 230 0 0

General Builders, Limited,

London 2,796 0 0 220 0 0

Goss 2,694 0 0 220 0 0

Dupont 2,659 0 0 192 0 0

Neal 2,625 0 0 160 0 0

Waterman 2,564 0 0 202 0 0

Turner, Limited. 2,534 0 0 209 0 0

Watkins 2,448 0 0 218 0 0

Cowbridge 3,398 0 0 225 0 0

Reed 2,350 0 0 215 0 0

EAMES, Watford (*accepted*) 2,298 0 0 210 0 0

A. Deduct if fireproof omitted.

For stables and stores at 95 High Street. Mr. CHARLES P. AYRES, architect, Watford.

Dove £1,075 0 0

Wiggs 1,050 0 0

Waterman 1,043 0 0

Brightman 1,025 0 0

Neal 1,020 0 0

Turner, Limited 982 0 0

Clark 950 0 0

Eames 944 0 0

Cowbridge 927 0 0

Reed 923 0 0

WATKINS, Watford (*accepted*) 896 0 0

For additions to District Cottage Hospital. Mr. CHARLES P. AYRES, architect, Watford.

Andrews £1,250 0 0

Neal 1,125 0 0

Wiggs 1,115 0 0

Darvill 1,099 0 0

Clifford & Gough 1,098 0 0

Brightman 1,090 0 0

Eames 1,088 0 0

Waterman 1,080 0 0

Reed 1,070 0 0

T. TURNER, LIMITED, Watford (*accepted*) 1,067 0 0

Watkins 1,032 0 0

Cowbridge 977 0 0



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WATFORD—continued.

For stripping, reglazing and reslating the roof of the Clarendon Hall. Mr. C. P. AYRES, architect, Watford.		
Wiggs	£705	0 0
T. Turner, Limited	653	0 0
Cowbridge	543	0 0
EAMES, Watford (accepted)	480	0 0

WEST HAM.

For private street works. Stratford—Park Lane, Park Place, Abbey Lane; Upton Park—Rochester Avenue, Percy Road, Cloughton Road, Selsdon Road and Green Street. Mr. L. ANGELL, borough engineer.		
W. Griffiths	£6,649	7 10
W. Gibbs & Co.	6,254	8 7
T. Adams	6,060	0 0
J. JACKSON, Plaistow (accepted)	5,808	11 2
For works for the West Ham Town Council. Mr. L. ANGELL, borough engineer.		

Foundations, Lnnatic Asylum, Ilford.

McCormick & Son	£7,654	0 0
T. Adams	13,349	6 2
Shillitoe & Son	12,300	0 0
J. Jackson	11,756	8 0
C. Wall	11,646	0 0
G. Sharpe	11,230	0 0
Chessum & Sons	10,907	0 0
Kirk & Randall	10,828	0 0
G. W. Bell	10,306	0 0
GREGAR & SON, Stratford (accepted)	10,130	0 0

Drainage at Small-pox Hospital, Dagenham.

W. Gibbs & Co.	1,113	3 5
W. Wade	768	0 0
T. Adams	755	8 4
J. JACKSON, Plaistow (accepted)	614	7 6

WOMBWELL.

For extension of the Board school at Broomhill. Mr. JOHN ROBINSON, surveyor, Park Cottage, Wombwell.		
--	--	--

Accepted tenders.

W. Johnson, mason and bricklayer	£141	10 6
C. Linford, carpenter and joiner	77	19 8
C. Kemp, slater	21	0 0
F. Saville, plumber and glazier	15	0 0
J. McPartlain, plasterer	9	0 0
F. C. Wilson, painter	8	10 0

BUILDING AND BUILDERS.

THE old building known as the Fine Art Gallery, Old Christchurch Road, Bournemouth, is in course of demolition to make room for shop property.

A PROPOSAL is on foot to restore West Stafford parish church, near Dorchester, as a memorial to the late Canon Reginald Smith, for more than half a century rector.

UNDER the auspices of the Bar Congregational church at Scarborough a new church, to seat 500 persons, is about to be erected in the north-west ward.

FOR the congregation which for over two years has met in the Co-operative Hall at Ossett a new Congregational church and school are about to be erected.

ON July 31 the corner-stones of a new Liberal club, which is being erected at Norden, in the Heywood parliamentary division, were laid by Alderman William Healey, mayor of Heywood.

AT four o'clock to-morrow afternoon the Duke of Connaught will lay the foundation-stone of a new hospital at Southsea, the funds for which have been raised to commemorate the sixty years' reign.

THE foundation-stone of an isolation hospital which is in course of erection at Isleworth has been laid by the Duchess of Teck. The site of the hospital is in a remote part of Isleworth parish, not far from the Kneller Hall School of Music. Provision is made for forty-six beds.

THE Countess of Warwick opened her secondary and technical school at Dunmow on July 30. The school, which is a new building near the ancient mansion of the Fitzgeralds, is fitted up for the accommodation of 100 pupils, and in connection therewith are schools for laundry and needlework.

THE Highgate Police Court, which has hitherto been held at Northfield Hall, having been found inconvenient, a site has been purchased in the Archway Road on which will be erected a new court, and an adjacent site is to be covered by a police station. The foundation-stone was laid on the afternoon of the 3rd inst. by Mr. R. A. M. Littler, C.B., Q.C., chairman of the Middlesex County Council and Quarter Sessions.

THE estate of West Bangour, near Uphall, has been purchased on behalf of the Edinburgh Lunacy Board at the price of 13,000/. The extent of the property is about 861 acres, of which 86 are woodland. The gross rental is 639/., and the public burdens average about 132/.. The property has been

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purchased for the purpose of erecting upon it a new asylum for pauper lunatics in consequence of the necessity imposed upon the Board of removing the pauper lunatics from Morningside Asylum.

THE memorial-stones of a Wesleyan school-chapel were laid on July 31 on a vacant piece of ground in Ladypit Lane, Beeston Hill, Leeds. Mr. G. F. Danby is the architect for the new structure, which will be of brick with stone dressings, plain externally but commodious, affording accommodation for 250 worshippers. There will also be three classrooms, and by means of a patent folding partition one of these will, when occasion demands, supply fifty additional seats. The total cost is estimated at 1,250*l*. Mr. W. Schofield has the contract for the brick and stonework, and Messrs. J. Tomlinson & Son that for the woodwork, a large portion of which will be pitch pine.

THE new Verdin Technical Schools and Gymnasium which have been erected at Northwich, from the designs of Mr. J. Cawley, architect, of Northwich, by Mr. W. Molyneux, of the same place, were recently opened by the Duchess of Westminster. The site, which contains 2,619 yards, is situated in the London Road, to which it has a frontage of 132 yards. The building, which is of two storeys, is in Renaissance style, with terra-cotta enrichments, and within it provision is made, on the most approved scale, for technical and manual instruction, art teaching, &c. There are a chemical and a physical laboratory, a spacious art school, classrooms, workshops, cookery-room and laundry, with all the necessary adjuncts thereto. The gymnasium is placed on the south side, and is 60 feet long by 31 feet 6 inches wide, and of great height, a gallery being placed at one end. The apparatus provided in all the departments is the best of its kind. A striking feature in the building is the stained-glass of the windows. The "Empire window" over the main entrance, and the "Victorian window" over the entrance to the art department, are excellent specimens of stained-glass. The inclusive cost of the buildings is 12,000*l*.

A GRANITE obelisk, which has been provided by public subscription as a permanent memorial of the seventy years' labour of the veteran Primitive Methodist, the late Mr. Thomas Bateman, was unveiled in Chorley burial-ground, Nantwich, on Wednesday last.

ELECTRIC NOTES.

THE Bo'ness Harbour Commissioners have authorised their engineers, Messrs. Thomas Meek & Son, to prepare a specification and obtain tenders from several firms of electrical engineers for lighting the harbour and docks with an installation of the electric light.

A COMPANY has offered to take over the provisional order for electric lighting when obtained by the Dorking Council, and to establish works for the public and private supply of electricity on certain terms. Mr. Warden-Stevens, of Westminster, has been retained by the Council to advise them in the matter.

THROUGH some failure of the machinery at the Edinburgh Corporation Electric Lighting Station, a large portion of the city of Edinburgh was about midnight on August 1 plunged in total darkness. All the street lamps went out, and the gas lamps having been entirely removed from those thoroughfares where the electric light has been substituted, those privileged streets had to remain destitute of artificial illumination. No explanation was offered of the cause of the failure, which was most seriously felt in the newspaper offices and other establishments where night work is a necessity.

VARIETIES.

THE water supply of towns is being largely attended to in New South Wales. Twenty-four municipalities in the colony own waterworks constructed at a cost of 546,088*l*., and others are being established, at a cost of 135,436*l*., in six more municipalities.

WHILST laying the gas-mains in Wakefield Road, Brighouse, last week, two workmen were entombed by the collapse, without warning, of a high stone-built boundary wall. George Mayne, New Street, Batley, was taken out dead, but William Bull, Batley, was only slightly injured on the leg and arm. Both are married men and Mayne has a grown-up family.

LEA BRIDGE, which joins the counties of Middlesex and Essex, has been rebuilt by the London County Council, and the new structure is now open. The old bridge, which was erected in the latter part of the last century, interrupted the river traffic; the new one admits of two barges passing abreast, and is constructed largely of web-plate girders, giving headway of 7 feet 4 inches. The cost amounts to 8,399*l*.

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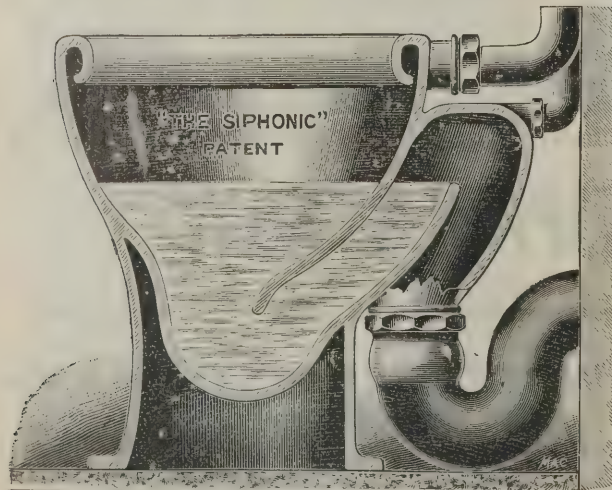
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THE new post office which has just been built at Lydney, at a cost of 2,000*l.*, was formally opened on July 31. The building was erected by Messrs. Kear & Son, from plans by Mr. Howard Howells, of Lydney. The new premises contain excellent accommodation for post office work in all departments. In the rear is the residence of the postmaster, Mr. A. H. Harrison, from whom the site was purchased.

MR. COOPER, general manager of the Glasgow and South-Western Railway Company, and other officials, visited Port-Glasgow on August 2, where they were met by Provost Rodger, the town clerk, and several members of town council, for the purpose of examining the ground near to the line of rails of this company running past Port-Glasgow, with the object of recommending a suitable site for the construction of a passenger station. The town council unanimously voted in favour of the new station, and in doing so represented the wishes of the community.

THE work of repairing the tower and spire of Salisbury Cathedral is being rapidly pushed forward, and Sir A. Blomfield, the architect, believes that by the new year the scaffolding will have been removed. He has informed the Dean and Chapter that the turret at the north-west side of the cathedral was in such a bad state that it would be necessary to have it rebuilt. The Rev. G. D. Boyle, the Dean of Salisbury, declares that every stone that could be used again "appears in its proper place, only new stones being introduced wherever the original stones had been crushed or broken."

AN important addition to London's suburban theatres has just been built at Crouch End, and is to be known as the Queen's Opera House. The new building is a commodious structure admirably adapted for its purpose and position. It covers over one-third of an acre. The auditorium is 100 feet by 54 and the stage 54 feet by 30. There is accommodation for 1,500 persons, including 100 in the orchestra stalls, 236 in the pit stalls and 436 in the pit. Above there is a large balcony. Four boxes add to the appearance of the house, which has been decorated by Messrs. Dean, of Birmingham. Mr. Tom Woolnough is the architect and Mr. Frank Matcham the consulting architect. The saloon and lounge is 50 feet by 27. The building has cost 12,000*l.*

THE Hôtel Burlington, which has been recently opened at Dover, is of noble proportions, and faces the centre of the bay, being set back a little from the Marine Parade; but the houses which intervene are to be cleared away, so as to give an un-

impeded view of the Channel from every part of the building. The hotel contains 380 rooms. Opening out of the grand hall, which forms the lounge of the hotel, and which is fitted as an Oriental divan, with some fine Indian carvings forming structural screens and portières, and can also be utilised as a ball or concert-room, are some beautifully decorated and richly upholstered apartments. Long corridors traverse the three wings of the hotel, and on the upper floors give access to the bedrooms and private suites. They are furnished in every style, French and English, the best periods of each having been selected to please the educated sense. The sanitation, ventilation and lighting of the hotel are carried out on the latest systems. The architects are Messrs. Murray & Foster.

AN accident of a serious character has occurred on Kew Bridge. A heavily-laden furniture van, belonging to Mr. T. Morris, of High Road, Chiswick, was being driven from the Surrey to the Middlesex side, and when just on the crown of the bridge the driver saw that, owing to the steep gradient, a collision with two carts stationed lower down the incline was inevitable. In his endeavour to avoid the collision he pulled his horses sharply on to his off-side, with the result that the animals got on to the footpath and the centre pole of the van came violently into contact with one of the balustrades, which was knocked over. The force of the impact caused a rebound and another collision, in which more balustrades went over. For a few moments it looked as if the horses must drag the van and driver over into the river, but happily the animals were got under control in time to prevent that disaster. Mr. N. Parr, the surveyor to the Brentford District Council, on being informed of the accident, made arrangements for scaffolding to be erected at the damaged portion of the bridge.

TRADE NOTES.

THE new Cottage Hospital, Accrington, is being warmed and ventilated by means of Shorland's patent Manchester grates.

THE date for the second International Furnishing Trades Exhibition is fixed for March 18 to 29, 1898. This is somewhat earlier than last year's date, but the time is altered at the request of a large number of exhibitors, who are of opinion that more orders will be placed in the month of March than at any other time.

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THE CONCILIATION ACT, 1896.

THE first report by the Board of Trade of proceedings under the Conciliation (Trade Disputes) Act, 1896, has been published. It opens with the following letter to the President of the Board of Trade from the Permanent Secretary:—

July 12, 1897.

Sir,—I have the honour to present the first report of the Board of Trade under the Conciliation Act, 1896. Under the Act the Board are from time to time to present a report to Parliament of their proceedings, and it has been thought desirable to record the Board's experience of the working of the Act without waiting the completion of twelve full months from its passing.

The administration of an Act so largely dependent for its success upon the actions of persons other than the officers of the Department must be tentative, and it is far too soon yet to judge of its full influence on the prevention and settlement of trade disputes. The fact, however, that thirty-one applications have been made for the assistance of the Department in about ten months shows a willingness to rely upon the good offices of the department in conducting negotiations which is of considerable promise for the future.

The experience gained in working the Act clearly establishes, in my opinion, one important fact, namely, that in a large number of disputes, when a meeting between the parties can be arranged, great benefit follows from the presence of an impartial person able to mediate, to prevent the effect of personal asperities, to make suggestions and to facilitate concessions. It is to be noticed also that negotiations with a mediator may tend to encourage the parties to arrive at a settlement by themselves.

It will be seen from Mr. Llewellyn Smith's report that of the thirty-five disputes in which some kind of action by the Board of Trade has been either taken or invited nineteen have been settled under the Act by conciliation or arbitration. The greater number of these cases have been settled by conciliation, but during the period under review there have been five cases of actual arbitration under the Act—four the result of joint application and one in which, under an agreement effected by conciliation, I myself was appointed by the parties to determine certain points.

The arbitrators hitherto appointed have been Sir William Markby, K.C.I.E., in two cases, Sir David Dale, Mr. Thomas Bell and Captain Wilson. The hearty thanks of the Board of

Trade are due to these gentlemen for the readiness with which they placed their valuable services at the disposal of the Board, as well as to Sir Horatio Lloyd, county court judge of Chester, who, acting as conciliator and not as arbitrator, procured a settlement in a complicated dispute in North Wales, and to Mr. W. E. Willink and Mr. Baillie Dun, who acted at the request of the Board as chairmen at conferences and otherwise.

If the tendency to use the Act grows the Board of Trade will have to rely more and more on the assistance and services of such gentlemen in completing negotiations, the preliminary stages of which may be usefully conducted by the officers of the Department.

It is as yet impossible to predict how far the Act is likely ultimately to succeed; but I repeat that the experience gained in the Department shows that advantage has been found, and may be expected to be found, from negotiations conducted by independent persons whose only object is the termination of disputes which must be injurious to trade.

I have the honour to be, Sir, your obedient servant,
COURTENAY BOYLE.

The Labour Commissioner, Mr. Llewellyn Smith, explains the proceedings taken under the Act from August 7, 1896, when it became law, up to the end of June last. The duties cast upon the Board of Trade by the Act were twofold—the encouragement and extension of the work of voluntary conciliation boards and the settlement, under certain conditions, of actual disputes between employers and workmen. Hitherto the action of the Board under the latter head has been, it is stated, on the whole the more important. Of the thirty-five cases in which, as Sir C. Boyle states, action was taken or invited, applications were received from one or both of the parties in thirty-one disputes, while in the remaining four cases action was taken by the Board of Trade without formal application by either party. In twenty-six cases there was an actual cessation of work. Seven of the applications were refused, action of some kind being taken in the remaining twenty-eight. One of these cases is still pending. Of the remaining twenty-seven, nineteen were settled through proceedings under the Conciliation Act and four were settled between the parties during the negotiations, while in four the efforts of the Department were unsuccessful.

Among the cases the following were connected with building:—

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Bricklayers and Plasterers at Newcastle-on-Tyne.

There had been a long-standing dispute between the bricklayers and the plasterers at Newcastle-on-Tyne as to the limits of work belonging to the respective trades in respect of the laying of cement flooring.

In 1893 the matter was referred by the Bricklayers and Plasterers' Societies to the arbitration of the Tyneside Building Trades' Federation, the decision being that the work belonged to the plasterers, except jobbing builders' repairs or sanitary work, which might be done by either party. Difficulties, however, arose with regard to the working and interpretation of the award, leading to stoppage of work. On March 30, 1896, the employers belonging to the Newcastle, Gateshead and Tyne District Master Builders' Association locked out both plasterers and bricklayers. The latter, however, came to an understanding with the employers on the basis of leaving the arrangement of the work in dispute to the discretion of the employer. The plasterers remained out, and claimed that the former award should be maintained. They also demanded an advance of $\frac{1}{4}$ d. per hour in wages. An unsuccessful attempt was made on June 8 by the Newcastle and Gateshead Trade and Labour Council to effect a settlement of the dispute, but though the plasterers offered to accept arbitration the bricklayers refused. Matters remained in this state for some time, most of the workmen affected having found work elsewhere.

On November 4 an officer of the Department visited the district and had interviews with the parties affected. On the following day he presided over a conference of representatives of the two societies, at which the matters in dispute were thoroughly discussed. It was not, however, found possible to effect a settlement by mutual agreement, and it was then suggested by the Board of Trade that the matter should be referred to an umpire appointed by mutual consent or nominated by the Board.

The proposal was duly placed before the members of both trade unions, with the result that the plasterers accepted and the bricklayers refused the proposal for arbitration. Subsequently personal interviews took place between officers of the Department and the secretaries of the Newcastle Master Builders' Association and of the Plasterers' Society, but without effecting a settlement.

The dispute was arranged in March 1897, at a conference consisting of two architects, two builders, two bricklayers and two plasterers. One of the architects, Mr. Dyson, presided.

This meeting resulted in an agreement under which the rights of each trade to do cement work were specifically defined.

Painters at Middlesbrough.

On March 1, 1897, a strike of painters at Middlesbrough began, the men demanding an advance of 1d. an hour and certain alterations in the working rules. Three months' notice of these demands had been given, but apparently no negotiations had taken place between the parties previous to the strike. The employers declined to submit the dispute to a board of conciliation in accordance with the working rules, claiming these rules to be void. They complained of the refusal of the workmen to agree to arbitration in a previous dispute. The men belonged to the local branch of the National Amalgamated Society of House and Ship Painters and Decorators; the employers to the Middlesbrough Master Painters. About seventy men were affected. The Mayor of Middlesbrough, at the request of the men, endeavoured to bring the parties together during the first week of the dispute, but the master painters declined to accept his services.

On March 22 the general secretary of the men's union applied to the Board of Trade to take action under the Conciliation Act. In reply the Department asked for further particulars, both with regard to the exact demands of the men for alteration of working rules and certain other matters having a bearing upon the questions in dispute. On obtaining this information an officer of the Department visited the district on April 1, and on that and the following day saw the principal parties to the dispute and presided at an informal conference of two representatives of each side. As a result, the master painters offered to have an open arbitration to fix the rate of wages, promising not to reduce them below the existing rate in the event of the arbitrator awarding a reduction. This offer was transmitted by the Board of Trade to the general secretary of the union, who promised to recommend its acceptance. The local members of the union, however, refused to agree to the terms of reference, claiming that the only legal notice which could be dealt with by an arbitrator was their application for an advance, the rules providing for three months' notice of a claim for advance or reduction. The masters, however, as stated above, regarded the rules as having lapsed.

On April 22 a letter was received from the general secretary of the union stating that a further attempt at direct negotiations between the parties had been made, but that the conference broke up without result. On April 28 another officer

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of the Department visited the district and had an interview with the men's representatives, with the result that on the following day they agreed to accept the original offer made through the Board of Trade by the employers. This was communicated to the employers, who, however, on May 4 declined to renew the offer or to entertain any further negotiations. The dispute has not been settled.

Carpenters and Joiners at Prescott (No. 1).

On May 3, 1897, a dispute took place affecting carpenters at Prescott, near Liverpool. The works on which these carpenters were engaged were situated within the ten-mile radius from Liverpool landing stage, and so within the area covered by the working rules of the Liverpool district, agreed to in 1895 between the Liverpool Master Builders' Association and the Liverpool District Committee of Carpenters and Joiners. These rules, providing for a rate of wages of 9d. an hour, were not at the time enforced in the Prescott district, but in November 1896 the carpenters gave the master builders six months' notice of their intention to enforce them. Four of the builders in the district declined to sign the rules, and the strike took place at these firms. Mr. F. Brown, the largest of the employers affected, offered arbitration, but this the men declined, as they considered that it would prejudice the position of their members already working under the rules. The employer, however, claimed that he was governed by the St. Helen's rules.

On May 20 Mr. Brown applied to the Board of Trade to endeavour to bring about a settlement. Accordingly an officer of the Department visited the district on May 25, and had interviews with the representatives of the parties. As a result, both sides agreed to take part in a conciliatory conference under the presidency of a neutral chairman.

At the request of the Board of Trade, Mr. W. E. Willink, architect, of Liverpool, consented to preside at the conference, which took place on May 28, there being present three representatives of each side, together with the officer of the Department. As a result the following agreement was arrived at, and the men returned to work:—

As a settlement of the difficulty between Mr. Fred Brown and his joiners in respect to the conditions of working, Mr. Brown agrees to conform to the working rules of the Liverpool, Birkenhead and District Building Trades while working in the Liverpool, Birkenhead and district area.

FRED BROWN.
W. E. WILLINK
(Chairman of Conference).

Carpenters and Joiners at Prescott (No. 2).

The circumstances of the dispute affecting carpenters and joiners at Prescott are described above. The settlement effected at the conference, over which Mr. Willink presided on May 28, only included one out of four employers.

On June 16 a further application was made to the Board of Trade, on behalf of the three remaining employers affected, for assistance in bringing about a settlement of the dispute. At the request of the Board of Trade Mr. Willink undertook to act as conciliator, and on June 30 had an interview with the three employers. As a result of this interview the employers agreed to conform to the working rules of the Liverpool district, and promised to communicate their decision to the trade union officials.

Masons at Huddersfield.

On May 1, 1897, the masons at Huddersfield, to the number of about 200, struck work, their demands including a rise of wages and a revision of the local working rules. Previous to the strike negotiations had taken place between the local branch of the Operative Stonemasons' Friendly Society and the Huddersfield Master Masons' Association, but the parties were unable to agree with regard to a rule, proposed by the men, that no wallstone dresser, quarryman, or bricklayer should be allowed to do mason's work, and the strike therefore took place. On May 31 a communication was made to the Board of Trade by the Mayor of Huddersfield, asking, on behalf of the Master Masons' Association, that the Board of Trade should appoint a conciliator or board of conciliation under section 2 (1) (c) of the Conciliation Act. In consequence of this application an officer of the Department visited Huddersfield, and had an interview with the representatives of the men on June 4, with a view of making further inquiries, and of ascertaining how far the appointment of a conciliator would be likely to promote a settlement of the dispute. He was informed that the great majority of the strikers had obtained work elsewhere, and also that while not desirous of outside intervention, they were prepared to meet the employers if invited to do so by them. Under these circumstances the Mayor was informed that the possibilities of direct negotiation between the parties did not appear to be exhausted, and that it did not seem that any useful purpose would be served by appointing a conciliator at the present stage. Direct negotiations have accordingly been opened up between the parties.

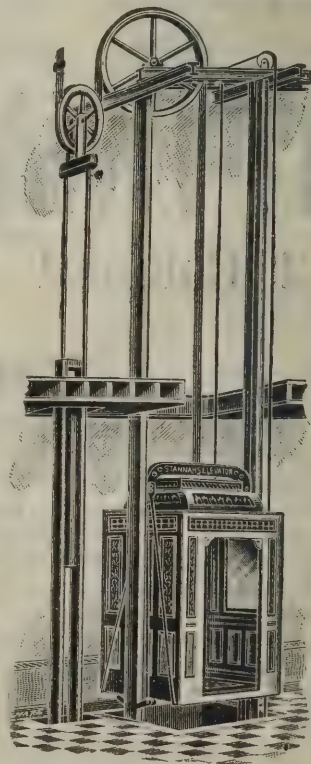
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ROCK-CUT TOMBS, TEMPLES, AND HABITATIONS.*

(Continued from last week.)

WE will now turn our attention for a few minutes to the consideration of rock-cut tombs in Asia Minor which were probably the work of the early Greek settlers; if so they brought the custom with them from Egypt or borrowed it from the Egyptians. There is a curious group of rock-cut monuments found at Doganlu. They are placed on the rocky side of a narrow valley and are not apparently connected with any great city or centre of population. Generally (says Fergusson), they are called tombs, but there are no chambers nor anything about them to indicate a funeral purpose, and the inscriptions which accompany them are not on the monuments themselves, nor do they refer to such an object. They are among the most mysterious remains of antiquity, and beyond a certain similarity to rock-cut tombs around Persepolis, present no features that afford even a remote analogy to other monuments which might guide us in our conjectures as to the purpose for which they were designed. They are of a style clearly indicating a wooden origin and consist of a square frontispiece either carved into certain geometrical shapes or apparently prepared for painting. At each side is a flat pilaster and above a pediment terminating in two scrolls. Some—apparently the more modern—have pillars of a rude Doric order and all, indeed, are more curious than beautiful. Judging from the inscriptions on them and the traditions of Herodotus, they would appear to belong to some race from Thessaly or thereabouts, who at some remote period crossed the Hellespont and settled in the neighbourhood; they may date as far back as 1,000, and in all probability at least 700 years before the Christian era.

Another important group in Asia Minor is that at Lycia, an account of which was published in 1838 by Sir Charles Fellows. They appear to indicate a wooden origin; the oldest of them cannot well be carried back further than the Persian conquest. It seems quite evident that prior to that event the Lycians used only wood for their buildings, and that it was only at that time, and probably from the Greeks or Egyptians, that they, like the Persians, learned to substitute for their frail and perishable structures others of a more durable material.

It is worthy of note that it is only in the infancy of a country that its inhabitants adhere to wooden forms of con-

struction, and as soon as habit and improved conditions of society give them familiarity with the use of more durable material they abandon the incongruities incident to wooden construction and soon lose all trace of original forms. All the original buildings of Lycia are tombs or monumental erections of some kind, and generally may be classed under two heads, those having curvilinear and those having rectilinear roofs, of which both classes are found, some of which are structural (standing alone), and some of which are rock-cut. One example is that of a perfectly constructed tomb rock-cut, with a façade similar in design to a structural edifice, having the outline of a curvilinear roof cut in the solid rock. Other examples were found having a pediment wrought in the rock above the entrance to the tomb. One very beautiful one was in imitation of an Ionic portico, having on each side two heavy pilasters, and between the pilasters two Ionic columns, the whole surmounted by a fairly good Ionic pediment.

Similar in many respects are the rock-cut tombs of ancient Etruria, the most remarkable of which is at Corte d'Asso. At this place there is a perpendicular cliff with hundreds of these tombs ranged along its face like houses in a street. A similar arrangement is found at Beni Hassan, Egypt, at Petra and Cyrene and around all the more ancient cities of Asia Minor.

In Etruria they generally consist of one chamber lighted by a doorway only. Their internal arrangement appears to be an imitation of a dwelling chamber with furniture like the apartment itself cut out of the solid rock. Externally they have little or no pretensions to architectural decorations. Some of the tombs are found adorned with fronts of a debased Doric or Ionic order; but these were executed at a much later period and under Roman domination, and hence cannot be taken as specimens of Etruscan art, but rather of that corruption of style sure to arise from a conquered people trying to imitate the arts of their rulers. Our time will not permit us to pursue this interesting topic further and we will turn our attention to the consideration of the second division of our subject, namely, "rock-cut temples."

With the exception of a few rock-cut temples in Nubia previously alluded to; it does not appear that the ancient Egyptians employed this method of construction for their sacred edifices. Like all rock-cut examples the world over, the Nubian temples are copies of structural buildings, only more or less modified to suit the exigencies of their situation, which did not admit of any very great development inside, as light and air could only be introduced through the one opening of the doorway. The prin-

* A paper by Mr. Cyrus K. Porter, published in *Stone*.

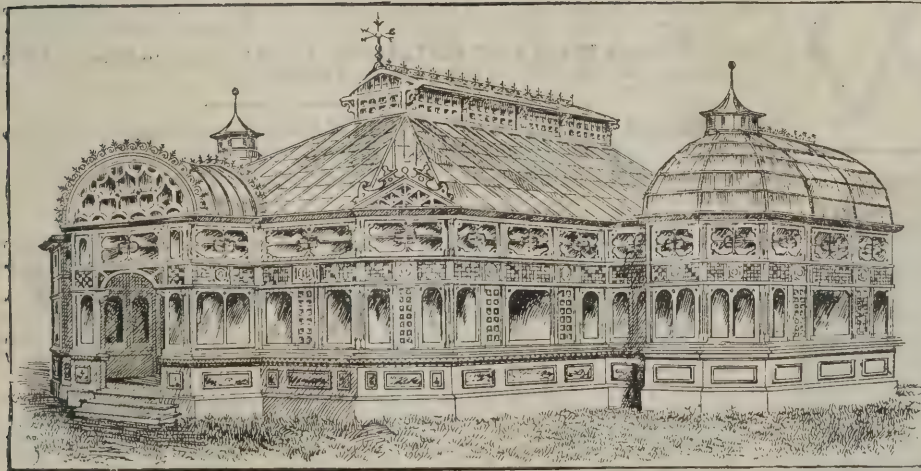
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cial examples of this class of monuments are the two at Ipsamboul, the largest of which is among the finest of its class known to exist anywhere. Its total depth from the face of the rock is 150 feet, divided into two large halls and three cells with passages connecting them. Externally the façade is about 100 feet in length, and adorned by four of the most magnificent colossi in Egypt, each 70 feet in height, and representing the king, Rameses II., who caused the excavation to be made. It may be because they are more perfect than others found in that country, but certainly, says Fergusson, "nothing can excel their calm majesty and beauty or be more entirely free from the vulgarity and exaggeration which is generally characteristic in colossal works of this sort." The smaller temple of the same place has six standing figures of deities countersunk in the rock and is carved with exceeding richness. It is of the same age as the larger temple, but will not admit of a comparison with it owing to the inferiority of its design. Besides these there is a very beautiful though small temple at Kalabsche, likewise belonging to the period of Rameses II., and remarkable for the beauty of its sculptured bas-reliefs as well as for the bold proto-Doric columns which adorn its vestibule. There are also smaller ones at Derri and Balagne at the upper end of the valley. At Essabua, Gissheh and Dandour the cells of the temple have been excavated from the rock, but their courts and pylons are structural buildings added in front—a combination never found in Egypt, and very rare anywhere else, although meeting the difficulties of the case better than any other arrangement, inasmuch as the sanctuary has all the imperishability and mystery of a cave, and the temple has at the same time all the space and external appearance of a building standing in the open air. This arrangement is found also to exist at the temples of Gibel Barkel, in the kingdom of Meroe, showing how far the rock-cutting practice prevailed in the upper valley of the Nile.

As all these temples are contemporary with the great structures in Egypt, "it seems strange," says Fergusson, "that the eternity of rock-cut examples did not recommend this form of temple to the Egyptians themselves, but with the exception of a small grotto near Beni Hassan and two small caves near the cataract of the Nile, the Egyptians seem never to have attempted it, trusting apparently to the solidity of their masonic structures for that eternity of duration they aspired to."

The most important examples of rock-cut temples are to be found in India. These examples can hardly be regarded as

belonging to ancient architecture. The traditions as to the extremely remote antiquity of the rock-cut temples and caves of Ellora, and the wonderful pagodas, have disappeared before the searching eye of critical investigation. Instead of being of almost diluvian antiquity, as was generally supposed, they have been proved to date from the seventh or eighth century of our era, while the most recent is the work of India-dymna as late as the twelfth century. One of these temples at Karli, near Bombay, presents exactly the features of a Roman basilica, or early Christian church. It has a circular end or apse, and is divided into three aisles by two rows of columns. Others are simple square buildings with a circular or oval chamber at the end entered by a small door.

(To be concluded.)

PATENTS.

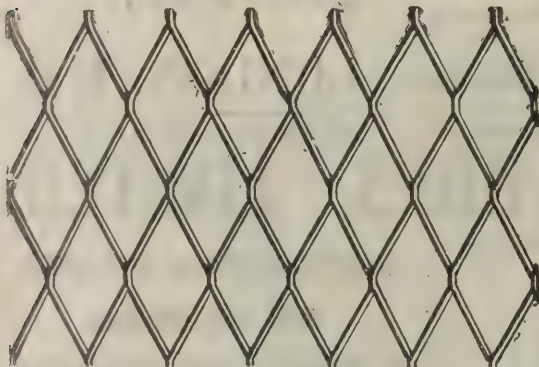
This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

- 17067. John William Craven, for "Improvements in brick-making machine."
- 17037. Benjamin Ferriss, for "Rail fasteners."
- 17058. John Shanks, for "Improvements in the discharge apparatus of water cisterns."
- 17096. Edwin Joshua Clayton, for "Improvements in window-shade attachments."
- 17206. Clarence Robert Heckford and Herbert Bagnall, for "Improvements in locks."
- 17230. Edward Mountjoy Price, for "A nautical level floor."
- 17243. John Owden O'Brien, for "Improvements in fire-bars."
- 17264. George Samuel Heath, for "An improvement in French windows and doors."
- 17308. Wolfe Mainzer, for "Improved method of hanging and fixing metal window-casements."

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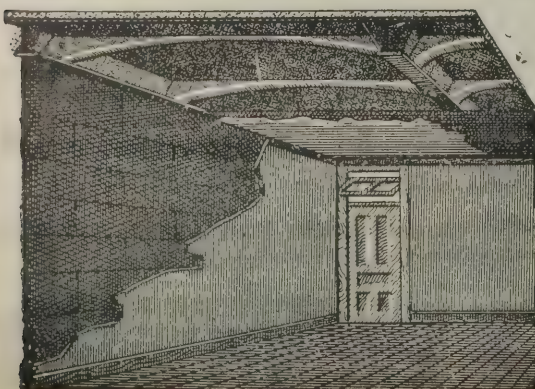
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TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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CONTRACTS OPEN.

ASHTON-UNDER-LYNE.—For taking-down cottages and erecting stables. Mr. J. H. Turner, Margaret Street, Ashton-under-Lyne.

AUDENSHAW.—For taking-down and rebuilding the Liberal Club. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

BATLEY.—For erection of five villa residences at Wilton Park. Mr. Walter Hanstock, architect, Leeds.

BEDFORD.—Aug. 17.—For alterations and additions to Board school at Oakley. Mr. M. Sharman, 6 St. Paul's Square, Bedford.

BELFAST.—For erection of nine houses, stores, &c., in Downing Street. Mr. D. M. Cooper, 47 Donegall Place.

BELFAST.—For erection of two houses, Wellington Park. Messrs. Forman & Aston, architects, Queen's Buildings, Royal Avenue, Belfast.

BELFAST.—Aug. 18.—For building new church in connection with Albertbridge Congregational Church. Messrs. Frazer & Son, architects, 117 Victoria Street, Belfast.

BELFAST.—Aug. 28.—For erection of a house on the Antrim Road. Mr. James A. Hanna, architect, 102 Donegall Street, Belfast.

BILLERIGAV.—Aug. 17.—For repairs to the windows and window-frames at the workhouse. Mr. Charles Edgar Lewis, clerk, Brentwood.

BRADFORD.—For erection of a clear ice factory, cold storage and chill rooms. Mr. Fred Holland, architect, 11 Parkinson Chambers, Hustlergate, Bradford.

BRENTWOOD.—Aug. 18.—For providing and fixing a movable floor over the swimming-baths at the Hackney Union Schools. Mr. Frank R. Coles, clerk, Homerton, N.E.

BRIDGEND.—Aug. 25.—For erection of a temporary wood and iron block to accommodate 100 patients at the Parc Gwyllt Asylum. Messrs. Giles, Gough & Trollope, architects, 28 Craven Street, Charing Cross, London.

BRIDLINGTON.—Aug. 17.—For taking-down of a cottage and other buildings and erection of a workshop and other buildings, on the east side of St. John Street. Mr. Samuel Dyer, architect, Quay Road.

BRIXWORTH.—For building infants' school. Mr. John Ingman, architect, Abington Street, Northampton.

BROCKLESBY.—Aug. 16.—For erection of Church institute and Sunday-school, near the church at Keelby, near Brocklesby, Lincs. Rev. N. L. Browne, Keelby.

BURNLEY.—For erection of stables, coach-house, &c., at Reedley. Mr. Charles Parsons, architect, 9 Grimshaw Street, Burnley.

BURTON-ON-TRENT.—For erection of a Wesleyan chapel at Church Gresley. Mr. Robt. Clarke, architect, Prudential Buildings, Nottingham.

CARDIFF.—Aug. 28.—For erection of a truant industrial school near Dinas Powis. Mr. W. H. Dashwood Caple, 1 St. John Square, Cardiff.

CHELMSFORD.—Aug. 17.—For erection of an engine-house on land in the market-place. The Borough Surveyor, 14 Museum Terrace, Chelmsford.

CHELTHENHAM.—Aug. 28.—For erection of school buildings opposite the Lyefield Schools, Charlton Kings, and for alterations to the present buildings. Mr. James Villar, architect, 1 Cambray, Cheltenham.

CHICHESTER.—Aug. 18.—For alterations and improvements at the workhouse. Mr. Edward Arnold, clerk, Chichester.

CLITHEROE.—For altering roof and providing new seating, &c., at St. Mary's Parish Church. Messrs. McCall & Robinson, 7 Tackett's Street, Blackburn.

COCKERMOUTH.—Aug. 16.—For providing and erecting a tool-house in the park for the Urban District Council. Mr. John Fearon, clerk.

COLNBROOK.—Aug. 16.—For erection of boys' school and alterations to infants' school. Mr. Thos. Potter, architect, 49 London Road, Sevenoaks.

CORK.—Aug. 26.—For erection of temporary buildings at Cork District Lunatic Asylum. Mr. W. H. Hill, 28 South Mall, Cork.

CORK.—For carrying out of structural alterations, 13 Beach, Queenstown. Mr. Nat Jackson, 13 Beach, Queenstown.

DERBY.—Aug. 23.—For the brickwork for six refuse-destructor cells, for the Corporation. Mr. R. J. Harrison, borough engineer, Babington Lane, Derby.

DEWSBURY.—Aug. 30.—For erection and completion of twenty-eight houses, outbuildings and boundary walls at Hill Head, Malkroyd Lane. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

DUNDEE.—Aug. 16.—For building a brick chimney 90 feet high, at the hydraulic engine-house. Mr. Geo. C. Buchanan, harbour engineer, Works Office, Harbour Chambers, Dundee.

DURHAM.—Aug. 18.—For alterations and additions to premises at Annfield Plain. Mr. D. M. Spence, architect, Front Street, Annfield Plain.

DURHAM.—Aug. 24.—For enlarging and reseating Wesleyan chapel, Trimdon Grange. Mr. W. R. Woodhead, Trimdon Grange.



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DURHAM.—Aug. 24.—For enlarging and reseating Wesleyan Chapel, Trimdon Grange. Mr. W. R. Woodhead, Trimdon Grange.

EVESHAM.—Aug. 31.—For converting a cottage and meeting-room into a chapel at Willersey, near Broadway. Rev. John R. Newall, Wesley Chapel House, Evesham.

FALKIRK.—Aug. 18.—For erection of lavatory, &c., at Cemetery. Messrs. A. & W. Black, architects, Falkirk.

GREAT YARMOUTH.—Aug. 20.—For erection of a residence. Mr. Chas. G. Baker, architect, Town Hall Chambers, Great Yarmouth.

HALIFAX.—Aug. 24.—For erection of large brass foundry, &c., near Albert Reservoir. Mr. Medley Hall, architect and surveyor, 29 Northgate, Halifax.

HUDDERSFIELD.—Aug. 16.—For altering and enlarging the old vagrant wards at Crosland Moor Workhouse into lock hospitals. Messrs. John Kirk & Sons, architects, Huddersfield.

IRELAND.—Aug. 16.—For erection of two one-storey cottages at Ballyhaise station, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

IRELAND.—Aug. 18.—For erection of a small meeting hall at Killeshandra, co. Cavan. Mr. J. Gervais Skipton, architect, North Gate Street, Athlone.

IRELAND.—Aug. 20.—For additions and alterations to the Carlow District Lunatic Asylum. The Secretary, Board of Control, Custom House, Dublin.

IRELAND.—Aug. 21.—For erecting boundary wall, gate, piers and railing, at the R.C. church, Croom. Mr. Moriarty, Croom.

KING'S LYNN.—Aug. 17.—For building a new chemical laboratory at the Borough Technical School, London Road. Mr. E. J. Silcock, borough surveyor, King's Lynn.

KINGSTON-UPON-THAMES.—Aug. 26.—For extension of electric light buildings. Mr. Harold A. Winsor, town clerk, Clattern House, Kingston-upon-Thames.

LANGLEY MOOR.—Aug. 17.—For erection of a dwelling-house. Mrs. Esther Maddison, Shafto Arms Hotel, Langley Moor, Durham.

LEEDS.—For plastering eight houses, Roundhay Road. Mr. Geo. Lax, Harehills Lane, Leeds.

LEEDS.—For erection of three houses, Victoria Park, Kirkstall. Messrs. I. Bexon & Son, 56 Briggate.

LEEDS.—For alterations to premises, 134 Burley Road, Leeds. Mr. Archibald Neill, architect, 18 Cookridge Street, Leeds.

LIVERPOOL.—Aug. 24.—For erection of chimney shaft in connection with new refuse destructor to be erected on the site of Cobb's Quarry, Everton. Town Clerk, Municipal Buildings, Liverpool.

MANCHESTER.—Aug. 18.—For erection of a police sub-station, city pound and stable in Bridgewater Street. City Surveyor, Town Hall.

MIDDLESBROUGH.—Aug. 16.—For alterations and additions to houses at Linthorpe. Mr. Arthur F. Newsome, architect, Albert Road, Middlesbrough.

MOSSLEY.—For alterations to Mossley National Schools. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

NEWBRIDGE.—Aug. 18.—For rebuilding of the English Baptist chapel, Newbridge, Mon. Mr. George Rosser, architect, Victoria Chambers, Abercarn.

NORTHAMPTON.—For additions and alterations to the British School. Mr. W. Hull, architect, 12 St. Giles's Street, Northampton.

PLUMSTEAD.—Aug. 31.—For erection of 572 feet brick and concrete walling, surmounted by wrought-iron unclimbable fencing, to enclose portion of the Plumstead Cemetery next Lodge Lane. Mr. H. H. Church, architect, William Street, Woolwich.

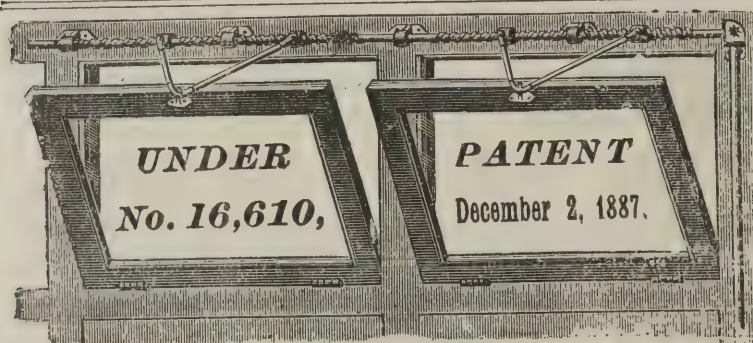
PONTYPOOL.—Aug. 18.—For alterations to existing work-house buildings, new steam laundry, new infectious diseases hospital and mortuary, aged couples' home and other works. Messrs. Lansdowne & Griggs, architects, Metropolitan Bank Chambers, Newport, Mon.

REDRUTH.—Aug. 23.—For erection of two semi-detached villas, Clinton Road. Mr. Horace W. Collins, architect, Penryn Street, Redruth.

RISHWORTH.—Aug. 16.—For erection of a Sunday school in connection with the Roadside Baptist Chapel. Mr. W. Clement Williams, architect, 29 Southgate, Halifax.

ROYSTON.—Aug. 16.—For erection of a head-master's house, adjoining the Board school, in Senior Lane. Mr. Joseph Olroyd, architect, Royston.

SALISBURY.—Aug. 21.—For additions to the lying-in wards &c., at the workhouse. Messrs. John Harding & Son, Canal, Salisbury.



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SCOTLAND.—Aug. 16.—For erection of a police station, Hallside, near Newton Station, Caledonian Railway, comprising one block of four married constables' houses, administrative department, four cells, airing yards, boundary walls, &c.

SHEFFIELD.—For rebuilding Heeley and Sheffield House, Gleadless. Mr. W. T. Rhoden, architect, Buckingham Chambers, St. James's Street, Sheffield.

SPENNYMOOR.—Aug. 17.—For rebuilding house and shop, High Street. Mr. J. Coldwell, architect, 14 Carlton Terrace, Spennymoor.

STANTON-IN-CLEVELAND.—Aug. 26.—For pulling-down and rebuilding the Blacksmiths' Arms Inn. Mr. W. H. Linton, architect, Exchange, Stockton-on-Tees.

TAUNTON.—Aug. 18.—For erection of buildings and plant at the works of the Taunton Gaslight and Coke Company. Manager, Gasworks, Taunton.

WAKEFIELD.—For erection of latrines to Board school, Alverthorpe. Mr. Edmund Wright, architect, Silcoates.

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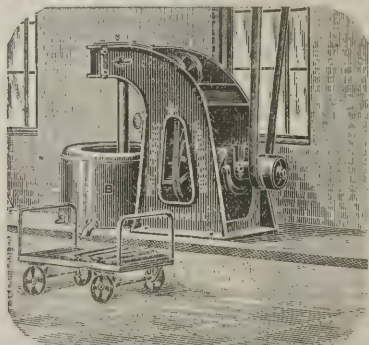
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For continuing the sinking of a well at Curraglass.
 J. O'KEEFFE, Monagown, Conna Pallow (accepted).

For building a teacher's residence and school-house at Kilmallock, co. Limerick. Mr. R. FOGERTY, architect, Henry Street, Limerick.
 J. J. THORNTON, Kanturk, co. Cork (accepted) . £395 0 0

KILLAMBASH.

For erection of six houses. Mr. WM. HY. WAGSTAFF, architect, Chesterfield.

THORPE & SYKES, Brighton (accepted).

KINGSTON.

For erection of endowed schools. Mr. A. J. PILKINGTON, architect. Mr. I. T. CAREW, surveyor.
 F. G. Minter (revised tender) £8,076 17 0

KIRKBY-IN-ASHFIELD.

For erection of stores. Messrs. F. BALL & LAMB, architects, 5 Hounds-gate, Nottingham.
 T. Cuthbert £725 0 0
 J. Oscroft 700 0 0
 W. Rigley 682 0 0
 R. S. Webster 655 0 0
 W. J. Bains 650 0 0
 H. GILBERT, East Kirkby, Notts (accepted) . 650 0 0

LINCOLN.

For erection of electricity works, offices and stores on Brayford Side. Mr. R. A. MACBRAIR, city surveyor.

J. M. Harrison £4,990 0 0
 W. Pattinson & Sons 4,553 0 0
 H. S. & W. Close 4,081 0 0
 Halkes Bros. 3,996 0 0
 W. WRIGHT & SON (accepted) 3,756 9 4

For erection of a tall chimney on Brayford Side. Mr. R. A. MACBRAIR, city surveyor.

Myles & Warner £1,289 11 0
 W. Pattinson & Sons 1,253 0 0
 H. S. & W. CLOSE, Lincoln (accepted) . . . 1,175 0 0

For supply and erection of cast-iron tanks, wrought-iron girders, roof trusses, chequer plates and other ironwork.
 Mr. R. A. MACBRAIR, city surveyor.

W. Lucy & Co. £614 0 0
 Porter & Co. 561 4 11
 W. FOSTER & CO., Lincoln (accepted) . . . 508 17 0

For supply, delivery and erection of electric-lighting plant, for the Corporation. Mr. C. S. VESEY BROWN, electrical engineer.

Accepted tenders.

Callender's Cable Co., cables £2,108 18 7
 Laurence, Scott & Co., engines, dynamos, &c. . 1,481 0 0
 Ruston, Proctor & Co., boilers 850 0 0
 Nalder & Hilton, switchboard 737 10 0
 Chloride Storage Syndicate, storage batteries . 696 0 0
 Green & Sons, fuel economiser 148 5 0
 Note.—For boilers there were 7 tenders sent in, engines, dynamos, &c., 30, fuel economiser 3, storage batteries 7, switchboard 19, cables 8.

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For alterations to 70 to 76 Courthill Road. Mr. ALBERT L. GUY, architect.	
J. Lawrence	£320 0 0
E. Mills	253 0 0
W. Anderton	220 0 0
Weatherley & Sons	213 0 0

LOUGHBOROUGH.

For erection of the Green Man Hotel, Swan Street. Mr. W. T. HAMPTON, architect, Swan Street, Loughborough.	
Corvett	£2,890 0 0
Main, Kendal & Main	2,820 0 0
Kirk & Fletcher	2,655 0 0
Faulks	2,640 0 0
Dobson	2,636 0 0
Harding	2,629 0 0
Corah	2,618 0 0
Barker & Son	2,605 0 0
Watson & Lovett	2,600 0 0
Moss & SON (accepted)	2,530 0 0
Tailby	2,405 0 0

LOWESTOFT.

For erection of an annexe to the infirmary at Oulton Work-house, near Lowestoft. Mr. ALFRED CLARKE, architect, 126 London Road, Lowestoft.	
Scarles Bros., Norwich	£4,100 0 0
Allerton & Earl	3,887 15 0
Cole	3,866 10 0
W. Cook	3,535 0 0
J. Ashby	3,530 0 0
J. & B. Swatman	3,325 8 6

LONDON.

For pulling-down and rebuilding of 90 High Street, Marylebone. Mr. J. RANDALL VINING, architect and surveyor, 89 Chancery Lane.	
A. Scott & Son	£2,137 0 0
Spiers & Son	1,959 0 0
F. T. Chinchin	1,820 0 0
J. Myring & Co.	1,799 0 0
J. & C. Bowyer	1,793 0 0
Perkins & Co.	1,793 0 0
Jerrard & Sons	1,750 0 0
COULSELL BROS. (accepted)	1,743 0 0

LONDON—continued.

For pulling-down and rebuilding of 4 High Street, Marylebone. Mr. J. RANDALL VINING, architect and surveyor, 89 Chancery Lane.	
C. Wall	£2,105 0 0
J. & C. Woodman	2,020 0 0
E. Lawrence & Sons	1,995 0 0
J. & C. Bowyer	1,733 0 0
H. M. DOVE (accepted)	1,695 0 0
For pulling-down and rebuilding of 88 High Street, Marylebone. Mr. J. RANDALL VINING, architect and surveyor, 89 Chancery Lane.	
F. & H. F. Higgs	£2,398 0 0
C. Wall	2,376 0 0
W. Johnson & Co.	2,324 0 0
J. Myring & Co.	2,157 0 0
W. Titmas & Sons	2,140 0 0
H. M. Dove	2,090 0 0
J. & C. BOWYER (accepted)	1,993 0 0
For new warehouses in Old Barge House Street, S.E., for the Civil Service Supply Association. Messrs. GOODEY & CRESSALL, architects, Colchester.	
Hall, Beddall & Co.	£27,984 0 0
Holland & Hannen	27,550 0 0
Larter & Son	27,484 0 0
Howard & Co.	26,000 0 0
Dove Bros.	25,965 0 0
Colls & Son	25,600 0 0
For erection of shops and warehouses at 178 and 180 Goswell Road. Mr. CHARLES BELL, architect.	
F. G. Minter	£2,300 0 0
For alterations and additions to the King's Arms Inn, Barnsbury Road, N. Mr. ALBERT L. GUY, architect, Bedford Row House, W.C.	
Simmonds & Son	£3,698 0 0
J. Godfrey & Son	3,177 0 0
Beer & Gash	3,051 0 0
S. Jerrard & Sons	3,027 0 0
Pritchard & Renwick	2,999 0 0
Dearing & Sons	2,991 0 0
Courtney & Fairbairn	2,969 0 0
F. VOLLER, Wood Green (accepted)	2,840 0 0

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LONDON—continued.

For painting and repairs, for the Lambeth Estate Company:

Mr. R. T. WREATHALL, surveyor.			
Hobson	£451	0	0
Laing & Son	400	0	0
Pritchard & Renwick	398	0	0
T. G. Minter	354	0	0

For alterations and additions to the Globe public-house, Great Dover Street, Borough. Mr. ALBERT L. GUY, architect, Bedford Row House, W.C. Quantities by Mr. A. R. BREDE, 58 Theobald's Road.

Johnson & Co.	£3,895	0	0
Simmonds & Son	3,658	0	0
Antill & Co.	3,248	0	0
Courtney & Fairbairn	3,201	0	0
Pritchard & Renwick	3,134	0	0
J. GODFREY & SON, Evering Road, Clapton, N.E. (accepted)	3,123	0	0

For laying new drains to infirmary, and alterations and additions to workhouse and infirmary, Fulham Palace Road, W. Mr. A. SAXON SNELL, architect, 22 Southampton Buildings, Chancery Lane, W.C.

T. Adams	£11,027	4	11
W. Keefe	8,824	19	0
H. Wall & Co.	7,562	0	0
T. Nye	7,515	0	0
G. WIMPEY & CO., Hammersmith, W. (accepted)	7,378	0	0
T. Bendon	7,136	0	0

For additions and alterations at 16 Lincoln's Inn Fields, for the Jewish Christianity Society. Mr. C. C. BRADLEY, architect.

Godson & Son	£1,318	0	0
Faulkner & Sons	1,153	0	0
Oldrey	985	0	0
F. G. Minter	897	0	0

For internal cleaning, &c., at the Royal London Ophthalmic Hospital, Moorfields. Messrs. LANDER & BEDELLS, architects, 6 John Street, W.C.

Williams & Sons	£246	0	0
T. Sobey	196	0	0
J. HEEPS (accepted)	141	0	0

LONDON—continued.

For alterations to the Market Tavern, 144 York Road. Mr. ALBERT L. GUY, architect.

Antill & Co.	£4,586	0	0
Ransom & Sons	4,527	0	0
Courtenay & Co.	4,496	0	0
Simmonds	4,391	0	0
Godfrey & Sons	4,285	0	0
Jerrard & Sons	4,093	0	0
Godson	4,021	0	0

Fittings.

Courtenay & Co.	1,236	0	0
Godfrey & Sons	1,218	0	0
Antill & Co.	1,201	0	0
Ransom & Sons	1,141	0	0
Peterson	950	0	0
Godson	931	0	0
Jerrard & Sons	917	0	0
Simmonds	879	0	0

For erection of orchestral saloon and thirty additional classrooms at the Guildhall School of Music, for the Corporation of the City of London. Mr. A. MURRAY, City surveyor, architect. Quantities by Mr. R. J. STAMP.

Ashby & Horner	£20,571	0	0
Lawrance & Sons	20,428	0	0
Mowlem & Co.	20,068	0	0
Larke & Son	18,832	0	0
Kirk & Randall	18,319	0	0
H. J. Williams	18,295	0	0
Patman & Fotheringham	17,421	0	0
Chessum	17,333	0	0
Atherton & Dolman	17,320	0	0
Colls & Sons	17,207	0	0
PERRY & CO. (accepted)	16,695	0	0

MERTHYR TYDFIL.

For erection of seventeen houses, for the Garth Building Club. Mr. MATTHEW WARLOW, architect, Warlow Street, Merthyr Tydfil.

J. James	£4,332	17	6
J. Jenkins	4,295	0	0
S. Hawkins	3,955	0	0
B. Davies	3,816	0	0
J. F. JONES (accepted)	3,382	0	0

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For exterior painting, Central Street.		
C. Gurling	£129	15 0
W. Hornett	169	0 0
Stevens Bros.	99	10 0
E. FOLLEY (accepted)	97	0 0
For exterior painting, Montem Street.		
C. Barker	£240	0 0
McCormick & Son	225	0 0
W. H. Stevens	171	10 0
G. S. S. Williams & Son	171	0 0
STEVENS BROS. (accepted)	158	0 0
For exterior painting, Popham Road.		
G. Barker	£205	0 0
McCormick & Son	189	10 0
Marchant & Hirst	137	0 0
Stevens Bros.	127	0 0
E. FOLLEY (accepted)	117	0 0
For exterior painting, Dalmain Road.		
A. Black & Son	£145	0 0
G. Summers	124	15 0
Jones & Groves	96	0 0
G. KEMP (accepted)	85	0 0
For exterior painting, Wood Street.		
G. Summers	£201	15 0
W. Banks	183	6 0
Jones & Groves	178	10 0
E. PROCTOR (accepted)	160	0 0
For exterior painting, Gainsborough Road.		
G. Wales	£216	0 0
W. Silk & Son	197	0 0
W. Shurmur	190	0 0
J. Kybett	187	0 0
G. Barker	148	0 0
A. W. Derby	159	0 0
T. NICHOLSON (accepted)	147	0 0
For exterior painting, Rotherhithe New Road.		
Johnson & Co.	£193	0 0
Rice & Son	185	0 0
G. Summers	172	10 0
W. Banks	150	0 0
E. TRIGGS (accepted)	133	0 0

LONDON SCHOOL BOARD—continued.

For exterior painting, St. John's Road.		
A. W. Derby	£252	0 0
W. Shurmur	238	0 0
McCormick & Son	195	0 0
W. Silk & Son	195	0 0
J. Kybett	189	0 0
G. S. S. Williams & Son	188	0 0
G. BARKER (accepted)	183	0 0
For exterior painting, Cobourg Road.		
J. Garrett & Son	£355	0 0
W. V. Goad	230	0 0
J. Ford	219	0 0
JONES & GROVES (accepted)	193	13 0
For exterior painting, New Road.		
Holloway Bros.	£243	0 0
F. G. Minter	230	0 0
J. Garnett & Son	179	0 0
Rice & Son	170	0 0
D. Charteris	168	0 0
G. Brittain	156	0 0
J. Ford	149	0 0
Lathey Bros.	149	0 0
Lilly & Lilly	147	0 0
E. TRIGGS (accepted)	143	0 0
For exterior painting, Warple Way.		
Rice & Son	£212	0 0
D. Charteris	155	0 0
R. E. Williams & Sons	151	0 0
Holloway Bros.	140	0 0
F. G. Minter	135	0 0
E. P. BULLED & CO. (accepted)	119	0 0
For exterior painting, Broomsleigh Street.		
F. Chidley	£238	0 0
Marchant & Hirst	154	0 0
W. Hornett	131	0 0
F. T. Chinchin	128	15 0
W. Chappell	128	10 0
E. T. FOLLEY (accepted)	83	0 0
For exterior painting, Trinity Place.		
T. Cruwys	£105	0 0
G. Wales	93	0 0
J. Kybett	85	0 0
G. BARKER (accepted)	70	0 0

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LONDON SCHOOL BOARD—continued.

For exterior painting, Monteith Road.

A. W. Derby	£375	0	0
J. Kybett	347	0	0
J. T. Robey	320	0	0
S. H. Corfield	295	0	0
D. Gibb & Co.	295	0	0
G. WALES (accepted)	271	10	

NEWTON-LE-WILLOWS.

For erection of purifying-house and other buildings at gas-works. Mr. RICHARD BRIERLEY, engineer, Earlestown.

G. Finning	£1,279	0	0
Sayce & Randle	1,148	0	0
E. Bunting	1,063	0	0
Fitzgerald Bros., Earlestown*	1,004	15	0

* Accepted, exclusive of iron roof.

NORFOLK.

For proposed additions to West Norfolk and Lynn Hospital.

R. W. Fayers	£1,223	15	6
W. H. Brown	1,106	0	0
Bardell Bros.	1,055	0	0
H. G. Rudrum,* Kings Lynn	1,028	0	0

* Accepted conditionally.

PERSHORE.

For repairs and painting of the workhouse infirmary, for the Guardians.

D. Panter	£51	12	0
H. J. Probert.	50	0	0
Nicholas Bros.	49	10	0
J. Coombe	30	0	0
A. CROSS & SONS, Pershore (accepted)	29	0	0

PETERBOROUGH.

For road drainage works at Garton End.

J. W. ROWE, Millfield, Peterborough (accepted)	£36	10	6
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Only tender.

For erection of two cottages at North Bank. Mr. J. G. STALLEBRASS, architect, North Street, Peterborough.

Walker	£500	0	0
Bailey	430	4	0
Gray	429	0	0
J. G. Nichols	390	0	0
R. J. Nichols	372	0	0
WATSON & LUCAS (accepted)	369	0	0

PLUMSTEAD.

For supplying twelve steel ventilating shafts, with cast-iron ornamental base and top (steel tube to be 6 inches internal diameter), height 30 feet from ground line. Mr. W. C. Gow, surveyor.

Phoenix Foundry Company.	£300	0	0
Waller & Co.	126	0	0
Stone & Co.	109	16	0
Richards & Co.	107	2	0
Ham, Baker & Co.	90	0	0
Ginman & Son	88	16	0
Blackwall Iron Company	84	0	0
Gibb & Co.	80	0	0
F. BIRD, Regent Street, W. (accepted)	72	18	0

POOLE.

For alterations and other works at the workhouse, Longfleet. Mr. H. F. J. BARNES, architect, Poole.

A. D. Saunders	£90	0	0
BAKER & PEARCEY, Parkstone (accepted)	84	7	6

PRESTON.

For outside painting at the County Asylum, Whittingham. E. CHALLONER & SON, Blackpool (accepted).

RUABON.

For scaffolding, cleaning and painting the Dee Bridge, New Bridge, near Ruabon. Mr. ELLIS W. JONES, district surveyor, Ael-y-Bryn, Wrexham.

A. Badwick	£157	0	0
H. B. Martin	130	0	0
Jenkins & Jones	126	10	0
B. Copleston	105	0	0
E. Jones	95	0	0
T. Downham	85	3	0
W. BURNETT & SON, 4 Mount Street, Wrexham (accepted)	75	5	0
Surveyor's estimate	96	0	0

SALTAIRE.

For additions to Hantsville, Nab Wood, Saltaire.

Accepted tenders.

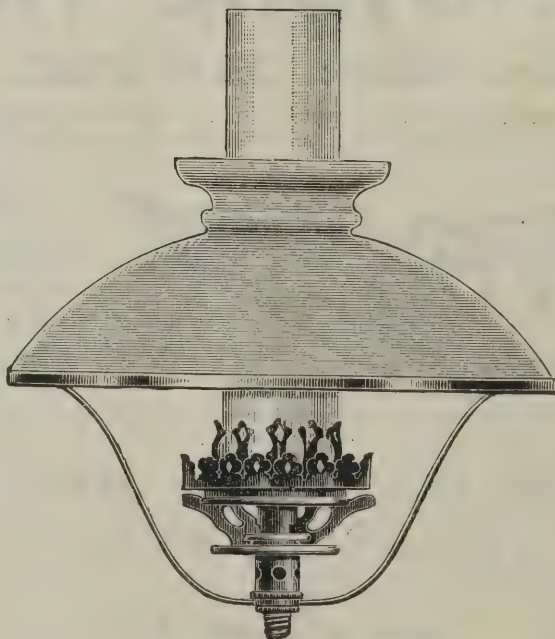
Shackleton, Jones & Chadwick, mason and bricklayer.

J. Fortune, carpenter and joiner.

C. Pickard, plumber and glazier.

A. Taylor, plasterer, &c.

J. Walsh, slater.

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For erection of Sunday-school in Rochdale Road.
W. WHITTAKER, Robin Hill Works, Rochdale
Road, Oldham (*accepted*) £1,800 0 0

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For kerbing and paving with tar concrete the footpath from
Five Lane Ends to Nicky Nack Bridge. Mr. G. W.
ROGERS, surveyor, Silver Street, Spennymoor.
C. Westgarth £935 10 7
F. Dixon 774 17 9
J. CARRICK, Durham (*accepted*) 735 0 0

ST. ALBANS.

For sewerage, levelling, paving, metalling, flagging, channel-
ling and making-good Manor Road and St. Peter's Road.
*Manor Road.*Nicholls & Son £335 0 0
G. COPPER, St. Albans (*accepted*) 305 0 0*St. Peter's Road.*Nicholls & Son 151 0 0
G. COPPER (*accepted*) 130 0 0

SUFFOLK.

For erection of a teacher's residence in connection with the
Swilland Schools. Mr. JOHN S. CORDEN, architect,
Wimbourne House, Ipswich.A. Sadler £593 0 0
G. Barrett 450 0 0
A. E. Kersey 390 0 0
J. GIBBONS, Crowfield (*accepted*) 342 10 0

SUNDERLAND.

For construction of a service reservoir at Seaton Bank Top
and a service reservoir and cottage at Down Hill, West
Boldon.H. FOTHERBY & SON, 30 Berkeley Street,
Burnley (*accepted*), about £26,500 0 0

TEDDINGTON.

For constructing Church Road. Mr. M. HAINSWORTH,
surveyor.*Roadway.*Lawrence & Thacker £3,554 10 0
S. Kavanagh 3,414 15 0
W. Adamson 3,315 15 0
T. Adams 3,275 1 8
T. Free & Sons 3,230 3 4
W. WADEY, Stoke Newington (*accepted*) 2,973 0 0*Tar Paving.*W. Wadey 550 0 0
Lawrence & Thacker 385 10 0
S. Kavanagh 357 1 8
T. Adams 321 2 6
W. Adamson 291 13 4
T. Free & Sons 267 13 4
A. J. Hobman 260 12 6
J. WAINWRIGHT, Shepton Mallet (*accepted*) 231 4 2

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For building a new classroom at the Practising Schools.

T. Tiffett £305 10 0
J. Collier 293 0 0
C. & J. HARRIS, Truro (*accepted*) 245 0 0

WALES.

For erection of an infants' school, outbuildings, &c., on Barry
Island, to accommodate 272. Mr. G. A. BIRKENHEAD,
architect, Caledonian Chambers, St. Mary Street, Cardiff.D. G. Price £2,873 0 0
Lloyd & Tape 2,847 17 0
D. Davies 2,795 0 0
J. Jenkins 2,794 0 0
C. & F. Couzens 2,749 10 0
J. LEWIS, 93 Main Street, Cadoxton (*accepted*) 2,753 12 3
Architect's estimate 2,703 2 8

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WALES—continued.

For making alterations and additions at the Board School, Glanamman. Mr. H. HERBERT, architect, Brynmarlais, Ammanford.

L. Davies	£1,370	0	0
Thomas & Stephens	1,350	0	0
J. Morris	1,249	0	0
Howells & Jones	1,189	10	0
Thomas & Evans	1,184	0	0
J. Howells	1,155	0	0
D. WILLIAMS, Glanamman (accepted)	1,000	0	0

WEST BROMWICH.

For erection of police station, reading-room and caretaker's house at New Park, Hill Top. Mr. ALBERT D. GREATOR, borough surveyor.

J. Harley & Son	£2,720	0	0
J. Malin	2,685	0	0
R. & E. Woodward	2,588	0	0
J. Dallow	2,500	0	0
H. Gough	2,496	0	0
J. Hazel	2,468	0	0
H. SMITH & SON (accepted)	2,449	0	0
Bradney & Lloyd	2,392	0	0
Borough surveyor's estimate	2,400	0	0

WEYMOUTH.

For erection of a residence on the Bingleaves estate. Messrs. JENNINGS & GOATER, architects, Bournemouth.

G. Bevan	£1,717	18	0
Jones & Son	1,678	0	0
G. Whittaker	1,644	0	0
W. Purchase	1,550	0	0
Bath & Co.	1,542	0	0
H. Smith	1,500	0	0
McWilliam & Son	1,479	0	0
F. HORSEY (accepted)	1,420	0	0

WOKING.

For erection of Conservative Club premises in Commercial Road.

A. A. Gale	£2,400	0	0
Loe & Howard	2,399	0	0
G. Kemp	2,397	0	0
J. Martin	2,356	0	0
J. Whitburn	2,307	0	0
M. Wells	2,250	0	0
Harris & Sons	2,227	0	0

NEW CATALOGUE.

MESSRS. MATTHEWS & YATES, LIMITED, of Cyclone Works, Swinton, near Manchester, are sending out a new issue of their catalogue of blowers, electrical goods and other specialties. It contains some excellent illustrations of the "Swinton" dynamos and motors, "Cyclone" electric blower and exhaustor for ventilating purposes, with and without combined steam-engine, electric fans, &c., with descriptive text, price list and other useful information.

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ALTHOUGH the notion largely prevails that it is only necessary to use disinfectants in hot weather, the idea is obviously an erroneous one, as it is in fact in the winter-time, when our houses are closely shut up and fires are in full swing, that the injurious effects of sewer-gas are most likely to be experienced. It therefore behoves the householder to be at least as careful in the winter as in the summer to keep the drains well flushed and disinfected. As a means of doing this both inexpensively and efficiently we have pleasure in saying a few words in favour of the "X. L." automatic disinfectant jar which is being put on the market by the British Druggists, Limited, of 219 Oxford Street, W. It is a simple little contrivance, in the form of a cylinder of porous earthenware, filled with permanganate crystals, creosolic or pinetic fluid, eucalyptus or carbolic acid and hermetically sealed. When placed in the flush-tank of w.c. or lavatory the action of the water slowly dissolves the contents of the jar, with which the water is impregnated, so that with every flushing the drains are automatically disinfected. The contents of a jar, which costs 3s. 6d., are calculated to be sufficient for a year's constant use.

APPLICATIONS were received from twenty-seven architects to advise the Lichfield Guardians upon the proposed alterations and extensions to the workhouse. Mr. W. H. Woodroffe, London, was appointed. The workhouse, which is situated in the Trent Valley Road, was erected in 1840, and was designed by Sir Gilbert Scott. It is of picturesque appearance, in red brick and stone, and small windows with iron diamond-shaped casements, which for a workhouse are not conducive to healthy rooms, and though of quaint appearance are to be removed.

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BUILDING AND BUILDERS.

THE memorial-stone of a new Baptist Sunday school at Earlestown was laid on the 5th inst. The school when completed will cost about 560*l*.

THE foundation-stone of a new Congregational church in Farrar Street, Barnsley, was laid on the 5th inst.

THE ceremony of laying the foundation-stone of St. Mary's new Roman Catholic church, Eccles, will be performed on Saturday, 28th inst.

PLANS have been passed for the erection at Springwells, Airdrie, of an Episcopal church which will accommodate 200, including the choir. The building will be Gothic in design.

THE foundation-stone of the new Radcliffe Hall National Schools, which are being built in connection with the Radcliffe parish church, was laid on Saturday afternoon. The schools are expected to cost between 2,000*l*. and 3,000*l*.

THE plans for the technical school buildings have been received by the town clerk of Bootle, Mr. J. H. Farmer. The site chosen for the buildings is at the corner of Pembroke and Balliol Roads, which will be a most central position and conveniently situated. The estimated cost of the new Technical Instruction School building is 16,800*l*., the amount required for furnishing being included in that sum.

AT the pretty and historic church of St. Chad's, Over, near Northwich, the foundation-stone was recently laid of two new vestries and an organ transept, which are being built at a cost of nearly 1,000*l*. This is the first time since the year 1543 that the fabric of this ancient church, which dates from the reign of Edward I., has been substantially enlarged. For more than 350 years its walls have stood very much as they are to-day.

AT a meeting of the Rowley Vestry it was resolved to apply to the Consistory Court of the Diocese of Worcester for a faculty to collect funds to enable them to build a chancel to north and south transepts of the parish church, springing therefrom a gallery for the accommodation of the organ, and, further, a heating chamber in the base, while on the ground-floor vestries will be erected. This block of buildings will be attached to the existing church, of which, on being consecrated, it will become a part, and will be the first instalment of an entire new church. The committee were also to be empowered to take down the church as soon as they had sufficient funds and build a new church and tower on the same site. The resolution was carried with one dissident.

VARIETIES.

THE new church of St. Matthew's, Douglas, has recently been opened for Divine service.

IT is believed that the contractors of the new North Bridge, Edinburgh, have received instructions to have the work completed at the end of August.

THE nave at Swansea parish church, which has been rebuilt at a cost of 14,000*l*. from designs by Sir Arthur Blomfield, was opened on the 5th inst.

MR. GEORGE FRATER, varnish manufacturer of Newcastle, who left for a tour in Switzerland on the 2nd inst., has been found in an unconscious condition on the road from Annemasse to Geneva. His pockets had been rifled of all his money. He was taken to an hotel, where he died. Mr. Frater's son has left Newcastle for Switzerland to make a searching inquiry into the affair.

THE board of directors of Drury Lane Theatre have decided to have the interior and exterior of the theatre redecorated, a new fireproof curtain put in, and certain other improvements carried out previous to the opening next month. The work is being done under the supervision of the architect, Mr. Philip E. Pilditch.

RUMOUR says that the purchaser of the Sandlea Estate, near Windsor, at the recent auction at Tokenhouse Yard, was Her Majesty the Queen. The best offer before the fall of the hammer was 11,500*l*., which was not a bad price, considering that the lands only comprise sixteen acres, and the house is a very ordinary structure. It has a frontage of about 900 feet to the Thames.

AT a meeting of the directors of the Aberdeen Granite Association on the 4th inst. it was reported that the American Tariff Bill, which had now become law in the United States, had raised the duty on Aberdeen granite from 30 to 50 per cent. There was a feeling that prices were likely to rise on the other side, so that the increase in the tariff would in that case make comparatively little difference in the export trade of Aberdeen.

A NEW reservoir, constructed by the Corporation of Perth, was opened on the 9th inst. at Burghmuir, two miles from Perth. The reservoir is erected at an elevation of 320 feet, which is an altitude sufficient to supply all the higher districts round the outskirts of the city for many years to come. The size of the reservoir is 121 feet square, by 21 feet 9 inches deep. The reservoir when full holds 1,956,084 gallons, being 117,300 gallons more than the existing three reservoirs hold when full.

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THE construction will be commenced almost immediately of a new quay in Brindisi Harbour, alongside which the Peninsular and Oriental steamers will be moored. This new quay will adjoin the harbour railway station, and travellers will thus have only a short way to go between the ship and the train. The quay will be roofed the whole distance from the steamer berth to the station. Plans are being considered for reducing the time of transit between Brindisi and Calais.

SOME time ago two pinnacles were promised for vacant spaces above the chancel of Bury (Lancashire) parish church, and four others were promised by Mr. J. Kenyon, M.P., Colonel O. O. Walker, Mr. J. Aitken and the rector of the parish (the Rev. F. G. Blackburne), on condition that the eight which were required were completed. At the last meeting of the churchwardens and sidesmen the rector offered to give another if the wardens and sidesmen would be responsible for the last out of the church funds. This offer was accepted, and the work is to be put in hand at once, the total cost being nearly 500l.

THE new free library, Burton-on-Trent, is now open to the public. The building is situated in Union Street, and is that which was formerly occupied by the Burton Institute authorities. Since it was taken over by the Corporation extensive alterations have been made and the latest improvements introduced. The fittings are for the most part pitch-pine, the partitioning being ornamented with fancy glass. The electric light has been installed, and the various rooms have been smartly painted and decorated, while the heating apparatus has been greatly improved.

A SERIOUS subsidence, which created much alarm among the church officials, recently occurred in the sanctuary of Dane Bridge parish church, Northwich. The floor was supported by arches, and the keystone and brickwork of one of these gave way owing to the sinking of the foundations caused by brine-pumping. A hole 6 feet long, nearly 4 feet wide and extending to the base of the building was caused. The cavity was planked over and hidden to prevent a panic among the worshippers. The porch, walls, &c., show large fissures, and the whole fabric has suffered considerably. A further subsidence is feared, and entire rebuilding is necessary.

ANOTHER victim of the reprehensible practice of cleaning windows from the outside narrowly escaped a shocking death on Monday last. He was cleaning the windows of a large seven-storey building in Major Street, Manchester, when he fell from the topmost storey into the street. A lorry laden with

Manchester goods happened to be passing, and, alighting upon this, he rebounded and rolled on to the pavement. Had his fall not been thus broken he would inevitably have been killed. He was able to raise himself partially without assistance, and upon being taken to the Royal Infirmary it was found that he was suffering from shock, but it was not considered necessary to detain him as an in-patient.

ST. CATHERINE'S CHAPEL OF EASE, Donore Avenue, South Circular Road, Dublin, was used for Divine worship for the first time on Sunday morning, when the building was opened by His Grace the Lord Archbishop of Dublin at half-past eleven o'clock. The church, which is situated at the corner of Donore Avenue, facing the South Circular Road, and the erection of which cost upwards of 2,000l., is admirably placed, and the attractive plans which were prepared for it have been well carried out. The result is a chapel in every respect worthy of the sacred work to which it is dedicated. The edifice is in the Pointed style in red bricks. Accommodation has been provided for 1,000 persons, but the work has been executed in such a way as to enable additions to be made to the structure without difficulty, as occasion may demand. The roofing of the chapel is elegant and substantial, and the seating and furnishing appropriate. The building stands in from the roadway, from which it is railed off, and the principal entrance is approached by a flagged pathway; there is a second entrance in the southern transept. The decorative work is simple and effective.

A DISASTROUS fire occurred on August 8, in the station buildings at Lochawe, N.B. The fire was first observed a few minutes before nine o'clock, and spread so rapidly that before either hose could be brought into use the station was in flames from end to end. The hotel is built upon a rock facing the west end of the station platform, is connected with the platform by a bridge over the railway, and immediately facing the platform, and in the hotel ground is a shrubbery. The hotel people, finding that all efforts to save any part of the station buildings would be useless, directed their attention to saving the overbridge and the shrubbery, as, if the latter had caught fire, the hotel would be in serious danger. The guests in the hotel lent willing help, and were successful in preventing the fire spreading in the shrubbery, although many of the trees and bushes were destroyed. The station buildings were erected in 1880, when the railway was carried through to Oban, and were constructed in Swiss chalet style of pitch pine on a concrete foundation.

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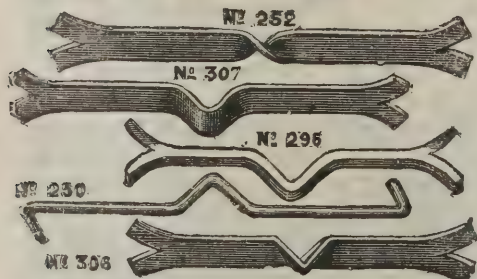
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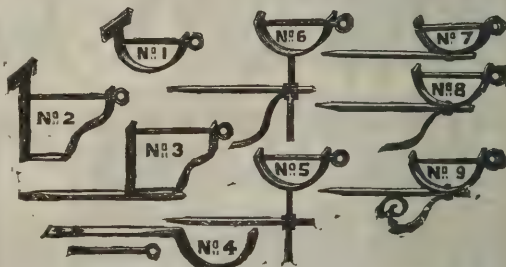
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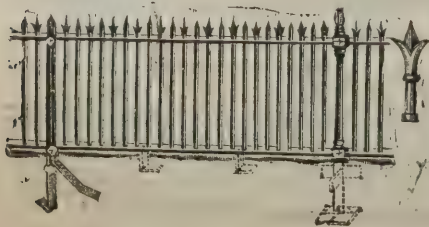
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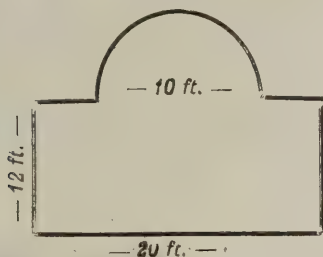
THE SANITARY INSTITUTE.

AT the sessional meetings of the Sanitary Institute from April to June 1897 the following were the examination questions:—

Practical Sanitary Science.—Birmingham, April 9 and 10.

PAPER I.

1. How is rain-water stored and filtered for delivery to towns?
2. Find the cubic contents of a room 20 feet square and 12 feet high, having a flat ceiling, with a hemispherical dome in the middle 10 feet in diameter.



3. What provisions are desirable with regard to window-space in living-rooms? State the sanitary advantages and disadvantages of the various kinds of windows in general use. In what way can any of these forms of windows be adapted for the purpose of ventilation?
4. State the relative advantages and disadvantages of heating by open fireplaces and by stoves. Describe and sketch a good form of open fireplace and a ventilating close stove.
5. Name four soils and compare their advantages or disadvantages as sites for dwelling-houses. Would the stratum immediately underlying the soil affect the question?

PAPER II.

6. What is the object of a "damp-proof course"? Give sketches showing in what position it should be placed to meet various conditions, and state the materials of which it may be constructed.
7. Draw in section, to a scale of 1 inch to a foot, walls of the following materials:—(a) Brickwork, English bond, one

brick thick and two bricks thick; (b) brickwork, Flemish bond, two bricks thick; (c) stone rubble; (d) concrete.

8. Describe and give a sketch plan of the drainage of a cowshed which is built upon a clay soil, 25 feet from a stream, which must not be polluted, and where there is no sewer available.

9. Describe the methods used for jointing iron pipes and for jointing stoneware pipes. How may iron pipes be protected from corrosion? In what circumstances are iron pipes preferable to stoneware pipes?

10. Describe, with sketches, the best methods of providing for drainage from w.c.'s, sinks, baths and rain-water pipes. What arrangements should be made to prevent sewer-gas entering into dwellings?

Practical Sanitary Science.—London, May 7 and 8.

PAPER I.

1. Describe the principle and action of a mercurial barometer. How much heavier is mercury than water, and at what height will a column of water be balanced by the pressure of the atmosphere?
2. Upon what conditions do the fluctuations of ground air and ground water depend? In what way do ground air and ground water affect the healthiness of dwelling-houses?
3. Describe fully the best form of domestic filter with which you are acquainted, its method and rate of action, and its effects on water passed through it.
4. What would be the internal dimensions of hollow cubes containing respectively 300 and 1,000 cubic feet of air space? Why is floor area in inhabited rooms important?

PAPER II.

5. Enumerate the different methods of artificially heating living-rooms, describing in each case the changes they may produce in the air of the rooms.
6. State the general provisions of the statute law providing for the abatement of smoke nuisances.
7. Describe the manufacture and methods of testing Portland cement. Of what geological formation is Portland stone? Specify the composition of good Portland cement concrete.
8. What is the object of an oviform section of sewer, and how is the hydraulic mean depth of flow determined?

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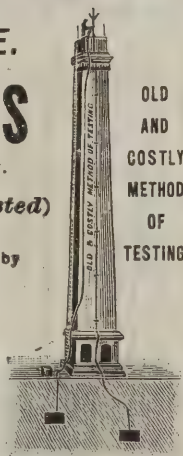
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Practical Sanitary Science.—York, June 18 and 19.

PAPER I.

1. At what temperature does water boil at the level of the sea? Why does it boil? And is there any relation between that fact and the height to which an ordinary pump will lift water? If so, explain it.

9. How is rainfall calculated? How should a rain-gauge be constructed? What is the average rainfall in England? What is the ratio between rainfall and percolation through different strata?

3. Describe in detail the conditions which have to be observed to prevent the pollution of the domestic water supply within a dwelling.

4. Name the different kinds of bricks used in building. What are the relative advantages of each?

PAPER II.

5. Describe some system of warming and ventilation of a hospital, asylum, or public building, on a natural (as distinguished from a mechanical) principle, explaining the methods for the admission of pure and the extraction of vitiated air.

6. What are the legal duties of a private individual with regard to a dangerous infectious disease—e.g. scarlet fever—attacking a member of his family?

7. Draw to scale of $1\frac{1}{2}$ inches to 1 foot the following traps:—Disconnector, Dubois, Anti D., D., Bell, Dip.

8. A house-drain is 40 feet in length, 6 inches in diameter, and falls 1 in 20; at its upper end is a vertical pipe 4 inches in diameter. How many gallons of water will be required to fill the drain and vertical pipe to the level of 4 feet above the invert of the drain at its lower end?

Practical Sanitary Science.—Bristol, July 2 and 3.

PAPER I.

1. What are the component parts of (a) pure atmospheric air, (b) pure water? What are the usual sources of contamination of air and water in dwelling-houses? What is the natural law as to the diffusion of gases?

2. A ventilating shaft is 50 feet high and 18 inches square; how much air would ascend through it per minute when the temperature at the bottom is 20 degrees Fahrenheit greater than that of the atmosphere?

3. What is meant by the terms "Hydraulic mean depth"

—"Head of pressure"—"Specific gravity"—"Capillarity"—"Absorption"?

4. A reservoir is 30 feet in depth; what is the pressure on the bottom of the retaining wall in pounds per square foot, and at what depth is the centre of pressure?

PAPER II.

5. What are the chief causes of contamination of the subsoil of dwellings, and how can they be avoided?

6. Describe the properties and use of the following materials:—Portland cement, chalk lime, asphalté, oolites, lias lime, hair mortar, sandstone and granite.

7. What powers have a rural sanitary authority to make by-laws, and in respect to what nuisances are these limited? Can the Local Government Board increase these powers, and if so under what Act?

8. Describe the proper construction and fitting-up of a valve water-closet and a short hopper-closet, detailing the manner in which the water should be supplied, and the way in which the discharge pipes should be dealt with.

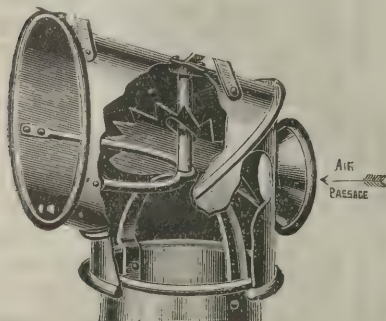
CARPENTERS' COMPANY PRIZES.

THE winners of the medals, &c., presented by the Carpenters' Company to students in the classes conducted under the auspices of the company and the council of the college are as follows:—Building construction, day classes, under Professor Fletcher.—Gold medal and 3/4, H. C. Bishop; silver medals and 2/4, E. F. Knight, A. J. West and C. W. Myddleton; bronze medals and 1/4, G. A. Turner, W. Shelley and A. E. Ruffhead. Evening classes.—Gold medal, J. G. Wiles; silver medals and 3/4, F. G. Pain, S. A. Switern and P. C. Blow (medal only); bronze medals and 2/4, C. W. Beaumont, C. J. T. Dadd, H. C. Bishop, H. Gloyne and W. Marchmont. Lord Mayor's medal for sanitary building construction.—A. Carter, J. Kent, S. A. Switern, T. Graves, J. Gough, W. Drake and C. J. T. Dadd have also won money prizes. All prizes of money are given in books to the value of the prize won. Wood carving classes (amateur).—Silver medals, Miss Carpenter, T. Ainsworth and John Dunn; bronze medals, L. A. Waldron and A. J. South. These medals are accompanied by scholarships tenable at the classes at King's College. The prizes will be presented at King's College on September 30.

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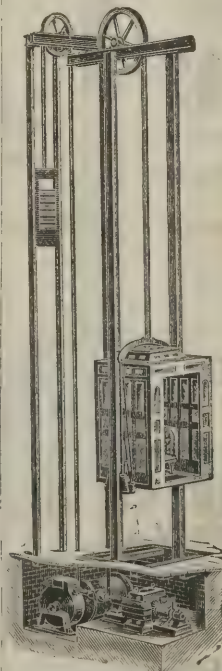
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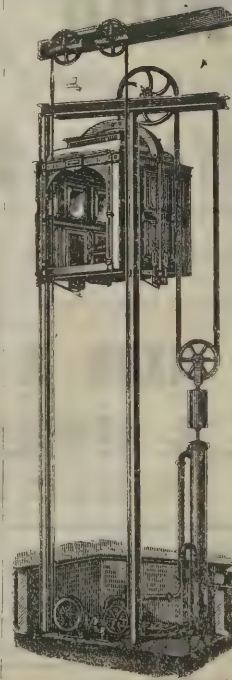
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NEW BATHS FOR SMALL HEATH, BIRMINGHAM.

THE baths and parks committee, in their report to the City Council, submit their proposals for the new suite of public baths for Small Heath, on land already secured adjoining the free library in Green Lane. The elevation of the proposed building conforms in character and style to the branch library. The first-class swimming bath, to be on the south side of the building, will measure 100 feet from front to back and about 60 feet in width. The water area of the swimming bath will be 81 feet by 33 feet wide, and will have a graduated depth of from 4 feet 6 inches at the shallow end to 7 feet at the deep end, and will contain about 90,000 gallons of water. The promenades on each of the four sides of the bath will be about 7 feet 6 inches wide, fitted on two sides and at one end with forty-four dressing-rooms. In addition a separate room will be provided for the use of swimming clubs. A public gallery or balcony will be constructed immediately over the dressing-rooms on both sides and one end of the bath, with separate stairs and entrance from the first-class corridor leading thereto. The second-class swimming bath on the north-east side of the establishment will measure about 97 feet from front to back and about 47 feet in width. The water area will be the same as the first-class bath, and the promenades on each side will be about 7 feet 6 inches wide, but there will be no dressing-rooms, as seats will be fixed against the walls, with partitions between each, giving accommodation for about 125 persons at one time. The men's first and second-class private baths are placed between the two large swimming-baths. Each department will contain seventeen private bath-rooms, and will be fitted up with the most improved white enamelled baths and hot and cold water services, showers and fittings. It is proposed to case the whole of the internal walls of the establishment throughout with white or tinted enamelled bricks, and the floors of the corridors and of the private bath-rooms will be laid in granolithic or mosaic pavement, with special ribbed adamantine tiles round the promenades of the swimming baths next the stone kerb to prevent slipping. A large well, 8 feet diameter, has already been sunk on the site to a depth of 120 feet, and, when completed, will reach a depth of 160 feet below the ground level, and a bore-hole 12 inches in diameter has also been made to a further depth of 465 feet, making a total depth of 625 feet. An ample supply of water has been obtained, equal to about 9,000 gallons per hour, and this will be raised by special deep-well pumping machinery, and discharged

into a cold-water reserve tank, capable of holding from 50,000 to 60,000 gallons of water. The estimated cost (including the well) is 25,000*l.*, and the committee recommend that they be authorised to invite tenders and to proceed with the work.

PYECOMBE CHURCH, SUSSEX.

THE rector and churchwardens of Pyecombe are now engaged in an effort to obtain funds for the restoration of the parish church. The building is of great antiquity, and is interesting from an archaeological point of view, as, in addition to the Norman work, there are some traces of Saxon material to be found in it. A remarkable feature is the triple arch (of more than one architectural style) dividing the nave from the chancel, and the leaden font, which is believed to date from the eleventh century, is also of much interest. Very few leaden fonts are to be found in the kingdom—about twenty, it is believed, three of which are in Sussex churches. The church is in a very exposed position, situated as it is on a hill, so that it has to bear the brunt of "all the winds that blow"—in fact, most of the dwellings in this picturesque parish in the Southdowns are much more sheltered than is the grand old church which has outlived so many generations. And then there is the hand of time, that at once beneficent and destroying power, and so the structure has fallen into bad repair, while the tremendous gale which swept over Sussex on Ash Wednesday of this year brought such serious injury to the church that restoration has become absolutely necessary. It is to be hoped that the work will be begun before another winter sets in, but of course heavy expense will have to be incurred. Among the works which it is necessary to take in hand are the re-roofing of a portion of the tower and nave, restoring the belfry, putting in new windows, with fresh iron, lead, glass and stone-work, painting a portion of the walls with petrifying damp-proof solution, improving the heating apparatus, improving the seating, altering and increasing the accommodation for the school children, putting new guttering and stack pipes to the roof and a new brick drain round the exterior of the building, &c. It is estimated that a sum of 500*l.* will be required for adequately effecting these purposes, a sum which it would be impossible to raise within the parish, which is a purely agricultural one, with a population of 350 and no resident landowners or gentry.

Telegrams, "Imperial, Wolverhampton."

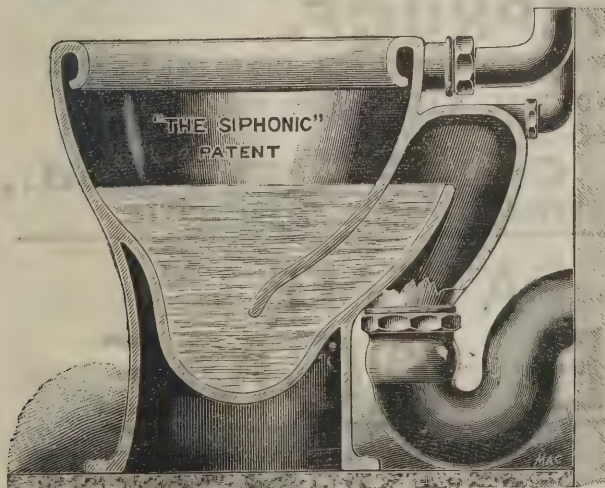
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THE GREAT CENTRAL RAILWAY EXTENSION.

THE extension to London of the railway system which until recently was known as the Manchester, Sheffield & Lincolnshire Railway, but will henceforth bear the name of the Great Central Railway, is making progress towards completion. The London section of the line, which has changed the aspect of St. John's Wood and swept away insanitary areas in the region of Lisson Grove, Marylebone, is being pushed on rapidly. Both the passenger and goods terminal stations are in the parish of Marylebone, the former of which, faced in Marylebone Road by the Grand Central Hotel, will have two long arrival and departure platforms. Down the centre of each is to be a cab-rank. Instead of one large glass and iron span covering the terminus, the roof will be built in short arches. The Grand Central Hotel, now in course of completion, will have a frontage of 200 feet and a depth of 315 feet. The hotel is to have a courtyard after the continental fashion. The terminal buildings also include a goods warehouse and coal dépôt. Having regard to the district now served by the railway and its possession of the port of Grimsby, a huge traffic in coal and fish is confidently anticipated. The goods warehouse will be five storeys high, 380 feet long and 270 feet wide. The coal dépôt will occupy a site formerly covered with slum property, and, in accordance with statutory obligations, the Company have erected blocks of industrial dwellings, presumably for the accommodation of the population displaced. As in most such cases, however, the tenants of the new buildings are not those of the old, but a superior class.

ROCK-CUT TOMBS, TEMPLES, AND HABITATIONS.*

(Concluded from last week.)

THE monasteries, which exceed the temples in number, seem generally to have been square caves supported by pillars of the natural rock left in their places and surrounded by a number of small sleeping places or cells. The most wonderful excavations are those at Ellora, near Aurangabad. These are a series of hypogea or caves sunk in the solid rock, extending a distance of three or four miles. Canina has given plans and views of the interiors of six of them. Those called Parasova Rama and Diannata are simply halls supported on massive piers with level architraves. The piers are richly carved with

figures and friezes and have a sort of cushion capitals and square abaci, and stand round forming a kind of atrium. That called Indra has a court open to the sky, in which is a shrine or small temple. In the solid rock are two halls similar to those before described, a larger and a smaller. The piers of the Tin Tal are quite plain.

In the Viswakarma is a quadrangle open to the sky and surrounded by pillars. This leads into an atrium with three aisles and an apse, and exactly like a basilican church. The most magnificent of the Ellora caves, and indeed of the native Hindoo works, are the chambers and halls called the Kylos or Kailasa. These are sunk into the rock, and occupy a space of 270 feet deep (from front or rear) and 150 feet wide. The roofs are solid rock supported by pillars, or resting on the walls or on the divisions of the assemblage of chambers. There is a porch, on each side of which there are two columns. This conducts into a hall supported on sixteen columns and leading into a sort of adytum. Round this is a passage space and five chambers. The whole forms a temple with its usual appendages, just such a one as would be built on the ground, and round this a wide open space, with a colonnade or cloister encircling the whole. A part is open to the sky for the sake of light and air, but the work is entirely cut out of the solid rock. The date of its construction is about 1,000 of our era. Another celebrated excavated temple is the one at Elephanta, near Bombay. It is 130 feet long, 110 feet wide and 14½ feet high. The ceiling is flat and is supported by four rows of short baluster-shaped columns about 9 feet high. A square pedestal forms about one-third the height of the column. A great portion of the wall is covered with colossal human figures forty or fifty in number, in high relief, and distinguished by a variety of symbols, probably representing the attributes of the deities that were worshipped, or the action of the heroes whom they represented. At the end of the cavern there is a dark recess about 20 feet square entered by four doors each flanked by gigantic figures. Mr. Robertson, whom Mr. Gwilt quotes, says:—

"These stupendous works are of such high antiquity that, as the natives cannot, either from history or tradition, give any information concerning the time, in which they were executed, they universally ascribe the formation of them to the power of supreme beings. From the extent and grandeur of the subterranean mansions, which intelligent travellers compare to the most celebrated monuments of human power and art in any part of the earth, it is manifest that they could not have been formed in that stage of social life where men continue divided

* A paper by Mr. Cyrus K. Porter, published in *Stone*.

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into small tribes unaccustomed to the efforts of persevering industry."

Excavations similar to those at Elephanta are found at Canarah in the island of Salsette, near Bombay. In these there are four storeys of galleries leading in all to 300 apartments. The front is formed by cutting away one side of the rock. The principal temple 84 feet long and 40 feet broad is entered by a portico of columns. The roof is of the form of a vault, 40 feet from the floor to its crown, and has the appearance of being supported by thirty pillars octagonal in plan, whose capitals and bases are formed of elephants, tigers and horses. The wall contains cavities for lamps and is covered with sculptures of human figures of both sexes, elephants, horses and lions. An altar 27 feet high and 20 feet in diameter stands at the further end and over it is a dome shaped out of the rock. Though the sculptures in these caves are low in rank when compared with the works of Greek or Etruscan artists, yet they are certainly in a style superior to the work of the Egyptians, and we infer from them a favourable opinion of the arts in India at the period of their formation. We will bring this part of our subject to a close and proceed at once to the consideration of the last part, "Rock-cut Habitations."

Probably the most extensive system of rock-cutting for tombs, temples and habitations combined is that found in Arabia Petra, known in history as the city of Edom or Idumea. This city or what remains of it is located in a narrow valley among the mountains of Arabia Petra. The entrance to this valley is through a ravine from the east. It is, says a recent visitor—

"About a mile and a half in length, and winds continually, taking unexpected turns, as if it were the most flexible of meandering rivers instead of being a chasm in a mighty mountain wall. About 50 feet from the eastern entrance to the defile a picturesque arch is thrown across from one precipice to the other at a great height. Immediately beneath the spring of the arch on each side niches enriched with pilasters, evidently intended for statues, are sculptured in the face of the rock. At this point the cliffs are from 80 to 100 feet in height and the chasm is not more than 12 feet wide. It is one of the narrowest parts of the chasm. The bottom of the ravine watered by the brook from Ain Musa in the winter descends rapidly on its way towards the west, and the sides become proportionally higher, varying from 100 to 250 feet or more in height. They are everywhere perpendicular and the effect of the narrow strip of blue sky seen from the

gloomy depths below is very striking. Suddenly a flood of light streams across the ravine from a deep gash in the cliffs on the north side and on the south side simultaneously, and beyond it the beautiful rose-coloured temple, Khugneh-Faron, appears carved in the cliff of the southern chasm facing the east. From this point the defile pierced on each side with tombs and caves innumerable turns towards the north-east until it opens into a little glade overgrown with oleanders and tamarisk bushes, a favourite haunt of the present inhabitants of Petra and close to some tombs which serve as convenient dwelling-places. The rock-hewn amphitheatre is just below towards the north. Beyond it the cliffs, still honeycombed with caves and tombs, once more approach each other till a little further to the north they open into the Valley of Petra. The bed of the winter torrent pursues its way and, as it crosses the valley, winds among the ruins of the city of Petra, then enters a defile in the western hills."

The city of Petra or Idumea is of ancient origin, and dates back to the days of the Pharaohs, at the time of the Israelitish exodus from Egypt, when Moses with his whole army came to the borders of Idumea. He sent ambassadors to the king of the Idumeans and desired him to give him a passage through his country, and agreed to send him what hostages he should desire to secure him from injury. The king refused permission, and Moses withdrew his forces and travelled around Idumea through the wilderness. There is no question but what Petra, hemmed in as it was by impassable cliffs on all sides except by its eastern and western entrances, was an important commercial centre. Its limited area and the precipitous cliffs by which it was surrounded would to a great extent prevent it from becoming at any period of its history a very populous city. Its circumscribed area, would have a tendency to compel its inhabitants to resort to the expedient of providing themselves with places of abode in the cliffs of the rocks. Professor Palmer, who visited the locality recently and who contributes several interesting articles in "Picturesque Palestine," thus describes the ancient city. He says:—

"The effect on entering the city is most imposing, the chief monuments being hewn into the solid rock, and the most elaborate façades, pediments and pilasters, and all strictly monolithic. The valley was no doubt occupied in the earliest times by the cave-dwelling tribes who are spoken of in the Bible as Horites, and their dwellings have been enlarged and ornamented by the later inhabitants, and used for, houses, temples and tombs. In some of the caves, notably at the smaller and less known rock-cut towns which still exist in


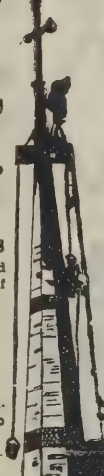
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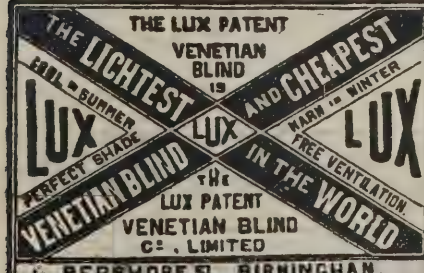


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the neighbourhood, though unknown to travellers, the walls and ceilings are decorated with elaborate and graceful patterns painted in distemper, as bright and fresh as though they had been but lately finished. One ceiling at El Barid, which was discovered by the late Mr. Drake and myself, is painted with festoons of grape vines and convolvuli, with Cupids playing among the branches. The design is evidently Roman, and is extremely well executed."

The ancient architecture of Petra was, under Roman civilisation, so changed and modified that scarcely a vestige of it can now be traced, and its present architecture belongs to the debased Roman style which prevailed in the third and fourth centuries of the Christian era, when the severe simplicity of the Classical period had given way to florid decoration, and harmony of design was sacrificed to striking effect. Professor Palmer in describing the valley says:—

"The first thing which strikes the spectator is the magnificent colour of the rocks. The stone where the surface is old and weathered is of a deep chocolate hue, but where it has been more recently cut or excavated it assumes a bright red, or yellow tints relieved here and there by white, the general effect being that of gorgeous watered silk. . . . At a point in the valley where the ravine takes a sharp turn we come upon one of the most remarkable monuments in Petra, called Pharaoh's Treasury, excavated in the solid rock, and surpassing all the other tombs and temples in beauty of colour and execution. The façade is of a deep but delicate rose colour, which shines out in strong relief against the deep reddish brown of the uncut rock around it and the bright green of the oleanders and other shrubs beneath it. The façade consists of a portico originally of six columns, but one of them has been broken away. The four middle pillars support a pediment. On the apex of this is an ornament which has been variously described, but which on more careful examination proves to be a lyre. Above the whole is a very curious piece of ornamentation. A second pediment the width of the whole façade is supported by two pilasters at each end. The pediment has been cut through on each side of the centre, and the block so left has been fashioned into a cylindrical ornament surmounted by an urn. The cylinder and recess have been furnished with pilasters and dressed to correspond with the front portions. This pediment which has thus been divided into three parts presents nine faces of rock, each having a pilaster on either side, and on these are sculptured female figures with graceful flowing drapery."

It is probable that these nine figures represented the nine muses, and that this beautiful excavation was designed as a museum. Time will not permit me to give a further description of this wonderful city of the rocks. You will pardon me if I suggest that much of the beauty of that enchanting spot comes from the tone and colour of its rocky walls. This of itself should be an important lesson to architects and builders in the designing and erecting of public buildings.

PATENTS.

This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.

APPLICATIONS FOR PATENTS.

18094. Robert Adams, for "Improvements in means and appliances for opening, closing, regulating and fastening at any required angle swing windows, doors, ventilating fanlights and analogous articles."

18150. Hugo Reimer and Harry Tossell, for "Round or flat rod chimney, with attachable springs and rings."

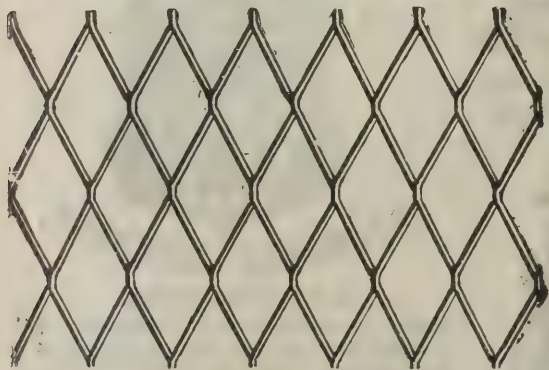
18151. Cyeil Timm, for "Improvements in machines for making bricks."

18248. Philip Middleton Justice, for "Improvements in and connected with apparatus for opening and closing bulkhead and other doors, hatches, parts, valves, gates and the like."

18298. John Williams, for "Wind defier chimney-cowl."

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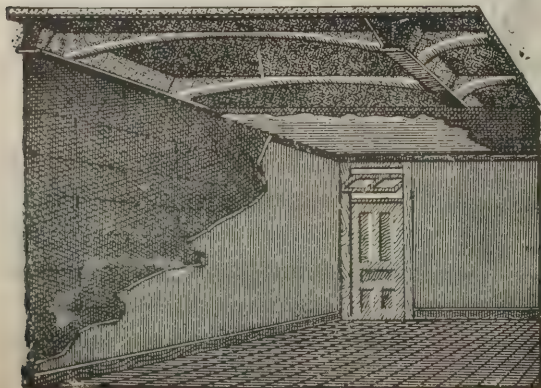
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TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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CONTRACTS OPEN.

ABERDARE.—Aug. 24.—For erection of a detached villa in Abernant Road. Messrs. Watkins & Davies, architects, 4 Canon Street, Aberdare.

BELFAST.—Aug. 28.—For erection of a house on the Antrim Road. Mr. James A. Hanna, architect, 102 Donegall Street, Belfast.

BENSHAM.—For plastering thirteen houses near station. Mr. Morris, builder, Millicent Terrace, Gateshead.

BEXLEY.—Aug. 24.—For repair of old church tower and spire, Bexley Heath. Mr. J. Russell Willmore, hon. secretary, Bexley Heath.

BLACKBURN.—Aug. 28.—For extension and alteration of the buildings at the electricity works, Jubilee Street. Mr. E. M. Lacey, engineer, 10 Delahay Street, Westminster.

BRIDGEND.—Aug. 25.—For erection of a temporary wood and iron block to accommodate 100 patients at the Parc Gwyllt Asylum. Messrs. Giles, Gough & Trollope, architects, 28 Craven Street, Charing Cross, London.

BRIDLINGTON.—Sept. 3.—For erection of board-room offices adjoining the workhouse. Mr. Samuel Dyer, architect, &c., Bridlington Quay.

BRISTOL.—Aug. 31.—For erection of ward accommodation for 150 female patients, a nurses' annexe, isolation hospital, and a dining and recreation hall and offices, &c., at the Lunatic Asylum, Fishponds. Town Clerk, Council House, Bristol.

BRIXHAM.—Aug. 24.—For enlargement of the fish market by the construction of an embankment wall about 230 feet in length, and extending about 26 feet from the southern boundary of the market. Mr. Wm. B. Spark, clerk, Brixham.

BURNLEY.—Aug. 26.—For additions to chancel and new vestries, &c., at St. Andrew's Church. Messrs. Austin & Paley, architects, Lancaster.

BUXTON.—For erection of a retaining wall to the village green, Fairfield. Messrs. Garlick & Flint, architects, Buxton.

CARDIFF.—Aug. 28.—For erection of a truant industrial school near Dinas Powis. Mr. W. H. Dashwood Caple, 1 St. John Square, Cardiff.

CHELTHENHAM.—Aug. 28.—For erection of school buildings opposite the Lyefield Schools, Charlton Kings, and for alterations to the present buildings. Mr. James Villar, architect, 1 Cambray, Cheltenham.

COLCHESTER.—For addition to The Cannons, Layer Road. Mr. Chas. E. Butcher, architect, 3 Queen Street, Colchester.

COLCHESTER.—For erection of a house in Beaconsfield Road. Mr. Chas. E. Butcher, architect, 3 Queen Street, Colchester.

COLNE.—Aug. 26.—For construction of refuse destructor, building engine-house, mess-room, &c., and offices of the proposed health dépôt, off Burnley Road. Mr. T. H. Bartley, borough surveyor, Town Hall.

CORK.—Aug. 26.—For erection of temporary buildings at Cork District Lunatic Asylum. Mr. W. H. Hill, 28 South Mall, Cork.

DERBY.—Aug. 23.—For the brickwork for six refuse-destructor cells, for the Corporation. Mr. R. J. Harrison, borough engineer, Babington Lane, Derby.

DERBY.—For conversion of seven houses into business premises and dwelling-houses, Exchange Street and East Street. Messrs. Coulthurst & Booty, architects, 4 Albert Street, Derby.

DEWSBURY.—Aug. 25.—For construction of warehouse, Church Street, into shops. Messrs. Holtom & Fox, architects, Westgate.

DEWSBURY.—Aug. 30.—For erection and completion of twenty-eight houses, outbuildings and boundary walls at Hill Head, Malkroyd Lane. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

DOVER.—For alterations and additions to wards, &c., at the Hospital. Messrs. Fry & Gardner, architects, Cannon Street, Dover.

DROYLSDEN.—Aug. 28.—For erection of a sludge press-house. Mr. W. Curry, Council Offices, Droylsden.

DURHAM.—Aug. 24.—For enlarging and reseating Wesleyan chapel, Trimdon Grange. Mr. W. R. Woodhead, Trimdon Grange.

DURHAM.—Aug. 24.—For enlarging and reseating Wesleyan Chapel, Trimdon Grange. Mr. W. R. Woodhead, Trimdon Grange.

ELGIN.—Aug. 30.—For erection of villa in Stotfield. Mr. John Milne, architect, Elgin.

ELLENBOROUGH.—Aug. 25.—For enlargement and alterations at the Infants' Board school, Ellenborough, near Maryport. Mr. C. Eaglesfield, architect, Maryport.

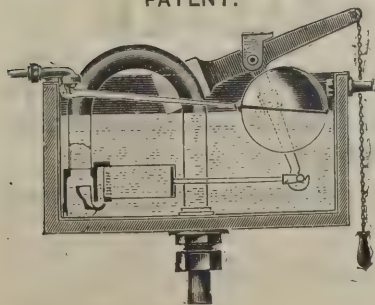
EVERTON AND, MATTERSEA.—Aug. 28.—For painters' work on the property of the Magnus Charity at Everton and Mattersea. Mr. Godfrey Tallents, clerk to the charity, Newark.

EVESHAM.—Aug. 31.—For converting a cottage and meeting-room into a chapel at Willersey, near Broadway. Rev. John R. Newall, Wesley Chapel House, Evesham.

FALMOUTH.—Aug. 31.—For erection of residence and studio. Mr. Horace W. Collins, architect, Penryn Street, Redruth.

ARCHITECTS PLEASE NOTE.

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FERRY HILL.—For reconstruction of billiard-room at Windlestone Hall, Durham. The Agent, Estate Office, Windlestone.

GRANGEMOUTH.—Aug. 30.—For new Established church at Kerse Road. Mr. John P. Goodsir, architect, Newmarket Street, Falkirk.

GRAVESEND.—Sept. 7.—For erection of police cells and other buildings adjoining the town hall. Mr. Chas. E. Hatten, town clerk, Court House.

HALIFAX.—Aug. 24.—For erection of large brass foundry, &c., near Albert Reservoir. Mr. Medley Hall, architect and surveyor, 29 Northgate, Halifax.

HARRINGTON.—Aug. 30.—For erection of two houses, shop and warehouse in Church Road. Messrs. W. G. Scott & Co., architects and surveyors, Victoria Buildings, Workington.

HARRINGTON.—Aug. 30.—For erection of clubroom and two cottages. Messrs. W. G. Scott & Co., architects and surveyors, Victoria Buildings, Workington.

HUDDERSFIELD.—Aug. 23.—For construction of seatings for two Lancashire boilers, foundations for generating plant, additions to flues, &c., for the electric-lighting committee. Mr. A. B. Mountain, borough electrical engineer, St. Andrew's Road, Huddersfield.

HULL.—Aug. 25.—For erection of new junior department for the Kingston-upon-Hull School Board. Mr. W. Botterill, architect, 23 Parliament Street, Hull.

ILKLEY.—For erection of hall and parish-rooms. Mr. W. J. Morley, 269 Swan Arcade, Bradford.

IRELAND.—Aug. 31.—For erection of a bank office at Rathmines. Mr. William Butler, surveyor, 58 Mountjoy Square, Dublin.

KINGSTON-UPON-THAMES.—Aug. 26.—For extension of electric light buildings. Mr. Harold A. Winsor, town clerk, Clattern House, Kingston-upon-Thames.

LIVERPOOL.—Aug. 24.—For erection of chimney shaft in connection with new refuse destructor to be erected on the site of Cobb's Quarry, Everton. Town Clerk, Municipal Buildings, Liverpool.

LURGAN.—Aug. 26.—For erection of a dispensary and dispensary residence at Folly Hill, Aghalee. Mr. Edwin Jas. Donaldson, clerk, Lurgan.

MORLEY.—Aug. 25.—For erection of a Sunday-school and institute. Mr. Charles Gott, 8 Charles Street, Bradford.

MUIRKIRK.—Aug. 26.—For erection of two-storeyed tenement, 36 feet 9 inches long, at Muirkirk. Mr. A. Welsh, secretary Co-operative Society, Limited, Muirkirk.

MYTHOLMROYD.—Sept. 6.—For building a vicarage house in Cragg Vale Road. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

NELSON.—Sept. 7.—For erection of the Walverden Board school. Mr. Thos. Bell, architect, 14 Grimshawe Street, Burnley.

NEW BARNET.—Aug. 31.—For erection of a detached residence. Mr. E. Fergusson Taylor, surveyor, 70-72 Chancery Lane and New Barnet.

NORHAM-ON-TWEED.—Aug. 30.—For alterations and additions to farm buildings at Mount Carmel. Messrs. Hamilton, Mount Carmel Farm, Norham-on-Tweed.

NOTTINGHAM.—For walling-in brick garden, Mansfield Road. Mr. W. H. Radford, Pelham Chambers, Nottingham.

PENZANCE.—For erection of a villa at Carbis Bay. Mr. A. C. Jenkin, 3 Parade Passage, Penzance.

PLUMSTEAD.—Aug. 31.—For erection of 572 feet brick and concrete walling, surmounted by wrought-iron unclimbable fencing, to enclose portion of the Plumstead cemetery next Lodge Lane. Mr. H. H. Church, architect, William Street, Woolwich.

RAMSGATE.—Sept. 1.—For erection of a wall to enclose the proposed addition to cemetery. Messrs. Hinds & Son, 57 Queen Street, Ramsgate.

REDRUTH.—Aug. 23.—For erection of two semi-detached villas, Clinton Road. Mr. Horace W. Collins, architect, Penryn Street, Redruth.

SALISBURY.—Aug. 31.—For erection of a sorting office near station. Messrs. Welch & Atkinson, 10 Lancaster Place, Strand.

SCOTLAND.—Sept. 4.—For erection of public baths at Great Junction Street, Leith. Mr. Simpson, town architect, Town Hall.

SEASCALE.—For brickwork of two houses. Mr. J. Postlethwaite, Seascale.

SHREWSBURY.—Sept. 2.—For construction and erection of engine and boiler-houses, coal stores, chimney shaft and other works at Coleham. Messrs. John Taylor, Sons & Santo Crimp, engineers, 27 Great George Street, Westminster, London, S.W.

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STANTON-IN-CLEVELAND.—Aug. 26.—For pulling-down and rebuilding the Blacksmiths' Arms Inn. Mr. W. H. Linton, architect, Exchange, Stockton-on-Tees.

SWANSEA.—Aug. 26.—For erection of a warehouse on the Victoria Wharf, North Dock Basin. Mr. A. O. Schenk, engineer, Harbour Offices, Swansea.

UXBRIDGE.—Aug. 31.—For erection of a fire-escape house. Mr. William L. Eves, 54 High Street, Uxbridge.

WAKEFIELD.—For erection of shop premises in Kirkgate. Messrs. Gelder & Kitchen, architects, 76 Lowgate, Hull.

WAKEFIELD.—For erection of two semi-detached villa residences, Bradford Road. Mr. W. Wrigley, architect, 4 and 6 Westgate, Wakefield.

WALES.—Aug. 27.—For erection of new police-stations at Mardy and Merthyr Vale. Mr. T. Mansel Franklin, clerk, Pontypridd.

WALES.—Sept. 11.—For the restoration of Llanfihangel-y-Creuddyn Church tower. Rev. J. P. Evans, vicar, Llanfihangel Creuddyn.

WALES.—Aug. 31.—For erection of detached villa residence at Llanwryd Wells. Mr. H. Teather, architect, Andrew's Buildings, Queen Street, Cardiff.

WARRINGTON.—Sept. 20.—For erection of county asylum on the Winwick Hall Estate, Winwick, near Warrington. Mr. Fred. C. Hulton, clerk, County Offices, Preston.

WESTON-SUPER-MARE.—Aug. 28.—For erection of laundry buildings, Moorland Road. Mr. Sidney J. Wilde, architect, Boulevard Chambers, Weston-super-Mare.

WILLENHALL.—Aug. 26.—For mortuary, chapels, entrance lodge and boundary walls in brick and stone, with incidental works. Mr. Charles J. Jenkin, engineer.

WOOD GREEN.—For erection of the new higher-grade schools. Mr. A. M. Butler, architect, 16 Finsbury Circus, E.C.

A HANDSOME stained-glass window has been put in the north side of the Grantham parish church. The four principal panels are devoted to figures of St. Ambrose, St. Jerome, St. Gregory and St. Augustus, and at the foot of each saint is depicted one of the chief incidents in his life. The window is in memory of the late Dr. and Mrs. W. Eaton, of Grantham.

TENDERS.

AMBLE.

For repairing and painting street lamps for the Amble Urban District Council. Mr. W. GIBSON, surveyor, 31 Queen Street, Amble.

Bookless & Turnbull	£8 15 6
N. & T. Young	8 3 0
BROWN & SON, Queen Street (accepted)	7 11 10

BECCLES.

For making-up Denmark Road.

R. Clark	£360 0 0
E. W. Hindes	500 0 0
C. Rackham	470 0 0
B. H. GLENNY, Colchester (accepted)	470 0 0

BLYTH.

For improvements in Union Road.

G. E. SIMPSON (accepted)	£701 17 0
--------------------------	-----------

CARDIFF.

For painting the whole of the wood and iron-work of the abattoirs and cattle market at Roath and Canton. Mr. W. HARPUR, borough engineer.

Roath abattoirs.

E. Bowden & Co.	£325 0 0
D. Mullens	239 0 0
D. R. Bradbury	236 17 6
GOUGH BROS. (accepted)	142 0 0

Canton abattoirs.

D. R. Bradbury	329 15 9
E. Bowden & Co.	205 0 0
D. Mullens	179 0 0
GOUGH BROS. (accepted)	125 0 0

For construction of a dwarf wall and railings round St. John's Churchyard. Mr. W. HARPUR, borough engineer.

J. Allan	£1,885 17 9
S. Shepton & Son	1,821 13 11
E. TURNER & SONS, Cardiff (accepted)	1,698 19 8

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CARNARVON.

For erection of new infant school at Carmel. Mr. R. LL. JONES, architect, Carnarvon.

O. Mortis	£765	0	0
HUGHES & GRIFFITH (accepted)	750	0	0
E. Parry	750	0	0
R. Jones	725	0	0

For erection of a chapel and schoolroom, Edeyrn, near Pwllheli. Mr. R. LL. JONES, architect, Carnarvon.

Griffiths & Griffiths	£3,125	0	0
R. Jones	2,511	0	0
G. JONES, Morfa Nevin, via Pwllheli (accepted)	2,398	0	0
J. Jones	2,392	0	0
D. M. Roberts	2,294	0	0

For erection of a Sunday-school. Mr. R. LL. JONES, architect, Carnarvon.

W. Roberts	£1,764	0	0
Williams & Roberts	1,335	0	0
D. Jones	1,298	0	0
H. HUGHES, Newborough, Llanfair, P.G., Anglesey (accepted)	1,275	0	0
H. Jones	1,232	0	0

CHATHAM.

For rebuilding the Alexandra Hotel. Mr. BOUCHER, architect, High Street, Rochester.

J. & M. Patrick	£3,267	0	0
Wyles	3,100	0	0
Phillips	2,800	0	0
Filley	2,754	0	0
Snow	2,745	0	0
Seagar	2,742	0	0
West Bros.	2,723	0	0
C. E. SKINNER, Railway Street (accepted)	2,661	0	0

CHELTENHAM.

For erection of municipal buildings. A. ESTCOURT & SON, Gloucester (accepted).

CHESTER.

For renovation of the town hall, recently injured by fire. W. W. FREEMAN, Chester (accepted) £7,970 0 0
Lowest of eight tenders received, the highest being £9,491.

CHORLEY.

For painting and decorating the grand staircase, assembly-room and ante-rooms in the town hall. Mr. W. LEIGH, borough surveyor.
CROASDALE & SON, Glover's Court, Preston (accepted).

CLACTON-ON-SEA.

For erection of a block of shops, residences and stables, corner of Wellesley and Carnarvon Roads. Mr. JAMES W. MARTIN, surveyor, Station Chambers, Clacton-on-Sea.

T. W. Dixon, Clacton-on-Sea	£3,714	0	0
Myall & Ellis, Clacton-on-Sea	3,300	0	0
E. West, Chelmsford	3,198	0	0
H. J. Linzell, Clacton-on-Sea	3,080	0	0

CROXDALE.

For erection of Wesleyan church. J. ROSS, Hume Street, Low Spennymoor (accepted) £436 19 6

DARTFORD.

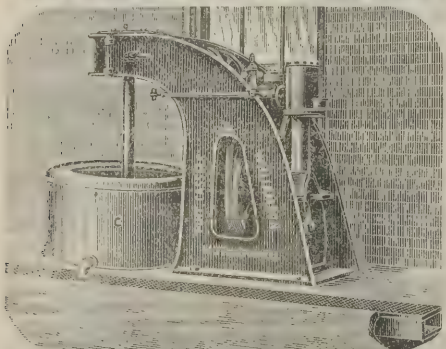
For extending the rain-water reservoir, laying storm-water drain and forming absorbing pond at the Gore Farm Hospital, near Dartford, Kent, for the Metropolitan Asylums Board. Messrs. A. & C. HARSTON, architects, 15 Leadenhall Street, E.C.

Leslie & Co., Limited	£2,300	0	0
Shillitoe & Son	2,200	0	0
Pedrette & Co.	2,097	0	0
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T. HOGG, Blackhill, co. Durham, 2s. 6d. per superficial yard (accepted).

For building a cement concrete retaining wall, about 42 yards long, in the river Skerne, near the Sedgfield Asylum. Mr. W. CROZIER, county surveyor, Durham.

J. Rule £107 0 0
J. CARRICK, Durham (accepted) 71 0 0

FULHAM.

For fitting-up the kitchen department of the Western Hospital, Seagrave Road, Fulham, S.W., for the Metropolitan Asylums Board. Messrs. A. & C. HARSTON, architects, 15 Leadenhall Street, E.C.

Clements, Jeakes & Co. £1,810 0 0
Benham & Sons, Limited 1,492 0 0
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J. Lewis, Treharris £145 0 0
Phillips & Jones, Treharris 143 10 0
J. A. Blatchford, Treharris 142 10 0
Griffith, Owen & Co., Abercynon 141 15 0
J. Bowen, Treharris 141 0 0
J. HOWELLS, Abercynon (accepted) 137 10 0

HALIFAX.

For erection of fireproof stables for eighty horses, large coach-house, offices, manager's residence, &c., in Fenton Road, King Cross. Messrs. RICHARD HORSFALL & SON, architects, 15 George Street, Halifax.

Accepted tenders.

B. Riley, mason.

S. Hanson, joiner.

J. W. Clayton, plumber.

S. Robinson, slater.

G. Greenwood & Son, concreter.

Bagshaw & Son, ironfounder and steel roof.

HAMMERSMITH.

For erection of a factory at Brook Green, Hammersmith, for the Incandescent Electric Lamp Company. Mr. J. W. STEVENS, architect and surveyor, No. 21 New Bridge Street, London, E.C.

Dearing & Son £7,490 0 0
Prestige & Co. 7,414 0 0
Holliday & Greenwood 7,362 0 0
White & Co. 7,342 0 0
Whitehead & Co. 7,245 0 0
W. & H. Castle 7,240 0 0
J. Carmichael 7,177 0 0
Bailey 6,898 0 0
Seymour 6,735 0 0

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For erection of bacon curing and drying-rooms, &c., in extension of the present factory. Messrs. JOHNSTONE BROS., architects, 39 Lowther Street, Carlisle.

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G. Wilkinson & Son 2,825 0 0
W. Reason 2,716 0 0
G. Wiggs 2,448 17 9
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For alterations to carriage works and erection of a new showroom in Church Street. Mr. CHARLES S. LEECH, architect, 24 Victoria Street, Burnham.

A. HARDING, Burnham (accepted) £196 10 6

KEIGHLEY.

For erection of shops, &c., at Ingrow Bridge. Mr. JOHN HAGGAS, architect, North Street, Keighley.

Accepted tenders.

Slater & Waddington, mason.

W. Thornton, slater.

J. King, plasterer.

W. Sugden, plumber.

J. Gill, ironwork.

Total, 897l.

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For repairing the bridge over the Browney, near Malton Colliery.

J. J. SINTON, Lanchester (*accepted*).

LONDON.

For extension of drainage of the workhouse, and also for re-flooring one room in workhouse. Mr. JOHN ENNALS, surveyor, Copford.

Drainage.

Mallett	£122	1	11
W. Shead	110	0	0
R. BEAUMONT (<i>accepted</i>)	107	7	4

Reflooring.

Mallett	16	0	0
W. Shead	14	10	0
R. BEAUMONT (<i>accepted</i>)	14	0	0

LLANDAFF.

For erecting stabling, greenhouse, &c., at Netherwood. Mr. JOHN W. RODGER, architect, High Street, Cardiff.

W. Thomas & Co.	£492	0	0
W. Cox	461	9	4
Gough Bros.	447	10	0
Shepton & Son	431	10	0
Powell & Mansfield	419	0	0
CADWALLADER & HOCKRIDGE, Cardiff (<i>accepted</i>)	394	0	0
Jones & Maddren	385	10	5

LONDON.

For removing the wall at the junction of Queen Victoria Street and Upper Thames Street, and for substituting a flight of steps.

Mowlem & Co.	£390	0	0
PEDRETTE & Co., Finsbury Park (<i>accepted</i>)	362	0	0

LYMINGTON.

For driving of piles and repairs to the town quay. Mr. J. PYM JONES, surveyor.

J. Buckle, Station Yard	£54	5	0
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NANTWICH.

For painting the outside wood and ironwork of the children's homes at the workhouse.

C. Kaye, Crewe	£18	0	0
T. H. Barrow, Sharrington-cum-Gresty	14	15	6
W. Barnett, High Street, Nantwich	9	8	6
J. HEATH, Beam Street, Nantwich (<i>accepted</i>)	8	18	6

NEWMARKET.

For additions to hospital, Fordham Road, Exning. Mr. JOHN BROWN, surveyor and inspector of nuisances, Burwell, Cambs.

TWEED BROS, Moulton (<i>accepted</i>)	£170	0	0
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NORWICH.

For painting the outside of the old asylum, and also for certain inside work. Mr. T. W. B. HESLOP, county surveyor.

Painting outside.

J. Wright	£398	19	0
T. C. R. King	279	0	0
Watson & Kirby	260	0	0
R. W. Riches	257	0	0
J. ANDERSON & SON (<i>accepted</i>)	236	0	0

Inside.

Anderson & Son	240	0	0
Watson & Kirby	230	0	0
J. Wright	219	18	0
T. C. R. King	215	0	0
PULLEN & MOSE (<i>accepted</i>)	179	10	0

POCKLINGTON.

For erection of kitchen wing, classrooms, drainage, &c., at the grammar school, Pocklington. Messrs. DEMAINE & BRIERLEY, architects, 13 Lendal, York.

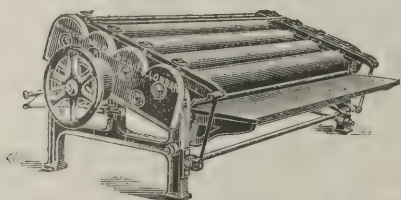
Accepted tenders.

T. S. Ullathorne, brick and stone and carpenter	£4,264	2	3
H. Hopkins, plumber and glazier	666	0	0
Johnson & Sons, plasterer	378	18	0
Sharp & Harper, slater	283	10	0
Bellerby & Son, painter	95	0	0

PORTSMOUTH.

For roadmaking, fencing, &c., at new infirmary at workhouse. Mr. C. W. BEVIS, architect, Elm Grove Chambers, Yarrow Road, Southsea.

J. Ford	£1,273	12	4
W. W. Evans	850	0	0
W. H. SAUNDERS & Co., Southampton (<i>accepted</i>)	730	0	0

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H. Thrickett, Crawshawbooth, mason	£475	0	0
T. Tattersall, Haslingden, joiner	180	0	0
J. Halstead, Rawtenstall, plumber	69	0	0
T. E. Cowpe, Rawtenstall, plasterer	69	0	0
A. Haworth, Rawtenstall, slater	40	15	0

SLAITHWAITE.

For erection of four dwelling-houses in Meal Hill Lane, Slaithwaite. Mr. J. BERRY, architect, 9 Queen Street, Huddersfield.

Accepted tenders.

W. Holroyd, mason.
J. Varley & Son, joiner.
F. Goodall, plumber.
W. E. Jowitt, slater.
J. Walker, plasterer and painter.
Total, £1,100.

SLOUGH.

For work and materials required in laying about 520 yards of 9-inch stoneware pipe sewer for the construction of a surface-water sewer and manholes, Windsor Road. Mr. W. WHITE COOPER, surveyor.

Free & Sons	£437	6	7
H. R. Atkins	355	8	7
T. Turner	316	8	6
H. Bowyer	294	3	7
Ketteringham	291	0	0
J. DEVERELL, Slough (accepted)	280	19	2
C. Summers	276	7	7
J. Porter	273	0	0

TADCASTER.

For taking-up an old rubble sewer in Westgate, Tadcaster, and for laying about 260 yards of 12-inch earthenware sanitary-pipe sewer in its place, with inspection chambers. Mr. H. DENHAM, surveyor, Aberford, near Leeds.

W. Thurlwell	£124	18	2
G. Bilbrough	110	12	0
J. RODGERS, Castleford (accepted)	99	6	4
Surveyor's estimate	96	2	0

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For supply of electric-lighting requisites, for the Corporation.

Accepted tenders.

J. Spencer, Wednesbury, combined arc lamp and trolley poles. Crompton & Co., arc lamps and accessories.

TAMWORTH.

For painting, &c., at the isolation hospital, Mr. HENRY J. CLARSON, architect, 22 Church Street, Tamworth.

H. M. Dimbleby	£83	18	0
C. Dent & Son	74	0	0
A. BROWN, Leicester (accepted)	52	10	0

TAUNTON.

For erection of six almshouses in St. James's Street. Mr. J. HOUGHTON SPENCER, architect, 8 Hammet Street, Taunton.

F. W. Rowsell	£1,275	16	0
H. J. Spiller	1,270	0	0
A. J. Spiller	1,245	13	6
H. S. Cook	1,240	0	0
G. Handford	1,128	8	0
G. H. Pollard	1,125	0	0
J. Morse	1,124	0	0
T. Manning	1,120	0	0
T. MOGGRIDGE (accepted)	1,070	10	0

THORNHILL.

For construction of a boundary wall round the site of infectious hospital at Bunker's Hill. Mr. S. W. PARKER, surveyor, Council Offices, Thornhill.

Land & Gothard	£343	16	6
R. Booth	262	6	8
W. Kilburn	260	10	10
E. Wilcock	258	0	0
E. SHEARD, Thornhill (accepted)	250	0	0

TOOTING.

For erection of boundary walls, fences, and gates at the site of Tooting Bec Asylum, for the Metropolitan Asylums Board. Messrs. A. & C. HARSTON, architects, 15 Leadenhall Street, E.C. No quantities.

Thos. Gregory & Co.	£3,459	0	0
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T. J. Messum	989	0	0
Taylor & Kensett	588	0	0
J. T. Bassano	507	0	0
W. Went	395	0	0

UXBRIDGE.

For additions to premises, Laundry Yard. Mr. WILLIAM L. EVES, architect, 54 High Street, Uxbridge.

Westacott	£245	10	0
Briant & Son	241	9	6
Kearley	219	17	0
Pratt	179	15	0
H. GRANGE (accepted)	170	0	0
Ward	168	18	0

For sewerage works. Mr. B. FREEMAN, surveyor, Uxbridge.

J. A. Holland	£128	15	0
J. Salter	90	13	6
Over Bros.	87	0	0
H. C. Belch	71	2	0

WALES.

For supplying and laying about 850 lineal yards of 12-inch stoneware pipe sewer, with the necessary manholes, lamp-holes, flushing valves, &c., required for the extension of the Llanishen sewerage system to Cefn Coed. Mr. W. FRASER, engineer, 17 Queen's Chambers, Cardiff.

G. H. Munday	£522	12	6
J. Ford	519	12	0
C. Gardener	453	5	8
Williams, Thomas & Co.	452	8	10
Barnes, Chaplin & Co.	439	11	3
E. Moore	404	19	4
W. Amos	396	18	8
Batchelor & Snowdon	396	12	7
F. ASHLEY, Canton, Cardiff (accepted)	395	6	0
T. Harris	393	7	6
J. Wood	375	5	3

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For erection of a new gasholder.

D. HOWARD, West Bromwich (accepted). £6,385 0 0

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For flagging, kerbing and channelling the footpath in Garstang Road and Whitworth Street, Wesham. Mr. W. H. HENSHAW, surveyor, Wesham.

W. Howarth & Sons £155 10 0
J. MOXHAM, 10 Blackenbury Street, Preston (accepted) 143 14 10

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For rebuilding the Artichoke public-house, Jubilee Street, E., for Mr. Walter Martin. Mr. ERNEST H. ABBOTT, architect, 6 Warwick Court, High Holborn, W.C. Quantities by Mr. ALFRED JOHNSON, 50 Imperial Buildings, Ludgate Circus, E.C.

John Anley	£1,480	0	0
Hall, Beddall & Co.	1,465	0	0
Robert Eddie	1,428	0	0
Alfred Fordham	1,419	3	6
Samuel Salt	1,390	0	0
W. Antill & Co.	1,350	0	0
A. E. Symes	1,324	0	0
T. Wontner Smith & Son	1,276	0	0
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Hall, Beddall & Co.	1,490	0	0
Robert Eddie	1,468	0	0
Alfred Fordham	1,457	7	0
Samuel Salt	1,420	0	0
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A. E. Symes	1,349	0	0
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For erection of a steel girder bridge over the river Ouse at Wilton, near Lakenheath Station. Messrs. T. H. B. HESLOP, county surveyor, Norwich, and F. WHITMORE, county surveyor, Chelmsford.

Price & Corneille	£1,698	14	0
G. Double	1,075	0	0
J. Westwood & Co.	990	0	0
Whitmore & Binyon	870	0	0
M. T. Shaw & Co., Limited	848	0	0
T. H. BLYTH (accepted)	840	0	0

WIMBLEDON.

For stabling, &c. Mr. C. H. COOPER, surveyor. Quantities by Messrs. PRYCE, CUXSON & LEIGH, 17 Victoria Street, Westminster, S.W.

J. Smith & Sons	£9,969	0	0
J. Garrett & Sons	9,940	0	0
D. Stewart & Sons	9,600	0	0
E. P. Bulled & Co.	9,497	0	0
W. H. Lorden & Son	9,444	0	0

WINCHESTER.

For additions to house in Foundry Lane. W. BERRY, St. Cross, Winchester (accepted) . . . £193 10 0

For erection of caretaker's lodge for isolation hospital. Mr. W. F. Y. MOLINEUX, surveyor.

T. Grace	£395	10	0
G. White	373	10	0
C. A. HUTCHINGS, Winchester (accepted)	280	0	0
Surveyor's estimate	303	0	0

WOBURN SANDS.

For enlargement of the Aspley Heath Board Schools. Mr. WM. POOLE, architect, Sydney Cottage, Woburn Sands.

C. Linfield	£1,148	0	0
Rootham & Jeakings	1,047	9	6
D. MANN & SONS, Amptill (accepted)	990	0	0
Fathers Bros.	939	0	0

WORTLEY.

For laying water-mains, Liberty Hill, &c. Mr. G. E. BEAUMONT, surveyor, Workhouse, Grenoside, near Sheffield. E. Butcher, Wadsley, Sheffield . . . £177 10 0

WOOLWICH.

For supplying and laying Aberdeen granite pitcher paving, and Jarrahdale jarrah wood paving in the unpaved main roadways through which the tramway passes. Mr. H. O. THOMAS, surveyor, Town Hall, Woolwich.

W. Griffiths	£8,649	0	0
J. MOWLEM & Co., Westminster (accepted)	8,199	0	0

WREXHAM.

For erecting shop and stores in Argyle Street. Messrs. DAVIES & MOSS, architects, 11 Regent Street, Wrexham.

W. Hughes	£1,050	0	0
J. Hughes	880	0	0
Davies Bros.	855	15	0
W. E. Samuel	810	0	0
Turner Bros.	749	0	0
R. JONES (accepted)	740	0	0
R. Williams	734	0	0

TRADE NOTES.

THE new sanatorium, Hastings, is being warmed and ventilated by means of Shorland's patent Manchester stoves, grates and patent exhaust roof ventilators. The Linslade Rural District Hospital, Leighton Buzzard, is also being warmed and ventilated by means of Shorland's patent Manchester grates, patent exhaust roof ventilators and special inlet panels.

THE new novel, "The Spirit of the Day," recently published (Beeton & Co., 2s.), is running into a second edition. The press criticisms have been exceedingly favourable, and as it is the first work of any serious import done by the author, Mr. Mulvy Ouseley, he is to be congratulated. H.R.H. the Princess of Wales and the Duke of York have honoured him by accepting a copy of the work.

IN the peristyle of a house at Pompeii recently excavated two fine wall-paintings have been found, probably transferred there from some other building. One of these represents a poetess reading to a female musician; the other a young girl leaning against a pillar, and conversing with a girl seated and wrapped in a large mantle.

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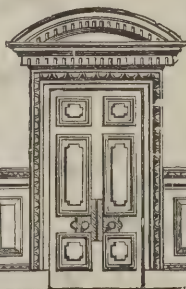
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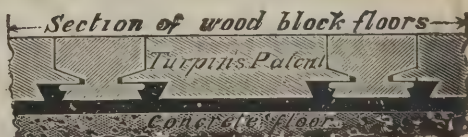
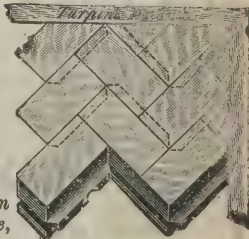
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CATHEDRAL SERIES.—CANTERBURY: BECKET'S CROWN FROM TRINITY CHAPEL.—EFFIGIES OF ENGLISH MONARCHS IN THE ORGAN SCREEN.—CAPITALS.

THE NATIONAL GALLERY OF BRITISH ART, MILLBANK, S.W.—PART OF UPPER GALLERY.—BAY OF SCULPTURE GALLERY.

ELECTRIC NOTES.

THE electricity committee of the Glasgow Corporation have agreed, in view of the city's requirements, to purchase ground near Eglinton Toll, in the southern district, and a portion of land near Phoenix Park, in the north-western district, as sites for new producing stations. It is believed that these sites will meet the necessities of the city for at least a quarter of a century.

At a meeting of the lighting committee of Aberdeen Town Council Mr. Lewis Anderson, the lighting inspector, submitted three schemes for the improved lighting of Union Street. Decision was deferred until information has been obtained as to the difference in the cost of lighting by gas and by electricity. The feeling of the committee was in favour of electric lamps along the centre of the street. It was decided to erect four overhead electric lamps in Market Street.

At a meeting of the Harrogate Town Council, the electric committee made application to borrow the sum of 16,500*l.* for the purpose of extending the electric-lighting plant and works, situate on the Corporation Farm, just outside the borough boundary. Councillor T. H. Thwaites, chairman of the committee, stated that the proposed extension was essential owing to the increased demand that had been made for the electric light. The Corporation have decided to apply to the Local Government Board for sanction to borrow the sum named. The electric-lighting works have already cost 27,000*l.* The sum of 3,000*l.* of the proposed loan will be applied for the purpose of further street lighting.

JAMES GRIFFIN, New Bedford, Mass., U.S.A., formerly of Bath, an employé of the Fall River Mass. Electric Lighting Company, was electrocuted on Friday, July 30, while engaged in stencilling the arms of a pole. His body came in contact with the ends of two tire wires which held cables to the poles, and he received 2,000 volts, alternating current, killing him

instantly. He fell backwards to the ground, 21 feet, and his skull was crushed and both arms were badly burned. Griffin was about forty years of age and leaves several children. He was considered a careful and experienced man.

BUILDING AND BUILDERS.

THE watching committee of Aberdeen Town Council have approved the plans for the new fire brigade station in King Street. The buildings are estimated to cost 11,896*l.*

Two men employed in erecting new chemical works at Baxenden, near Accrington, were killed and three others severely injured by falling off a scaffold. They were working at the first storey, when the scaffold gave way, and they were hurled to the basement.

WHILE a slater's labourer named Philip Fernie, thirty years of age, and residing at Commercial Road, Glasgow, was working on the roof of a building, 36 feet high, in William Street, Glasgow, he fell to the ground. The only injury he sustained, however, was a few bruises.

THE public health committee have recommended for approval by the Chester Town Council the tender of Mr. Freeman, to erect the same for 14,400*l.* The Local Government Board have sanctioned the expenditure. The site of the proposed hospital is on the Sealand Road, about a mile from the city, and it is intended that the works shall be commenced at once.

THE church of All Saints, Thwing, near Hunmanby, is to be restored. The church dates back to the twelfth century, and contains Norman work. It is proposed to preserve all its ancient features, but the pews will be replaced by open seats. The fine old font, which had been removed from the church and was lying in a garden in another parish, has been repaired and restored. An estimate of partial restoration is 750*l.*, and of entire restoration 1,000*l.*

SCAFFOLDING has been erected round All Saints Church at the East Street corner of the High Street, Southampton, and workmen are engaged in knocking off the old cement which composed the outside of the sacred edifice. The work that is to be done is to re-cement the exterior of the building, together with certain other repairs and renovations to both exterior and interior. The work is being carried out by Messrs. Jenkins & Sons, Portland Street, Southampton, and Bournemouth.

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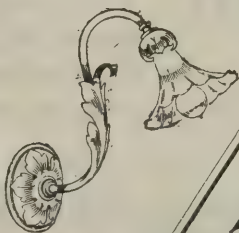
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VARIETIES.

THE new tower of Flamborough parish church was formally dedicated by the Archbishop of York on the 11th inst.

MR. YOUNG, Lord Penrhyn's manager, was able on Wednesday last to accept the terms which were offered by the men for his approval. The conditions will be made known to-morrow (Saturday) evening.

THE West Lancashire Rural District Council have recommended the Formby parochial committee to take into consideration the question of forming a separate drainage district for Formby, so that the expenses of such a work may be borne by the township, and not by the Council's district.

THE plans of Messrs. Stevenson & Burstall, of London, for the reconstruction of the Douglas sewerage system, at a cost approaching 50,000*l.*, have been approved. The tender of the Stanton Ironworks Company, Limited, Nottingham, for the supply of iron pipes in connection with the scheme, for 3,481*l.* 11*s.* 3*d.*, was accepted.

IN the course of a severe thunderstorm recently experienced in the Vale of Leven the lightning struck an iron gaspipe in Renton parish church, and running along, it reached and melted the lead pipe in one of the back lobbies. The gas igniting, set fire to the flooring. The church officer, John Graham, was fortunately in another part of the building, and, alarmed by the smell of gas, soon found out the cause. A joiner was got, and tearing up the flooring, had the smouldering wood extinguished.

AT the quarterly and special meeting of the Leeds County Council the scheme for the erection of a wholesale dead meat market and abattoir on a portion of the market estate bounded by York Street, Harper Street and Sykes Place, at an estimated cost of 24,000*l.*, was adopted, and it was resolved to offer premiums for the preparation of plans and estimates.

AN exhibition will be opened at the People's Palace in October next illustrative of trade in all its branches and of inventions brought to light during the Queen's reign. The adjudicators in the various sections will be appointed from the largest and most important firms in the various trades competing. Medals specially designed will be awarded to manufacturers and individual artisan exhibitors.

THE annual demonstration of the National Association of Plasterers and Labourers (Manchester branch) was held on the

14th inst. at the New Brighton Tower Grounds. The party arrived at the Central Station by special train about ten o'clock, and headed by two bands and banners setting forth their claims and advantages, perambulated the principal streets of the city. They were under the superintendence of the general secretary of London, Mr. Dellei, and Mr. M'Laren, secretary of the Manchester branch.

THE new Theatre Royal, which is being erected in Rolfe Street, Smethwick, will be opened on September 20. The theatre is constructed on the most modern lines, and will be capable of accommodating 4,000 persons. The stage is the largest in the district, being 75 feet wide. The building is to be surmounted by three figures symbolic of art, those at the end being 8 feet in height and the centre one 14 feet. The theatre will be lighted with electricity. The builders are Messrs. John Harley & Son, of Smethwick.

AT Messrs. Cordingley & Co.'s forthcoming exhibition at the Agricultural Hall, Islington, which opens on Monday next, there will be, in addition to the largest amount of laundry machinery ever seen under one roof, the finest show of motor cars ever held. There will be seen specimens of steam, gas, petroleum and electrically-driven cars and vans; and that the motor car industry is not dead will be amply proved by some of the very handsome vehicles exhibited. We may mention that specimens of electrically-propelled cabs will be shown for the first time on exhibition, although Mr. Cordingley, the promoter of the exhibition, has had one in use with most successful results for the last fortnight.

THE pended tower formerly connecting the Abbey of Dunfermline with the Palace has been converted into a museum, and was formally opened by Mr. Andrew Carnegie on the 6th inst. The tower, which is a massive oblong building situated at the south-west corner of the abbey grounds and crossing the roadway, was until recently used as a sexton's toolhouse, but through the generosity of Mr. Carnegie it has been transformed into a home for antiquities connected with Dunfermline and neighbourhood. The work of renovating the building has been carried out under the direction of Her Majesty's Office of Works, the plans being prepared by Mr. Hawks, who also undertook the superintendence of the tradesmen. The alterations which it was necessary to make have been of such a character as to retain the whole building in harmony with its surroundings. There are in all four rooms

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of different sizes and shapes. The windows have been filled in with cathedral glass, and in the principal apartment the Scottish standard and the Dunfermline burgh arms appear in the eastern and western lights respectively, while Mr. Carnegie's monogram is shown in another.

AUGILL CASTLE, near Brough, Westmoreland, and about five miles from Kirkby Stephen, has been offered for sale by auction at Kirkby Stephen by Messrs. Thornborrow & Co., of Penrith. The residence, which was offered with $8\frac{1}{2}$ acres of meadow land, was the property of the trustee of the late Mr. J. H. Jackson, of Culgarth. The house has the reputation of being haunted, and has not been occupied during the last fifteen years. Last winter it was visited by large crowds, who are said to have been awed by mysterious lights flitting about the premises. The property was purchased by Mr. Dyson, of Rylstone House, Skipton, for 650/. The castle, which is said to have cost 14,000/. to build, was sold some years ago for over 2,000/. Since concluding the transaction, Mr. Dyson has received numerous offers of sums ranging from £500 to £5,000 profit on the purchase; these, however, he has declined.

THE borough surveyor of Blackpool has submitted to the members of the Council his scheme for widening the Promenade—an improvement that has now been talked of for some years. He shows that the present Promenade varies in width from 24 feet to 70 feet, and the footpath from 5 feet to 17 feet. The scheme, which will probably be put before Parliament for sanction, provides for a footpath 10 feet wide on the east side next the houses, a carriage-way 55 feet, an island footpath 10 feet wide, a raised track for a double line of trams the whole length of the Promenade 20 feet 9 inches wide, and then the Promenade footpath, with a uniform width of 42 feet, faced at the side by a sloping bulking of 15-inch granite setts. The sea wall will be exactly like that on the North Shore works, and will run on the same level till it meets the new Promenade opposite the south end of the Tower, where it will join the upper one. The concrete of which it will be constructed will be 7 feet thick, and faced above the granite hulking with concrete blocks and coping. The estimates state that the cost of the section from the south end to the Manchester Hotel will be 117,896/.; the second section, from the Manchester Hotel to the Royal Hotel, 98,661/.; and the third section, as far as the North Shore Promenade, 132,424/., a total cost of a little under 350,000/.. The scheme has already been considered by the Council, and awaits final decision.

A NEW bonded warehouse nine storeys in height is about to be erected at Bonnington, Leith. Messrs. Pattisons have recently acquired an old sugar refinery for the purpose of extending their storage accommodation. The old buildings are being partly demolished, and partly converted into bonded stores. In addition to the existing buildings, the firm are erecting a new bonded warehouse, which, it is believed, will be the largest in the kingdom. The new building stands on the banks of the Water of Leith, and has a railway siding running into it from the Leith branch of the North British Railway. The new building is 190 feet long one way by 180 feet the other. The height from the foundations is close upon 100 feet. The floorage area is $6\frac{3}{4}$ acres. It is entirely built of brick, and there will be about one million and a half of bricks used in its construction. The interior, having to bear great weights, is entirely constructed with steel standards and steel beams, the old cast-iron construction of bonded warehouses being abandoned. By this means greater strength and greater economy is secured. There are upwards of 2 miles of steel standards in the new warehouse, and $5\frac{1}{2}$ miles of steel beams. It is calculated that when the building is filled with whiskey it will accommodate over 22,000 casks. There are three mechanical lifts in the new building for taking in and discharging the casks, and these can be raised direct from the carts and from the railway trucks without intermediate handling. The lowest floor, which is to be used as a duty paid and bottling department, will be entirely fireproof. The architects for the new building are Messrs. George Beattie & Son, 136 George Street, Edinburgh.

THE River Weaver Trustees have just commenced an undertaking which is intended, by an expenditure of 35,000/., to greatly improve the waterway. The sum has been borrowed, the Cheshire County Council being the guarantors. The work includes the erection of two swing-bridges worked by electricity, the making of new roads and the removal of obstructive locks. One swing-bridge will replace the fixed bridge at Northwich on the high road between Manchester and Chester. This structure is constantly sinking, and though it has been raised as high as the gradients of the road permit, salt craft returning light to Winsford have been unable to pass beneath or have only got through with the utmost difficulty. In order that road traffic shall not be unduly interrupted an alternative swing-bridge and road are being made 400 or 500 yards distant. As the land in the neighbourhood of both is subject to subsidence the weight of the bridges will rest on pontoons,



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which will not be affected by any difference in the levels of the river in times of flood or drought. The town's gas and water will be carried under the river by a duplicate set of pipes placed in syphons. By the removal of the Newbridge Locks, two miles below Winsford, the water level will be raised, thus enabling larger craft to navigate the river and to carry greater cargoes to Liverpool and Manchester. The order for the construction of the bridges, apart from electrical connections, &c. has been placed in the hands of Messrs. A. Handyside & Co., Limited, of Derby, the contract being 16,687*l.* Messrs. Beckett, of Hartford, are making roads at a cost of 3,018*l.*, while the remainder of the work will be carried out by the trustees' own employés.

THE new station at Mauchline, on the Glasgow and South-Western Railway, with increased waiting-room accommodation, is now completed, and has just been opened. The new premises, situated a little to the north of the old buildings, are of the most modern style and in keeping with the increased traffic. Built of Ballochmyle redstone and rough-cast, they consist of a large booking-hall, agent's room, parcels office and booking office, ladies' waiting-room, gentlemen's first-class waiting-room and dressing-room, and a general waiting-room, all tastefully furnished and fitted up. On the opposite side of the main line, where formerly there was no waiting-room accommodation for the convenience of Glasgow and Ayr passengers, there are now two commodious waiting-rooms.

THE report of the architect instructed to ascertain the extent of the subsidence of Dane Bridge parish church, Northwich, has been received, and sets forth that there is "a very serious settlement in the brickwork of the vaulting below the sanctuary, causing the abutment of the arch carrying that portion of the sanctuary floor to give way. In other parts there are settlements in the foundation walls which make the continued safety of the sanctuary very doubtful. Owing to subsidence the font has a bearing on only two of its four foundation walls, and these, with settlement, are very critical. No dependence can be placed upon it." The report concludes:—"I am of opinion that the only portion of the church which is at present safe—apart from subsidence—to use for public worship is the nave between the chancel arch and the cross aisle in line with the entrance porches westward. I consider that the altar should be moved west of the chancel arch, and all the remaining provision for the services should be arranged within these limits until accommodation can be provided by the erection of a framed building."

NEW CATALOGUE.

WE have just received from Messrs. Croggon & Co., of 16 Upper Thames Street, a copy of their new catalogue, or the section of it relating to electric apparatus, comprising electric bells and fittings, telephones and electric-light supplies. It contains numerous illustrations of bells, batteries, pulls, pushes, switches, contacts, fire alarms and accessories of every description. In the lighting section will be found many very pleasing designs in brackets and other fittings, and all prices are plainly given.

A HANDY CONTINENTAL GUIDE.

THOSE of our readers who propose to make a holiday trip to the Continent, whether they intend their stay to be of limited or lengthened duration, should in any case be careful to provide themselves with the excellent and handy "Tourist Guide to the Continent," by Percy Lindley, which is being issued by the Great Eastern Railway Company. Although contained in only some 150 pages, the information is succinctly given, and embraces Holland, Germany, Belgium and Switzerland. Among its excellent features are a series of continental maps, a chapter upon cycling routes in Holland, Belgium and Germany, and a chapter, "Dull, Useful Information," giving particulars as to the cost of continental travel. The price of this useful little volume, which is profusely illustrated and well printed on good paper, is only 6*d.*

THE IRISH CHANNEL TUNNEL.

A REPORT has been presented to the Belfast Chamber of Commerce by the deputation that interviewed the President of the Board of Trade on the subject of the proposed tunnel between the South-West of Scotland and the North-East of Ireland. The deputation report that although they were met by the President of the Board of Trade with every courtesy, their reception was distinctly unfavourable. Mr. Ritchie, they say, expressed the opinion that the construction of such a tunnel was practically impossible, and that if not impossible, the expense might be far in excess of any estimate fixed by several eminent engineers who had been consulted by the deputation; further, that to undertake preliminary inquiries would, on the part of the Government, be a new departure; and, lastly, that those who might be injured by the possible diversion of traffic would raise an opposition with which the

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Government would have to reckon. The deputation assured the Council that they adhered strictly to the instructions they had received, and did not suggest directly or indirectly that the Government should commit themselves to the construction or financing of the tunnel at all. The deputation referred to the strong engineering evidence before them in order to justify and call for inquiry and examination by trial borings and soundings, and the preliminary inquiry which they considered absolutely essential to the formation of anything like a sound opinion on the subject. The deputation suggest that a small committee of the Council, along with the President and the two Vice-presidents, should be appointed to continue in charge of the matter, and also that they be authorised to act with the London committee to further the project. The report was adopted.

IRON AND STEEL CONSTRUCTIONS.

THE following report has been issued by General W. Sooy Smith, United States Government supervising architect for public constructions, on the best means of rendering iron and steel constructions perfectly proof against corrosion and the effects of heat:—

"Rust, under favourable circumstances, will eat to 1 inch depth in iron in eighty years. This means that the steel buildings in Chicago, as they are built to-day, may not survive more than thirty years. To make them perfectly safe corrosion of the steel must be prevented. This is a thing to be accomplished by the use of the new fireproofing material, but I will first consider the effect of fire:—

"Owing to the combustible material in buildings, the present fireproofing as applied to modern buildings will be heated to redness very quickly. Then along come the fire-engines and throw a stream of cold water upon the heated parts of the building. To be good, the fireproofing must be able to resist the combined action of red heat and cold water.

"I have tested nearly all the best fireproofing employed in this city, but not a single one have I found that can be heated to redness and plunged into cold water without cracking. Some of it literally burns up. Some will stand red heat without cracking, but none will withstand the combined action of heat and water as described. Another trouble lies in the fact that nearly all the so-called fireproofing material is a good conductor of heat, a thing which makes it valueless as fireproofing, permitting, as it does, the passage of heat to the steel.

"The rigidity of steel, without being heated to redness, decreases considerably when the temperature rises above 400 deg. Fahrenheit. In this city the fireproofing in any building containing a moderate amount of combustible material would, should the structure take fire, be heated beyond that degree, and even to redness. Then the columns would yield and the building come down with a crash.

"The danger is increased owing to the fact that, with a moderate rise of temperature in a steel building, the beams and girders of the floor systems would expand unequally as the heat varies. These unequal expansions would throw the columns out of the vertical and into a buckling position.

"Instances of this are shown in the fire which destroyed the Manhattan Life Insurance Company's building in New York. The structure was destroyed, although the fire which caused the disaster was in a building 50 feet away. The building of the Chicago Athletic Association was on the point of falling from the same cause, although the fire did not last half an hour. In this case the columns of the lower storeys were completely stripped of fireproofing by the action of the heat and water.

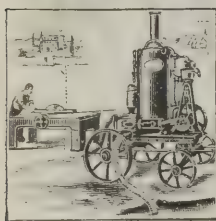
"Fireproofing, to be worthy of the name, must resist the combined action of heat and water and be a non-conductor of heat. In trying to find a material that would serve the required purpose I first tried talc, which is a good non-conductor and very refractory. Soapstone is an impure talc. By mixing this in a pulverised condition with hydraulic cement and other substances I succeeded in making a good fireproofing material.

"While conducting these experiments I heard of a material in the great asbestos mine near Montreal, Canada. There is found in that quarry serpentine rock carrying a large percentage of asbestos. This rock, pulverised and mixed with good cementing materials, makes by far the most perfect fireproofing yet discovered.

"Asbestic, as the new material is called, is invaluable for use in a general way as fireproof plasterings in all sorts of buildings. It will prove especially so in its application as fireproofing for covering the steel parts of buildings.

"It may be heated to 1,100 deg. Fahr. (red heat) without harming its durability. Nails may be driven into it and it will not crack. When the nail is removed nothing but a small hole remains, which may be readily filled with putty or any other substance in order to restore the finish of the wall. Struck with a hammer, there is no breakage, only the indentations showing. Then, again, the material is elastic. If the building

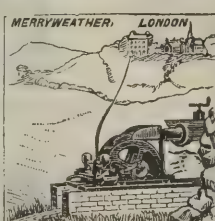
MERRYWEATHER on WATER SUPPLY TO COUNTRY MANSIONS, &c.



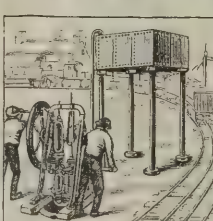
"Estate" Steam Pumping and Driving Engine.



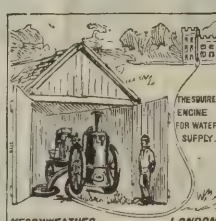
Light Pumping Engine and Boiler.



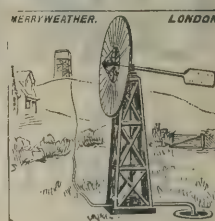
Water Wheel Pumps.



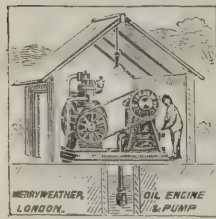
"India" Pattern Pumping Engine.



"Squire" Portable Fire Engine.



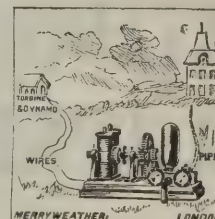
Windmill Pump.



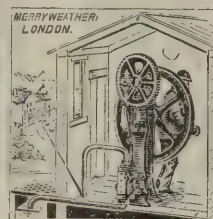
Oil Engine and Pump.



Estate Manual Force Pump.



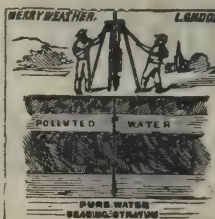
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WHITWORTH SCHOLARSHIPS.

THE following candidates were successful in the competition for the Whitworth Scholarships and Exhibitions, 1897:—

Scholarships value 125*l.* a year each (tenable for three years) to George M. Russell, 25, student, Porchester; George M. Brown, 25, engineer, Swallow; William Du B. Duddell, 24, electrical engineer, London; George Wilson, 25, engineer, Sheffield.

Exhibitions value 50*l.* (tenable for one year).—George Service, 21, apprentice engineer, Cambuslang, N.B.; Edgar J. Kipps, 23, engineer, Bootle; Frank Piercy, 25, draughtsman, Newcastle-on-Tyne; Arthur Morley, 20, student, Manchester; A. Marshall Downie, 21, apprentice engineer, Glasgow; John R. Powell, 22, engineering student, Cardiff; Alfred D. Owen, 19, fitter, Plumstead; Charles C. Allen, 20, tool maker, Manchester, and William J. Rouse, 25, draughtsman, Cathcart, N.B. (equal); Arthur E. Holmes, 25, fitter, Southsea; Alfred T. J. Kersey, 21, engine-fitter, Portsmouth; Edward C. Horsley, 23, draughtsman, Newcastle-on-Tyne; John Berry, 19, engineer's apprentice, Bolton; James Turnbull, 23, locomotive engineer, Glasgow; Thomas Taylor, 24, engineer, Dunblane, N.B.; Robert L. Wills, 23, student, Dublin; James Paton, 22, engineer, Govan, N.B.; Henry T. Sisson, 25, draughtsman, Gloucester; Leonard Ward, 24, fitter, Plumstead; Arthur W. Loveridge, 21, engine-fitter apprentice,

Southsea; Timothy A. Thomas, 25, draughtsman, Plymouth; William Bell, 23, draughtsman, Erith; John R. Billington, 24, draughtsman, Horwich; George Powell, 23, fitter, Crewe; Edgar W. Riley, 20, assistant-engineer, R.N., Dublin; John Marshall, 21, engineer student, London.

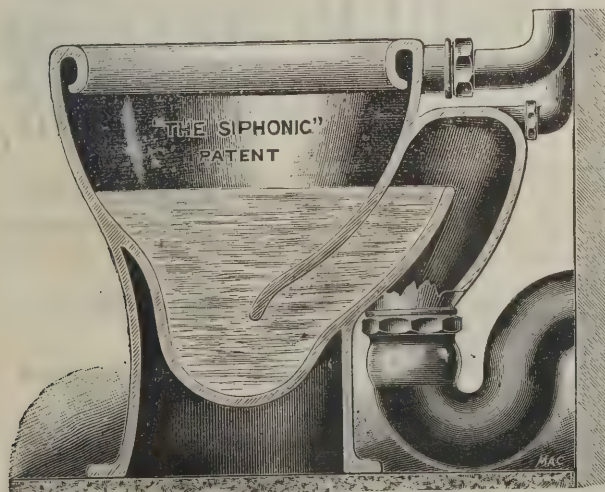
REPAIRING OR REBUILDING SCOTTISH CHURCHES.

WE lately published some of the evidence given by architects and builders upon the condition of the Shettleston Church, which is under the jurisdiction of the Presbytery of Glasgow. The question to be decided was whether the church could be repaired or whether rebuilding was necessary. The expense in the former case would have to be defrayed by one party, and if the church were rebuilt another party would become responsible. The Presbytery of Glasgow declared the church to be in a ruinous state and ordered rebuilding. The "heritors" appealed, and the case was heard in the Glasgow Sheriff Court during several days. Sheriff Strachan confirmed the judgment of the Presbytery. The following explanation by him of the reasons by which he was guided appears in the *Glasgow Herald*:—

In the course of a long note to his interlocutor, the Sheriff said that the church was built about the year 1751. The parish was then only a *quoad sacra*, and it continued to be so until the year 1847, when it was created into a parish *quoad omnia* (except as regarded poor-law administration), and the church then became a parish church. It was admitted that it was now decayed and dilapidated and unfit for its purpose, and the question he had to determine was whether it was to be repaired or an entirely new church erected in its stead.

He was of opinion when the case first came before him (involving as it did a matter of some public interest and importance) that the facts bearing on the condition of the church and on the expediency of repairing or rebuilding it could be ascertained better by a proof than by a remit to a practical person, seeing that his opinion could not be tested by any cross-examination, and that by accepting it he would be compelled to base his judgment on somewhat narrow and restricted data. He could not, of course, say what the result would have been had he followed the latter course, but he had no hesitation in stating that nothing could be more unsatisfactory than the voluminous evidence that had now been piled up in this case. He had never known a more striking instance of the unreliability of expert evidence. It would be very surprising,

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if it were not so common, to see the extent to which men of high character and ability could, when acting as experts, entertain and express the most conflicting and irreconcilable opinions regarding matters with which they must be familiar in their own everyday experience.

Before dealing with the facts of the case one or two questions of a legal character must be determined, and as regarded these he thought it only necessary to refer to the case of *Bertram v. the Presbytery of Lanark* (Carnwath case), July 20, 1864, which was the latest and, in his opinion, the most authoritative decision on the subject.

The first question that arose for decision was this:—Is there any legal standard or criterion for determining whether a church is to be repaired or rebuilt? In regard to this matter it was held in the case referred to that although no definite arithmetical rule could be laid down on the subject, yet it might be considered as settled that if the expense of repairing a church would only be about one-half of the cost of building a new one, in that case a new church, generally speaking, could not be asked for; but, on the other hand, if the repairs would cost three-fourths of the expense of a new church, then a new church might be asked for. If the expense, however, should fall in the large debatable land within these limits the Court would be influenced one way or the other by special circumstances. And, further, it might be held to be settled that the two things to be compared were not the expense of repairing the old church and the cost of building a new one with adequate accommodation, but the expense of repairing the old church and the cost of building a new one with the same accommodation as the old.

The second point to be determined was the meaning to be attached to the word "repairs" when used in connection with this question. Now, he thought it clear that it was not to be understood in the narrow or restricted sense of merely mending, refitting, or restoring to a good or sound state something which had become decayed or been destroyed or injured. It embraced alterations and additions usually falling under the term "reconstruction" where those were necessary for putting the church into a proper and efficient condition. Thus in the case of *Bertram* above referred to, a large portion of the expense taken into account by the Court in determining whether or not the church should be repaired, consisted of the estimated cost of removing the gallery stairs from the inside to the outside of the church.

The third point was this, What is the criterion or standard

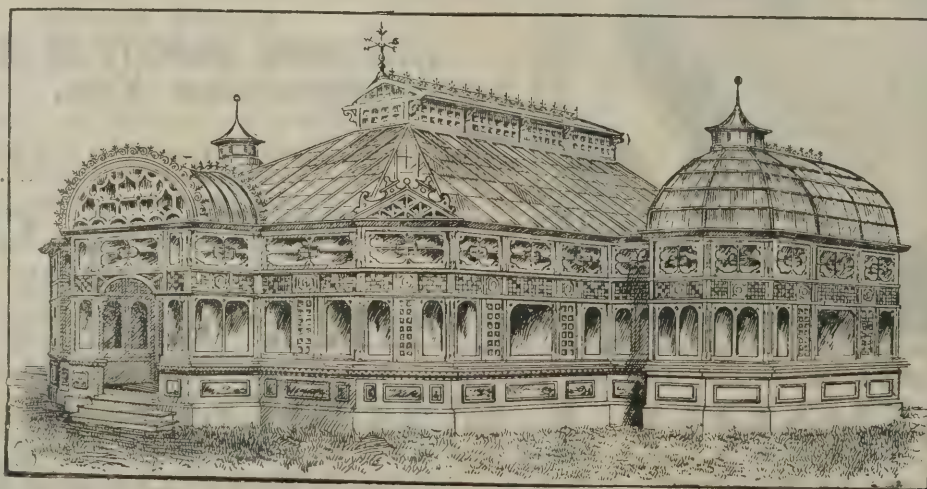
by which the sufficiency of the repairs is to be determined? The heritors' contention on this question was that their duty was discharged if they put the church in as good a condition as it was at the time of its erection in 1751. The case, they said, was entirely different from that of a rich city congregation. The members of that congregation were spending their own money, and could do with it what they pleased; while the heritors, being burdened with the cost of a church which the great majority of them did not attend, and in which they had no interest, were bound to do nothing more than provide a building in which the congregation could worship without risk of injury to their health. In fact, they regarded their obligation very much in the same light as the obligation to make provision for the poor, which was considered to be discharged by supplying them with the plainest food and the cheapest clothing. That was, in his opinion, an entirely mistaken view on their part. There were, unquestionably, very great differences of opinion as to the justice or expediency of providing a church for a particular congregation at the expense of the owners of property in the parish; but there could be no doubt that so long as that was the law of the country it must be administered in a fair, reasonable and equitable manner. What the law required on the part of the heritors was that they provide and maintain in the parish "a suitable and comfortable place of worship." There could, of course, be no formal standard by which the sufficiency of these equipments could be tested; that must be left to the Court to determine in each particular case. He did not think that he should go far astray were he to hold that the standard in the present case might be taken to be the condition into which a modern congregation, possessing the requisite means, would desire to put their own church. Referring to the evidence in detail, the Sheriff said that the controversy as to the state of the woodwork which had been carried on so warmly between the parties was by no means edifying or creditable to them. The witnesses on both sides professed to be perfectly familiar with dry rot, and to be constantly meeting with it in the course of their business—some of them even having been obliged to have experience of it in their own houses; and yet when shown a piece of rotten wood the experts on the minister's side emphatically declared that it was affected by dry rot, while those on the heritors' side with no less confidence maintained that it was nothing of the kind—that it was simply ordinary damp rotting. It was very curious that notwithstanding their professed familiarity with it none of

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the witnesses were able to lay down a common rule by which dry rot could be recognised. Viewing it as a mere matter of evidence he had no hesitation in holding that the dry rot theory had not been substantiated. Besides, notwithstanding all the time wasted over this point it was really not of the slightest importance.

The heritors argued that the vestry was no part of the church, and that they were not bound to maintain it. That, he thought, was a mistake on their part. The vestry was a part or adjunct of the church; it was taken over by the heritors when the parish was erected in 1847, and had since been maintained by them, and would require to be so. As to its present condition it was simply scandalous. He had scarcely ever seen a more dilapidated, depressing and uncomfortable-looking place.

The church was at present heated by a Gill's stove—that was a stove built into the back wall and intended to force heated air into the church through an opening in the wall. It was represented by the heritors to be quite sufficient for the purpose, and they proposed no change. This was unreasonable. It would be difficult to imagine anything more primitive than this system of heating or anything more useless for the purpose it was intended to serve. It could only be termed a heating system on the "lucus non lucendo" principle. According to the evidence it did force some heated air into the church, but it did so, to the extent only of a few pews in the vicinity of the opening in the wall, these favoured places being made uncomfortably hot, while all beyond was left out in the cold. At present there was no attempt whatever at ventilation beyond the primitive method of opening the windows. There really appeared to be no drainage of any kind at present in connection with the church, and the rain and surface water had in consequence no doubt found their way into the foundations and done much to produce the extreme dampness with which the church was affected.

Speaking generally, he was of opinion that if the church was to be repaired, all the operations proposed by the minister, with the exception of the damp-course, would require to be carried out. He was not, however, prepared to say that this must be done in the manner and to the extent proposed by him, or that the estimate made up by his skilled witnesses was to be held conclusive as to the cost. According to that estimate the cost would be 2,224*l.*, from which there fell to be deducted 136*l.* 10*s.*, the estimated cost of the damp-course, and 200*l.* as a reasonable allowance for excess or overstatement in the esti-

mate, making the total cost 1,887*l.* 10*s.* For the purposes of this case the estimated cost of building a new church might be taken as given by Mr. Bryden at 2,916*l.* Three-fourths of that sum was 2,187*l.*; so that the cost of repairing was within the limit which, according to Bertram's case, would necessarily involve the erection of a new church. The choice lay between repairing the old church and re-erecting another of an entirely different character, and at an expense which might be four or five times more than the amount with which the cost of the repairs was compared. If the erection of a new church were ordered, it must be a church capable of accommodating two-thirds of the examinable persons in the parish, that was persons not under twelve years of age. And an idea might be formed of what that meant when it was taken into account that the resident population of the parish was over 15,000 persons. He must do the heritors justice to say that he believed it was not against the erection of a church which would cost 300*l.* they were fighting so keenly, it was against the unknown but necessarily large cost of erecting a greatly enlarged church in conformity with modern tastes and ideas. If he were satisfied that by repairing the present church at a cost of 1,887*l.* 10*s.* it would be put into a "suitable and comfortable" state he would willingly order that to be done. But he was unable to satisfy himself that that would be the result. It would be kept in view that were the repairs carried out which he had held to be necessary, the result would be that the entire structure would be taken down with the exception of the front and two side walls. Now it did seem incongruous to pull down a building 150 years old, with the exception of three bare walls, and then proceed to restore it in the same style as before. Would any prudent man act in this way in dealing with his own property? But he was by no means satisfied with the condition of the walls which it was proposed to leave standing.

On the whole matter he had no difficulty in coming to the conclusion that it was inexpedient to repair the church, and that a new edifice must be erected.

LONDON BOARD SCHOOL BUILDINGS.

THE annual report of the works committee of the London School Board gives an abstract of the work done during the year ended March 25, and shows the progress made in the provision of accommodation which has been sanctioned by the

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Board and the Education Department. The committee, over which General Moberly, the vice-chairman of the Board, presides, after stating what had been done in connection with 10 sites for new schools and additional land for 46 existing schools with regard to which compulsory powers were obtained in 1895-96, report that in the past year it had been decided to schedule 20 sites for new schools and additional land for enlarging 25 existing schools or playgrounds or for the purpose of carrying out general improvements. In some cases, however, the sites and the land had since been omitted from the schedule. During the year the Board agreed to purchase various interests in sites, at a cost of 116,561*l.* 13*s.*, the surveyors' fees amounting to 659*l.* 19*s.* 6*d.* The large amount spent upon sites for school buildings since the Board came into existence will afford some idea of the extent of the provision which has had to be made for the accommodation of the children. The value of all the sites purchased or agreed to be purchased previous to March last was 3,222,412*l.*, and the costs 430,621*l.* According to a table prepared by the Finance Department, the cost of the sites for 325 schools, the accounts for which had been completed at September 29, 1896, was 6*l.* 11*s.* 10*d.* per child, and the average cost per head of the school buildings was 13*l.* 14*s.* 1*d.*, and of the furniture and fittings 10*s.* 7*d.* Up to Lady Day 1896, the total number of permanent schools which had been erected and opened was 409; and during the year under review 9 additional schools and 15 enlargements were opened. The 9 new schools were erected—1 in Finsbury, 1 in Greenwich, 1 in Hackney, 1 in East Lambeth, 2 in West Lambeth, 1 in Southwark and 2 in Tower Hamlets. The total accommodation provided was for 8,072 children, and the cost of sites, buildings and furniture was set down at 237,875*l.* 12*s.* 6*d.*, or an average cost per head of 29*l.* 9*s.* 4*d.* The enlargements were carried out in Chelsea, Greenwich, Hackney, East Lambeth, West Lambeth, Southwark and Tower Hamlets. They provided additional accommodation for 4,761 children at a cost of 98,787*l.*, or an average cost per head of 20*l.* 14*s.* 11*d.* Loans were authorised by the Education Department in respect of the 9 new schools and sites amounting to 239,527*l.*, and on account of the 15 enlargements and sites amounting to 131,202*l.*

As to future provision of schools, tenders were accepted during the year for erecting nine new schools—one in Chelsea, two in Finsbury, two in Hackney, two in West Lambeth, one in Marylebone and one in Westminster—giving accommodation for 9,968 children, at a cost of 170,936*l.*, or 17*l.* 2*s.* 11*d.*

average cost per head. Tenders were also accepted for eight enlargements—one in Greenwich, one in East Lambeth, one in West Lambeth, two in Southwark and three in Tower Hamlets—to accommodate 2,696 children at a cost of 69,832*l.*, or 25*l.* 4*s.* per head. With regard to the new schools, it should be stated that each would be provided with a hall for each department, which was not counted in the accommodation of the school, and the tenders included the provision of centres for cookery, laundry, manual training, or special instruction, and in eight cases a drawing classroom. As to the enlargements, the variation in cost arose mainly from the fact that in enlarging the buildings the opportunity was taken to improve the existing schools so as to make them thoroughly efficient, and in some cases centres were added. Tenders had also been accepted for providing twelve cookery centres, fourteen laundry centres, eighteen manual training centres, seven schools for special instruction, rooms for upper standards at three existing schools, extending a chemical laboratory, providing covered playgrounds at three schools, carrying out drainage and sanitary works to twenty-nine schools, and for other works. The total amount of the tenders for sanitary work at twenty-four of these schools was 32,398*l.*

In their last report it was stated that the committee were carefully considering the whole question as to the cost of the schools, and that they had appointed a sub-committee to consider the subject. This committee, whose report has already been published in the *Times*, recommended, with the view of reducing the cost, that among other things the Board should revert to the old specification in force in 1885-86 for the next six schools, subject to certain modifications; and the Board had sanctioned the experiment. Among the other works referred to the committee state that the proposed deaf institution at Anerley, for which a tender had been accepted for 38,920*l.*, had been abandoned because the Education Department had declined to approve of the plans. The industrial school for girls at Isleworth would soon be ready for occupation. Homerton Training College had been purchased and would be used for temporary school accommodation and for the provision of various centres. During the year 132 schools had been painted or cleaned inside or out. The system of carrying out repairs to buildings by workmen employed direct by the Board was being continued in 9 of the 18 districts of the clerks of works for repairs, the total number of men so employed being 49. On the subject of rates of wages paid by contractors, the report states that in all building contracts a revised clause

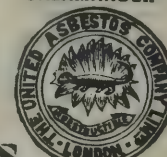
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was now inserted providing that where the London scale of wages applied the contractor should pay to the workmen not less than the rate of wages from time to time mutually agreed upon by the Central Association of Master Builders of London and the representatives of the men's unions, the agreed rate of wages at present recognised being set out in the schedule. In other districts where the London scale of wages did not apply the clause provided that the contractor should pay not less than the minimum standard of wages which might for the time be usual.

At Lady Day last the following amount of school accommodation was in course of provision:—Eighteen schools were being erected providing accommodation for 19,013 children, and 9 enlargements giving accommodation for 3,521 children. Thirty-two additional sites for new schools had been or were to be purchased. The schools to be erected on 20 of these sites would provide accommodation for 17,920 children, and in the case of the other 12 the accommodation had not been determined. Ten new sites for schools had been scheduled, and the schools to be erected on 5 of them would give accommodation for 4,185. Twenty-four enlargements had been sanctioned for 8,075 children, and the Education Department had also sanctioned the provision of sites, which would be scheduled next session, in 5 districts.

The report adds that the playgrounds of 226 schools are now open on Saturdays and 47 on Sundays for the use of the children.

ASSOCIATION OF SANITARY INSPECTORS.

A WELL-ATTENDED meeting of the Association of Sanitary Inspectors of Carnarvonshire and adjoining districts was recently held at Colwyn Bay. Dr. Fraser presided, and amongst those also present were Messrs. E. Davies, Conway; J. R. Thomas, Llewellyn; H. J. Hughes, Ogwen; W. H. Worrall, Bangor; G. Roberts, Carnarvon; W. H. Jones, Colwyn Bay; T. B. Farrington, Conway. It was resolved to write to the various local authorities requesting them to allow their inspectors to attend the different meetings held in furtherance of sanitation, and that their expenses as delegates be paid by the respective authorities; also that the next meeting of the Association be held at Portmadoc early in October. Dr. John Evans, Carnarvon, read an able paper on "The Relationship of Germs to Disease."

Mr. Worrall, Penmaenmawr, late secretary of the Northern Association, said great benefit would be obtained by being affiliated with one of the larger associations, and gave notice to move that they consider the matter of affiliating with an English association at the next meeting.

Mr. Stanfield, chief sanitary inspector of Manchester, said that in educating the people in sanitary laws they had the prejudice of "jerry-builders" against them—men who did not care if half the population died if they reaped good profit from jerry-building. They should get local authorities to pay local inspectors well enough to live. It was a pity that some authorities did not pay enough to enable inspectors to live respectably, especially where there were several owners on the Council, who considered an energetic inspector a nuisance. It was therefore necessary for inspectors to form large associations, comprising a large area, and strong combination.

Mr. Gill, Bangor, said if they joined a large association he wished their local association to be distinctive as well.

CONTROL OF THE METROPOLIS.

THE annual report of the chief officer of the Public Control Department of the London County Council, just issued, Mr. Alfred Spencer, embraces a great variety of subjects. Steady progress is reported in the extension of the constant supply of water. Three companies—the East London, the Grand Junction and the Southwark and Vauxhall—are stated to give the benefit of the constant service to the whole of their London areas. Such are the arrangements, but this statement in the report is, of course, to be taken in connection with the fact that occasional interruptions to the supply have happened in some localities. The report further intimates that the Kent Company hope to give a constant supply throughout their London area in the course of the ensuing month, and the Chelsea and West Middlesex Companies by April next, by which date also the New River Company will probably complete a similar service. But the Lambeth Company feel unable to give a definite assurance that their area will be fully dealt with before the end of 1898. Treating of a very different subject, it is mentioned that during the year upwards of 1,600 tons of explosives, in the course of conveyance into or through London, came under the notice of the Council's inspectors. Respecting the storage and sale of explosives in the Metropolis, the facts are said to show that

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gunpowder is largely going out of use for small-arm ammunition, and nitro-compound powders are taking its place. These are spoken of as probably safer than ordinary gunpowder—at least, under the conditions which prevail on gunmakers' premises. In another direction we find that the duties of the Council's officers in the examination of weights and measures, the number of which is extraordinary, have recently been increased in consequence of the use by publicans of glass in place of pewter measures, which are now being discarded. Certain local authorities in the north of England and elsewhere having largely reduced their scale of fees for verifying and stamping glass measures, there has been danger that the whole of the glass measure manufacture would be driven out of London. To prevent this result, the London County Council have resolved to make no charge for stamping, but to charge for unpacking and repacking the glass, and for the storage of the articles. The Control Department also has cognisance of the Petroleum Acts, in reference to which it is stated that there is an almost universal disuse of petroleum spirit for domestic lighting, though it is employed largely for outdoor purposes. Lamp accidents during the year caused the loss of forty lives in London, a decrease compared with the previous year. The quantity of petroleum spirit imported into the Metropolis is less than a twentieth part of the amount of petroleum oil, and the latter remains under no restriction whatever, although the total quantity is enormous, whereas the other can only be kept under license. Coroners and their Courts, and the working of the Infant Life Protection Act, are among the other subjects dealt with.

THE SANITARY INSTITUTE AT LEEDS.

THE sixteenth autumn Congress and Health Exhibition of the Sanitary Institute will be opened at Leeds on Tuesday, September 14, and will be continued throughout the week. It will be presided over by Dr. Robert Farquharson, M.P., LL.D., D.L. The Right Hon. the Lord Mayor of Leeds (Sir James Kitson, Bart., M.P.), who is a vice-president of the congress, is the chairman, and Councillor Womersley the vice-chairman of a large and representative local committee. The congress is arranged in three sections—"Sanitary Science and Preventive Medicine," presided over by Mr. T. Pridgin Teale, M.A., M.B., F.R.C.S., F.R.S.; "Engineering and Architecture," presided over by Mr. Lewis Angell, M.Inst.C.E., F.R.I.B.A., Fellow of King's College, London; and "Chemistry, Meteor-

ology and Geology," presided over by Mr. William Whitaker, B.A., F.G.S., Assoc.Inst.C.E., F.R.S. There will also be a special conference on river pollution, and conferences of municipal representatives, medical officers of health, municipal and county engineers and sanitary inspectors, and a ladies' conference on domestic hygiene. The Congress Lecture will be given by Mr. H. Percy Boulnois, M.Inst.C.E., city engineer, Liverpool, and the Popular Lecture by Mr. Philip Boobyer, M.B., M.R.C.S., medical officer of health for Nottingham. Visits to places of interest and excursions will be made during the week. The health exhibition in connection with the congress will be held in a building now being erected in the Engineers' Drill Ground, Camp Road, and will include clothing, food, cooking, domestic appliances, sanitary apparatus and machinery. The exhibition will be opened by the Lord Mayor of Leeds, and will remain open until October 9. It promises to be a greater success than any previous exhibition held under the auspices of the Sanitary Institute. This is attributable to two causes; first, the rapid and solid growth of the Institute (which, it will be remembered, has attained its majority this year, and can boast of over 2,000 members), and, secondly, the importance of the centre in which it is to be held from a commercial point of view. It will be interesting to know that over 600 delegates have already been appointed to attend the congress and exhibition from all parts of Great Britain, and it is probable that there will be a very large attendance of members and Associates to celebrate the coming of age of the Institute and the Jubilee year. We are informed that although the building in Camp Road will be the largest ever placed at the disposal of the exhibition committee, at the present moment three-fourths of the space available for letting has been taken by leading firms, representing all branches of sanitary science. It is, therefore, confidently expected that the exhibition will be of a most attractive and instructive character. The local secretaries are Dr. Spottiswoode Cameron, Mr. E. A. Pearson and Mr. W. Spinks.

ROYAL COURT THEATRE, LIVERPOOL.

THE disastrous fire which took place in the beginning of the year at the Court Theatre suddenly stopped the progress of the performance, and on July 21 the restoration was commenced with new roofing and new ceiling. Suggestions for the removal of a blot on the theatre—namely, the want of dressing-room

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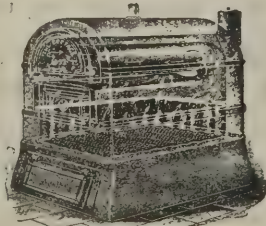
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accommodation—have been carried out, and now, instead of general dressing-rooms, as formerly, the theatre possesses thirty-six new dressing-rooms, all built on fireproof flooring. Each dressing-room has now a window and ample ventilation. Another improvement is that each dressing-room floor has two fireproof staircases as exits for the artistes. Lavatory accommodation has been provided for these dressing-rooms and also, it may be added, for the staff and general public.

Owing to the limited area of the rooms surrounding the theatre it was a matter of difficulty to increase the size of the old buffet, but by the removal of a staircase the accommodation of this department has been very materially increased. The buffet and the foyer have been refitted and redecorated, principally in white and gold. In addition to the above there have been many alterations under the stage and under the pit.

A new carpenters' shop and one for the engineer, with which is incorporated a fireproof brazier's shop, have been excavated out of the rock. Adjoining them will be found a new bandroom. Under the orchestra and under the pit a fine new room has been made, which can be used for general storage or an additional greenroom. It has, moreover, the great advantage of forming a connection between both sides of the stage. Further to add to the comfort of the theatre, a complete hot-water system of heating has been arranged.

Fire hydrants are provided in the pit, dress circle and gallery, to be used as an additional protection for the public. For the lighting of the theatre gas has been superseded by electric lighting wherever possible. The ventilation has not been forgotten, and the latest improvements have been adopted.

The work was commenced on June 21 last, and the theatre was completely ready for opening on Monday, August 2 (Bank Holiday), for the first performance of the "Trumpet Call." Notwithstanding the extraordinary difficulties which have stood in the way of anything like rapid progress—for instance, the large mass of rock to be removed in the course of the new excavations, the impossibility of getting plasterers owing to the prolonged strike, and consequent substitution of less pliable materials than plaster—the whole of the works have been completed strictly within the short time stipulated in the contract, viz. six weeks.


A shelter verandah has been designed to protect the public waiting for entrance to the theatre in Roe Street. The works have been executed by Messrs. W. Morrison & Sons, builders, of Wavertree, from the designs and under the superintendence of Mr. Edmund Kirby, architect, Liverpool.

THE RATING OF GOVERNMENT PROPERTY.

THE local government and taxation committee of the London County Council, in a report which they have just issued, state that they have under consideration the question of the contributions to local rates in respect of property in the occupation of the Government. As the law at present stands this class of property is not liable to assessment on the ground that the statue of 43 Elizabeth, c. 2, did not make the Crown liable, as the Crown was not expressly mentioned in the Act. It was valued by the Government and contributions to the rates were made on such valuations. From the following return prepared by the valuer to the Council it would be seen that with regard to certain well-known buildings in London, the property of the Government, the annual value of the sites alone in every instance but one exceeded the value of the sites with the buildings thereon as computed by the Government:—

Property.	Government Valuation.	Estimated Annual Value of Site.
Bethnal Green Museum	200	400
Somerset House	7,000	27,450
National Gallery	2,000	6,880
Newgate Prison (excluding Central Criminal Court)	425	4,325
Albany Street Barracks	1,050	2,600
Indian Store Dépôt	1,580	1,125
Treasury Buildings (including Education Office, Privy Council Office and official residences)	5,800	15,386
Dover House	1,084	3,132
British Museum	3,500	14,700

In consequence of individual pressure brought to bear on the Treasury by some of the assessment committees, the Government valuations of some of these properties have now been increased, viz. Bethnal Green Museum, 500%; Somerset House, 22,500%; National Gallery, including new Portrait Gallery, 6,000%; Foreign Office, &c., 25,000%; Albany Street Barracks, 2,000%; Treasury Buildings, &c., 10,500%; British Museum, 10,000%. These increases, however, the committee consider to be insufficient. The present system, the committee point out, allowed the valuation of Government property to be entirely in the hands of the Government valuer, and the rating authority had no influence except indirectly in the matter. This is an entire reversal of the general principle of the law of



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valuation, which is that all property liable to rates shall be valued by the rating authorities. Government property was not different from private property in the benefit it received from the services exercised by the local authorities at the cost of the ratepayers, and the ancient distinction between Crown property and local or parochial official property now no longer obtains.

The committee cannot but regard the present system as highly unsatisfactory, and they are of opinion that it is only fair and reasonable that Government property should be placed on the same footing as other classes of property and become liable to assessment in the ordinary way, and they see no reason why the Government should fix the value of their own property any more than the Council and other large ratepayers. The committee intended to recommend the Council to take steps to introduce a Bill to repeal the statute of Elizabeth, but as the matter is now under the actual consideration of a Royal Commission, and as the Council's witnesses will give evidence on the subject in the ordinary course, they have decided to await the report of the Commission.

CRYSTAL PALACE SCHOOL OF ENGINEERING.

THE award of the certificates to the students of the Crystal Palace Company's School of Practical Engineering took place on the 5th inst. at the Crystal Palace. Mr. G. A. Goodwin, past president of the Society of Engineers, presided. Mr. K. G. Hodson, superintendent of the school, read the examiners' report for the summer term of 1897, which is the second term of the twenty-fifth year of the school. Mr. R. J. Money, who examined in the mechanical section, noted the continued improvement shown in the work turned out since he was a student seventeen years ago, and since he examined the section six years ago. Mr. A. Marshall congratulated both the students and instructors on the result of the work in civil engineering. Mr. J. G. Aldridge, reporting on the electrical section, especially commended the work of Mr. Harbord. Mr. Goodwin then presented the certificates. Mr. W. Sims was first in the mechanical engineering section (first year's course), Mr. B. O'Dowda in drawing, Mr. F. Peach in pattern work and Mr. W. J. Wood in fitting work. In civil engineering in the second year's course the most successful students were Mr. O. A. St. John-Kneller, Mr. J. W. Simpson, Mr. J. M. Alvares and Mr.

R. F. Arkwright. In the electrical section Mr. W. T. Harbord and Mr. A. T. Araujo took first places. In the course of a short address to the students Mr. Goodwin spoke of the good work which this school had now for twenty-five years been doing towards educating young engineers. Its progress was continuous and remarkable. Although there was considerably greater competition amongst engineers at present than had been the case in past years, English engineers would always hold their own in any part of the world. On the motion of Mr. Green, a director of the Crystal Palace Company, a vote of thanks was passed to the examiners, and subsequently a similar vote was accorded to Mr. Goodwin for distributing the certificates.

PATENTS.

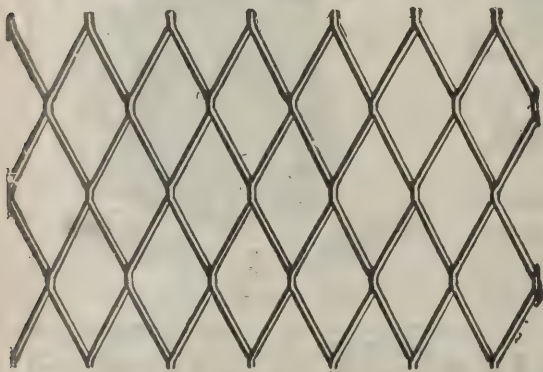
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

- 17553. George Anthony Marsden and John Newton, for "Improved dies for use in the manufacture of slabs or tiles."
- 17616. George Stuart Smith, for "A new or improved sash-fastener, also applicable to opening windows."
- 17617. George Cooper, for "An improved window sash-fastener."
- 17658. Alfred Davenport Dixon, for "Window blind-fastener."
- 17917. Carl Theodor Dorr, for "Improvements in apparatus for closing and opening bulkhead doors."
- 18010. Samuel Hill and Rowland Hodges, for "Improvements relating to door-closing appliances."

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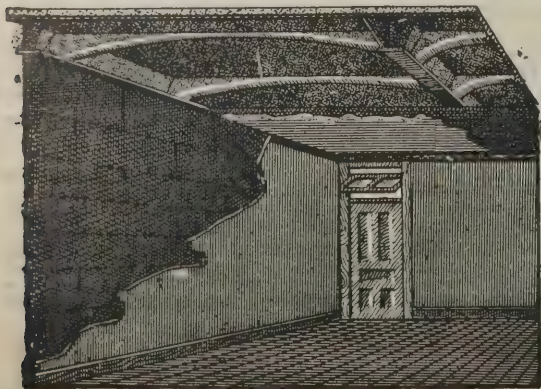
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Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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CONTRACTS OPEN.

ABERDEEN.—Aug. 30.—For erection of dwelling-house at Culter. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

BAILDON.—Sept. 1.—For erection of a house in Tong Park, Baildon. Messrs. Samuel Jackson & Son, architects, Tanfield Chambers, Bradford.

BATLEY.—Sept. 3.—For erection of five villas at Wilton Park, near St. Thomas's Church. Mr. Walter Hanstock, architect, Branch Road, Batley.

BELFAST.—For erection of a first-class public laundry on the grounds of The Abbey, at Whiteabbey. Mr. W. J. Fennell, architect, Chichester Street, Belfast.

BIDEFORD.—Aug. 30.—For removal of the old cottages lately belonging to Mrs. Bishop, the excavations required for the new cattle market. Mr. H. Chowins, borough surveyor, Bideford.

BOLTON.—Sept. 7.—For erection of an Inland Revenue office. Mr. Allan Paull, 6 Quality Court, Chancery Lane.

BRENTWOOD.—Sept. 6.—For erection of a boiler-house at the Asylum. The Medical Superintendent, Asylum, Brentwood.

BRIDLINGTON.—Sept. 3.—For erection of board-room offices adjoining the workhouse. Mr. Samuel Dyer, architect, &c., Bridlington Quay.

BRISTOL.—Aug. 31.—For erection of ward accommodation for 150 female patients, a nurses' annexe, isolation hospital, and

a dining and recreation hall and offices, &c., at the Lunatic Asylum, Fishponds. Town Clerk, Council House, Bristol.

BRITON FERRY.—Sept. 4.—For erection of seven dwelling-houses. Mr. H. Alex. Clarke, architect, Briton Ferry.

CARDIFF.—Sept. 6.—For alterations and additions to the Barry Intermediate School. Mr. T. Mansel Franklen, Glamorgan County Offices, Westgate Street, Cardiff.

CARLISLE.—Sept. 2.—For erection of nine houses, Metcalf Street. Mr. A. W. Johnston, architect, 81 Castle Street, Carlisle.

CHESTERFIELD.—For erection of two cottages. Mr. F. T. Skelton, North Road, Clown, Chesterfield.

CHRISTCHURCH.—Sept. 3.—For erection of an isolation hospital, near Fair Mile. Messrs. Kemp, Welch & Thomas, architects, Avenue Chambers, Bournemouth.

CLARA VALE.—For erection of store and pair of semi-detached cottages at Clara Vale, near Ryton. Messrs. Liddle & Browne, architects, Prudential Buildings, Newcastle.

CLITHEROE.—For cementing the Wesleyan Sunday-school, Slaidburn. Mr. R. Brennand, Slaidburn.

COVENTRY.—Sept. 6.—For enlargement of the school. Mr. T. F. Tickner, architect, Bishop Street.

DARLINGTON.—Aug. 31.—For extension of the boiler-house and engine-house at the gasworks. Mr. F. T. Steavenson, town clerk, Town Hall.

DEWSBURY.—Aug. 30.—For erection and completion of twenty-eight houses, outbuildings and boundary walls at Hill Head, Malkroyd Lane. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

DUNDEE.—Sept. 3.—For erection of six iron sheds, each of 100,000 feet. Mr. George C. Buchanan, harbour engineer, Works Office, Harbour Chambers, Dundee.

EVESHAM.—Aug. 31.—For converting a cottage and meeting-room into a chapel at Willersey, near Broadway. Rev. John R. Newall, Wesley Chapel House, Evesham.

FALMOUTH.—Aug. 31.—For erection of residence and studio. Mr. Horace W. Collins, architect, Penryn Street, Redruth.

FALMOUTH.—Sept. 16.—For alterations and improvement of the Smithick Schools, boys and infants' department. Mr. W. Jenkins, clerk, Falmouth.

FARNHAM.—Sept. 1.—For restoration of the local stonework to some of the arches, and the renewal of the oak framing in girders, posts, in bridge. Mr. Ernest Crundwell, clerk, South Street, Farnham.

GATESHEAD.—Sept. 6.—For erection of Nuns Lane School. Messrs. Oliver & Leeson, architects, Mosley Street, Newcastle.

GRANGEMOUTH.—Aug. 30.—For new Established church at Kerse Road. Mr. John P. Goodsir, architect, Newmarket Street, Falkirk.

GRAVESEND.—Sept. 7.—For erection of police cells and other buildings adjoining the town hall. Mr. Chas. E. Hatten, town clerk, Court House.

GREAT YARMOUTH.—Aug. 30.—For rebuilding the White Lion Inn, Cliff Hill, Gorleston. Mr. Sidney Rivett, architect, 5 South Quay, Great Yarmouth.

HALIFAX.—Sept. 1.—For erection of a governor house, &c., at the Gasworks, Bank Bottom. Mr. Thomas Holgate, engineer, Gasworks, Halifax.

HALIFAX.—Sept. 3.—For extension of storeroom and foundry at Paragon Ironworks. Mr. Arthur George Dalzell, 15 Commercial Street, Halifax.

HALIFAX.—Sept. 4.—For erection of stabling, coach-house, &c., at Ravenswood, Savile Park. Mr. S. Wilkinson, architect, Sowerby Bridge.

HALIFAX.—Sept. 14.—For erection of a school for 230 children at Salterlee, Shibden. Mr. Joseph F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.



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HALIFAX.—Sept. 14.—For erection of confectionery works (covering an area of over 1,300 superficial yards) in Queen's Road and Hammond Street. Mr. Medley Hall, architect and surveyor, 29 Northgate, Halifax.

HAMPTON.—Sept. 7.—For erection of a workshop at the Bell Hill recreation-ground and for construction of steps and landing-stage at the recreation-ground on the Hampton Court Road. Mr. J. Kemp, surveyor, Park House, High Street, Hampton.

HARRINGTON.—Aug. 30.—For erection of two houses, shop and warehouse in Church Road. Messrs. W. G. Scott & Co., architects and surveyors, Victoria Buildings, Workington.

HARRINGTON.—Aug. 30.—For erection of clubroom and two cottages. Messrs. W. G. Scott & Co., architects and surveyors, Victoria Buildings, Workington.

HEREFORD.—For alterations at the Theatre Royal. Mr. W. W. Robinson, architect, 10 King Street, Hereford.

IRELAND.—Sept. 1.—For erection of three labourers' cottages on plots of ground in the townlands of Shankill and Ballyman, in the electoral division of Rathmichael. Mr. Joseph D. Cope, executive sanitary officer, Board-room, Loughlinstown.

IRELAND.—Aug. 31.—For erection of a bank office at Rathmines. Mr. William Butler, surveyor, 58 Mountjoy Square, Dublin.

ISLE OF THANET.—Sept. 1.—For erection of a wall to enclose the proposed new burial-ground adjoining the Ramsgate Cemetery. Messrs. Langham & Cole, 70 High Street, Ramsgate.

ISLINGTON.—Sept. 7.—For erection of an infirmary for the accommodation of 800 patients on the land at the late Smallpox Hospital, Highgate Hill, Upper Holloway. Mr. Edwin Davey, clerk, Guardians' Offices, St. John's Road, Upper Holloway, N.

KEIGHLEY.—Sept. 6.—For erection of church and schools of St. Barnabas, Thwaites Brow. Messrs. W. H. & A. Sugden, architects, Cavendish Street, Keighley.

KILMORNA.—For building a creamery. Mr. E. T. Conyers, architect, Ashboro', Ballingarry, Limerick.

KINGSTON-UPON-THAMES.—Sept. 2.—For extension of electric-light buildings, for the Corporation. Mr. Harold A. Winsor, town clerk, Clattern House, Kingston-upon-Thames.

KINTYRE.—Aug. 31.—For erection of teacher's house and alterations and addition to school of Glenbarr. Mr. C. MacKinnen, Gallow Hill, Campbelltown.

LANCASTER.—Sept. 1.—For alterations and repairs to buildings at Moorside Farm, Bulk. Mr. J. Parkinson, architect, 67 Church Street, Lancaster.

LANCASTER.—Sept. 6.—For erection of classrooms and gymnasium at Ripley Hospital. Messrs. Austin & Paley, architects, Lancaster.

LEEDS.—Aug. 30.—For alterations to the New Inn, Town Street, Bramley. Mr. Thomas Winn, architect, 90 Albion Street, Leeds.

LEEDS.—For excavation in Sunny Bank, for the General Infirmary. Mr. W. H. Thorp, architect, 61 Albion Street, Leeds.

LEITH.—Sept. 4.—For erection of public baths at Great Junction Street. Mr. Simpson, architect, Town Hall.

LIVERPOOL.—Sept. 1.—For setting the new boiler at the workhouse, Smithdown Road. Mr. J. Moulding, 15 High Park Street, Liverpool.

LORDSHIP LANE.—Sept. 13.—For supplying and fixing wrought-iron railings and gates and building dwarf walls and piers to same at the public library. Mr. O. S. Brown, surveyor to the Vestry, Vestry Hall, Camberwell.

LYNTON.—Sept. 13.—For erection of a lighthouse, dwellings, &c., at the Foreland, near Lynton, Devon. Mr. E. G. Verity, 31 Golden Square, London, W.

MIDDLESBROUGH.—Aug. 30.—For additions to music warehouse, Newport Road. Mr. Arthur F. Newsome, architect, Albert Road, Middlesbrough.

MORECAMBE.—Aug. 27.—For erection of house and shop in Euston Road. Mr. Albert Gorton, architect.

MYTHOLMROYD.—Sept. 6.—For building a vicarage house in Cragg Vale Road. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

NAILSWORTH.—Sept. 13.—For taking-down St. George's Church, Nailsworth, and for the erection of a new church on site. Mr. M. H. Newland, architect, Gloucester.

NELSON.—Sept. 7.—For erection of the Walverden Board school. Mr. Thos. Bell, architect, 14 Grimshawe Street, Burnley.

NEW BARNET.—Aug. 31.—For erection of a detached residence. Mr. E. Fergusson Taylor, surveyor, 70-72 Chancery Lane and New Barnet.

NORHAM-ON-TWEED.—Aug. 30.—For alterations and additions to farm buildings at Mount Carmel. Messrs. Hamilton, Mount Carmel Farm, Norham-on-Tweed.

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PLUMSTEAD.—Aug. 31.—For erection of 572 feet brick and concrete walling, surmounted by wrought-iron unclimbable fencing, to enclose portion of the Plumstead cemetery next Lodge Lane. Mr. H. H. Church, architect, William Street, Woolwich.

RAMSGATE.—Sept. 1.—For erection of a wall to enclose the proposed addition to cemetery. Messrs. Hinds & Son, 57 Queen Street, Ramsgate.

ROTHERHAM.—For a mission church at Canklow. Mr. E. Isle Hubbard, architect, Moorgate Street, Rotherham.

ROTHERHAM.—Sept. 6.—For addition to the Seafeld Arms Hotel. Mr. R. B. Pratt, architect, County Bank House, Elgin, N.B.

SALISBURY.—Aug. 31.—For erection of a sorting office near station. Messrs. Welch & Atkinson, 10 Lancaster Place, Strand.

SCOTLAND.—Sept. 4.—For erection of public baths at Great Junction Street, Leith. Mr. Simpson, town architect, Town Hall.

SHEFFIELD.—Sept. 4.—For alterations and additions to the main building at the Sheffield Union workhouse. Mr. C. J. Innocent, architect, 17 George Street, Sheffield.

SHREWSBURY.—Aug. 31.—For erection of private school, for forty boarders. Mr. A. E. Lloyd Oswell, architect, Dana Chambers, Shrewsbury.

SHREWSBURY.—Sept. 2.—For construction and erection of engine and boiler-houses, coal stores, chimney shaft and other works at Coleham. Messrs. John Taylor, Sons & Santo Crimp, engineers, 27 Great George Street, Westminster, London, S.W.

SOUTH BENWELL.—For renovation of and alterations to buildings at South Benwell Works, for the Edison & Swan United Electric Light Co., Limited. Mr. Thos. Hanning, Northern Assurance Buildings, Collingwood Street, Newcastle-on-Tyne.

SOUTHOWRAM.—Aug. 31.—For building a retaining wall in Shibden Hall Road. Mr. W. H. D. Horsfall, 9 Harrison Road, Halifax.

STAINFORTH.—Sept. 1.—For erection of a wash-kitchen to the cemetery cottage. Mr. James Dyson, Silver Street, Stainforth.

STROUD.—Sept. 7.—For erection of a chimney-stack and flue at the workhouse. Mr. Fredk. Winterbotham, John Street, Stroud.

UXBRIDGE.—Aug. 31.—For erection of a fire-escape house. Mr. William L. Eves, 54 High Street, Uxbridge.

WADSLEY.—Sept. 18.—For erection of additional wash-house, engine-room and laundry at the asylum. Mr. Cotterill, Wadsley Asylum, Sheffield.

WALES.—Sept. 11.—For the restoration of Llanfihangel-y-Creuddyn Church tower. Rev. J. P. Evans, vicar, Llanfihangel Creuddyn.

WALES.—Aug. 31.—For erection of detached villa residence at Llanwryd Wells. Mr. H. Teather, architect, Andrew's Buildings, Queen Street, Cardiff.

WALES.—Aug. 31.—For rebuilding Panteg Congregational chapel, Ystalyfera. Mr. W. Watkin Williams, architect, 63 Wind Street, Swansea.

WALES.—Sept. 15.—For erection of forty-five cottages at Pontycymmer. Ffaldau Collieries Company, Limited, Cardiff.

WALTHAMSTOW.—For pulling-down and rebuilding 43 and 45 St. James Street. Mr. J. Williams Dunford, architect, 100c Queen Victoria Street, E.C.

WAR DEPARTMENT CONTRACT.—Sept. 5.—For erection of a canteen and works in connection therewith, at the Royal Military College, Sandhurst, Berks. Plans, &c., Royal Engineer Office, North Aldershot.

WARRINGTON.—Sept. 20.—For erection of county asylum on the Winwick Hall Estate, Winwick, near Warrington. Mr. Fred. C. Hulton, clerk, County Offices, Preston.

WATERLOOVILLE.—Aug. 31.—For enlargement of the schools at Waterloo. Messrs. Rake & Cogswell, architects, Prudential Buildings, Portsmouth.

WHITEHAVEN.—Aug. 31.—For alterations to 22 and 23 King Street. Messrs. Moffat & Bentley, architects, Whitehaven.

A SERIOUS accident happened at Stockport a day or two since. Some workmen were engaged demolishing old gas-works, which are to be replaced by an electric-lighting station, when part of the building suddenly collapsed, and three men, named William Maull, Peter Higgins and Joseph Woodall, were precipitated into some disused tanks below, a distance of 40 feet. The men were quickly rescued, but they lie in the infirmary in a critical condition.

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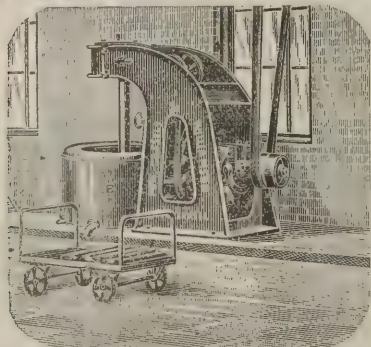
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NEWPORT.

For erection of new building for the Newport and Monmouthshire Hospital.
H. Willcock £34,250 0 0
C. H. Reed 34,110 0 0
W. J. Bloxham 33,660 0 0
W. A. Linton 32,575 0 0
W. Gradwell & Co., Limited 32,572 13 5
W. A. Blackburn 32,425 0 0
S. Warburton 32,314 0 0
W. Bowers & Co. 31,940 0 0
H. Parfitt & Dyson 31,000 0 0
J. Linton 30,850 0 0
D. J. Davis & Jones 30,097 0 0
T. Westacott 29,991 17 0
A. S. MORGAN & Co., Godfrey Road (*accepted*) 29,950 0 0

OSSETT.

For building a church at Gawthorpe, near Ossett. Mr. TOM H. FARRAR, architect, Fountain Street, Halifax.
Accepted tenders.
M. Scott, mason.
H. Garthwaite, joiner.
T. Elliott, plumber.
J. Firth, slater and plasterer.
A. Lucas, painter.

ROTHES (SCOTLAND).

For erection of peat shed and wall at Glengrant Distillery, Rothies. Mr. CHARLES C. DOIG, architect, Elgin.
Accepted tenders.
J. Robertson, builder £228 10 0
J. & A. Robb, carpenter 90 0 0
J. Youngson, engineer 65 10 0
J. Gordon & Son, plumber 18 17 6
W. Fordyce, painter 4 7 0

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PLYMOUTH.

For additions to Greenbank Mews, for Mr. W. Hawke. Mr. JAMES HARVEY, architect and surveyor, 9 Courtenay Street, Plymouth. Quantities by the architect.

Roach & Lovell	£400	0	0
J. H. Blackell	379	5	0
A. N. Coles	360	0	0
Paynter & Davy	359	0	0
W. H. Chamberlain	350	0	0
G. B. Turpin	348	0	0
W. Pellow	343	0	0
Good & Co.	342	0	0
W. E. Blake	340	0	0
Pearn & Son	315	0	0
JELLARD & STEVENSON, Plymouth (accepted)	310	0	0

SHIPLEY.

For construction of tank sewer 8½ feet by 8½ feet, 297 yards long, with pump well; about 2,275 yards of brick and concrete sewers; 598 yards of tunnelled sewers in brick and concrete; 161 yards of cast-iron pipe sewer in river bed; 5,000 yards of fire-clay pipe sewers; tunnel under canal; river-retaining wall, 15 feet high; with manholes, lampholes, storm overflows, automatic flushing shafts, &c. Mr. MALCOLM PATERSON, engineer, Bradford.

Duncan & Jones	£27,208	0	0
G. Bell	16,004	0	0
Rhodes Bros.	14,684	0	0
J. Bentley	14,027	0	0
A. Braithwaite & Co.	13,843	0	0
W. FOSTER, Bingley (accepted)	13,722	0	0
W. Brigg	13,384	0	0

SOUTH SHIELDS.

For works in connection with a scheme of main sewerage and sea outfall for the district of Cleadon. Messrs. D. BALFOUR, 3 St. Nicholas Buildings, Newcastle-on-Tyne, and J. H. MORTON, South Shields, engineers.

J. Thompson	£6,383	2	1
M. D. Young	5,544	11	10
G. Bell	5,200	0	0
J. Carrick	4,438	0	0
R. HUDSON, Sunderland (accepted)	4,350	0	0

SOUTHMOLTON.

For work of the Witheridge water supply, for the Southmolton Rural District Council.
HAWKEY & BEST, Teignmouth (accepted) £611 11 2

STROOD.

For kerbing, paving, &c., in the parish of Denton. Mr. WALTER BROOKE, surveyor, Meopham.
Kent Road Co., Limited £119 0 0
Tuff & Miskin 115 10 0
BENSTED & LAKE, Teynham (accepted) 102 10 0
Surveyor's estimate 108 0 0

TAUNTON.

For pulling-down and rebuilding shops and dwelling-houses at 41 and 42 High Street, with bakehouse in the rear. Mr. J. HOUGHTON SPENCER, architect, 8 Hammet Street, Taunton.
J. Spiller £1,410 0 0
J. Morse 1,398 0 0
G. H. Pollard 1,376 0 0
T. MANNING, Taunton (accepted) 1,341 0 0

TEWKESBURY.

For erection of iron bridge over Tredington Brook, in lieu of the present "Priests' Bridge."
King & Handley, Tewkesbury £16 15 0

WALES.

For erection of additions and alterations at Llanspyddid Board School. Messrs. W. & T. WILLIAMS, architects, Brecon.
T. E. Morgan, Brecon £752 0 0
B. JENKINS, Brecon (accepted) 730 0 0
For erection of a house and shop at Aberfan. Mr. J. M. WILLIAMS, architect, Treharris.
R. Morris £275 10 0
G. Hancock 275 0 0
S. Hawkins 254 0 0
W. Lloyd 250 0 0
James & Rees 249 0 0
J. C. RICHARDS, Pontypridd (accepted) 239 0 0
For erection of church at Garreg-ddu, Elan Valley, near Rhayader, Radnorshire. Mr. STEPHEN W. WILLIAMS, architect, Rhayader.
E. Davies & Son £1,895 10 0
M. Lloyd 1,793 10 0
T. LANT, Rhayader, Radnorshire (accepted) 1,548 0 0

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TRADE NOTE.

MESSRS. E. H. SHORLAND & BROTHER, of Manchester, have just supplied their patent Manchester grates to the new infirmary, Easthamstead, Berks.

BUILDING AND BUILDERS.

It is proposed to enlarge St. Paul's Church, Newbarns, Barrow-in-Furness, at a cost of 2,500*l*.

THE memorial-stones of a new Welsh Wesleyan church at Acrefair, a mining district near Ruabon, were laid on the 18th inst.

THE tender of Messrs. Morrison & Mason, Glasgow, to erect a new bridge at Millbrae, Renfrewshire, at the cost of 4,523*l*. 12*s*. 6*d*., has been recommended for acceptance by sub-committees of the Glasgow Corporation and Upper Renfrewshire committee of the County Council.

THE contract for the new premises of the London and Yorkshire Bank at Morley has been let to Messrs. Murgatroyd, builders, of Idle. The work has been commenced, and is being carried out from the designs and under the superintendence of Mr. William Bakewell, F.R.I.B.A., Leeds.

AT the meeting of the Bognor Urban Council on the 20th inst. attention was called by Mr. Tate to a statement contained in a letter received from Sir Allen Sarle, secretary of the Brighton Railway Company, at the last meeting, to the effect that six local builders had been invited to tender for the reconstruction of the shelter at the railway station, blown down last spring, and that none of them had responded. Mr. Tate said he had

made inquiries and could not find that a single Bognor builder had been asked to tender for the work. After a short discussion it was decided that the Clerk should communicate with Sir Allen Sarle, enclosing the copy of a letter written on the subject by six local builders.

ELECTRIC NOTES.

SATISFACTORY progress is being made with the installation of electric arc lamps up Haverstock Hill and through High Street, Hampstead, and, by an arrangement made by the vestries of Hampstead and St. Pancras, the whole of the main thoroughfare leading from a point a little north of Oxford Street to the top of High Street, Hampstead, will shortly be lighted by electricity. This length of roadway, one of the most important main thoroughfares in the Metropolis, extending to a distance of considerably over three miles, will be the longest in London entirely lighted by electric arc lamps.

THE Yorkshire House-to-House Electricity Company are making extensive preparations to meet the demands for current expected during the coming winter. Their new buildings are now rapidly approaching completion, and the additional generating plant, consisting of four new Lancashire boilers and four combined engines and dynamos, each of 500 indicated horse-power, have been obtained. The company now direct attention to modifications in the system of distribution, which have been approved by the Board of Trade, and which are being carried into effect at a large expense. It is stated that not less than 10,000*l*. is being spent this year in improving the means of distribution in a part of the centre of the city, and the new system will be extended to other central thoroughfares as quickly as circumstances permit. Some slight economy is expected to accrue to the company, but the main object of the change is to add still further to the efficiency and constancy of the supply of energy and the convenience of the customers. It may be explained that hitherto all the company's cables have conveyed electric current at high pressure, and the conversion to low pressure is done by a separate transformer on the premises of each consumer. Under the new system transforming sub-stations are constructed at various points in the centre of the city, at which the conversion of the current from high to low pressure will be effected by means of large transformers to be there installed. Up to the present four of these underground structures have been built, two in Albion Street, and two in Briggate.

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VARIETIES.

AN appeal is being made for funds for the restoration of Stratford-on-Avon Church. From the designs of Mr. G. F. Bodley the nave is to be resealed and the organ remodelled.

THE Aldershot Hospital, which has been built at a cost of 3,000l., and was designed by Mr. Thomas Davison, A.R.I.B.A., was opened on Friday, the 20th inst., by H.R.H. the Duke of Connaught.

At a meeting of the hospitals committee of Glasgow Corporation, in the City Chambers, Glasgow, it was agreed to erect a new hospital reception house to take the place of the one at present in existence in Weaver Street, Glasgow, at a cost of 6,500l.

THE theatre which Mr. Wyndham is about to erect in Charing Cross Road in proximity to the Garrick, which in size it will resemble, is designed by Mr. W. G. R. Sprague, and is expected to be ready for opening in time for the autumn season of 1898.

THE fine new bells in St. Patrick's Cathedral have attracted a great deal of public attention and deservedly, for they are undoubtedly a fine peal. From the height at which they are placed—about 120 feet—in the splendid tower built in 1370, their music can be heard at a considerable distance.

UPWARDS of 100 men are hard at work clearing away all the old property standing between Furnival Street and Fetter Lane, the greater part of the ground being occupied by the Old White Horse, formerly one of the chief coaching houses of London. The mortar is said to be as hard as rock.

THE new administrative block at the Chester Isolation Hospital, in Dialstone Lane, which has been erected for the convenience and necessary comfort of the master, matron, nurses and staff generally, was opened with some little formality on the 18th inst.

THE masons in Edinburgh and Leith came out on strike at the beginning of the month for a reduction of hours to 45 per week, but while a number of smaller firms granted the demand the larger ones held out, and now the situation has been complicated by a similar demand being made by the carpenters and joiners.

SOME sixty workmen employed by Messrs. Harrison & Spooner have commenced repainting and redecorating Blackfriars Bridge. The job will take them three months. The painters are giving the bridge a new coat of purple oxide, the

decorated parts being "mock bronzed," as the technical term goes, and the buttresses will be washed down. The last time the bridge was repainted was in 1888.

THE excavations that are being carried out near the Casino, at Baden-by-Zurich, have brought to light many relics of the time when this district was the great *entrepôt* of the Roman army in Transalpine Switzerland. Interest was first aroused by the discovery of the site of an old Roman military hospital, in the interior of which were found various surgical instruments. Within the last few days, however, a still more valuable "find" has been made in the shape of a villa, which, judging by the treasure already exhumed, must have belonged to a wealthy and art-loving Roman.

GRAND THEATRE, FULHAM.

THE new and handsome theatre which has just been erected at the foot of Putney Bridge, from the designs of Mr. W. G. R. Sprague, was opened on Monday evening. It is built of white Portland stone, in the Classic style, and is entirely isolated, the front being in High Street, Fulham. From the exterior the Grand bears a close resemblance to the Métropole at Camberwell. The interior possesses several noteworthy features. It is 60 feet wide, and the curtain is 65 feet away from the wall of the pit. In the auditorium there are no columns to obstruct the view, and seats have been arranged for 2,239 persons, 1,000 being in the pit, 800 in the gallery, and 239 in the balcony. There are eight private boxes. The Louis XIV. style of decoration is adopted throughout the house. The centre panel of the ceiling is dome-shaped, with four medallions in mitres filled in with painted subjects. All the decorative work is treated in delicate shades of cream and light terra-cotta. There is a good deal of gilding, but not so much as to make the surroundings look heavy. The stalls, carpets, and draperies are of a rich ruby colour, and all the reserved seats are very comfortable. The stage is spacious and large enough to take some of the biggest "sets." From the curtain-line to the back wall it is 65 feet, and the width is 76 feet. The proscenium opening is 30 feet wide and 28 feet high, and the height from the boards to the grid is 56 feet. The dressing-rooms are airy apartments, and close to them some bath rooms have been fitted up. The whole theatre is lighted by electricity generated on the premises, and preparations have been made for the cold weather by an improved heating apparatus.

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EXHIBITION.

THE exhibition opened at the Agricultural Hall, Islington, on Monday last, although by no means overcrowded as regards the number of exhibits, nevertheless contains many objects of interest to the visitor. The majority of the laundry exhibits are of the labour-saving order, and among them are several distinct novelties, while among the motor cars some examples of the cabs which are on the streets are shown, and prove to be very comfortable and attractive vehicles.

NEW CATALOGUE.

THE catalogues of Hart, Son, Peard & Co., Limited, are distinguished by one among several peculiarities. The traditions of the Gothic movement appear to be still influential in the workshops. The designs employed are always marked by fitness, and we might add sobriety. The metalwork is never obtrusive on account of its form or ornament, and in that way differs from much which is now produced in this country and America. The work has another Gothic quality—it is made to endure. These characteristics are to be seen in such small productions as sash lifts, fasteners, sash bolts, door furniture, bell levers, door handles, brackets, &c. The firm have to recognise that Mediæval forms are no longer dominant; but the thoroughness and good taste which they exhibited half a century ago inspire their treatment of later styles. The latest issue is Section 7, which relates to builders' ironmongery. The catalogue is comprehensive, and includes examples in all departments. Considering the quality of the work, the prices are most moderate, and we need hardly say that in the long run the goods are more economical than some which are offered at lower prices. There is also the satisfaction of knowing that the articles will correspond with the descriptions of them. It is more satisfactory to have one's own designs carried out, but

there are occasions when time will not admit of that arrangement, and on such occasions it is advantageous to have a stock available like what is found in the Drury Lane warehouse, in which design, workmanship, and material are praiseworthy.

GLASGOW CORPORATION AND BETTERMENT.

THE following report of the special committee on betterment has been presented to the Glasgow Corporation:—

The committee have carefully considered the remit made to them by the Corporation on April 1 last—viz., to consider and report on the following motion by Councillor Ferguson, viz.:—
“For the purpose of carrying out the principle of betterment and sustaining the Corporation in its contemplated expenditure for improvement of the city, power to be sought from Parliament of the kind suggested by the Commission upon the Housing of the Poor—viz. a rate of four per cent. per annum upon the selling value of all land within the city boundary.” The committee have resolved to recommend that the Corporation, having approved of the principle of betterment, should remit back to this committee to take steps to get a general bill containing provisions for carrying out the purposes thereof. In making this recommendation the committee think it right to place before the Corporation the data on which they have proceeded, and the information which has been before them in connection therewith, and beg to submit the following extracts from the report issued in 1889 by the Commissioners appointed in 1884 to inquire into the Housing of the Working Classes. The Commissioners in their report state that—

“They are of opinion that until some reform is introduced which shall secure contribution to local expenditure from other sources of income received by residents in the locality, in addition to the present rateable property, no great progress can be made in local improvements. In connection with any such general consideration of the law of rating attention would have to be given to the following facts:—At present land available for building in the neighbourhood of our populous centres, though its capital value is very great, is probably producing a small yearly return until it is let for building. The owners of this land are rated not in relation to the real value, but to the actual annual income. They can thus afford to keep their land out of the market, and to part with only small quantities so as to raise the price beyond the natural monopoly price which the land would command by its advantages of position. Mean-

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Canvas, Linen, Muslin, Calico, Paper, even Tissue Paper, will become waterproof when the paint is applied; in fact it will **Waterproof anything and everything from a Stone Wall or Iron Girder down to Tissue Paper.**

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time the general expenditure of the town on improvements is increasing the value of their property. If this land were rated at, say, 4 per cent. on its selling value, the owners would have a more direct incentive to part with it to those who are desirous of building, and a twofold advantage would result to the community. First, all the valuable property would contribute to the rates, and thus the burden on the occupiers would be diminished by the increase in the rateable property; secondly, the owners of the building land would be forced to offer their land for sale, and thus their competition with one another would bring down the price of building land and so diminish the tax in the shape of ground rent, or price paid for land which is now levied on urban enterprise by the adjacent landowners, a tax be it remembered which is no recompense for any industry or expenditure on their part, but is the natural result of the industry and activity of the townspeople themselves. Your Majesty's Commissioners would recommend that these matters should be included in legislation when the law of rating comes to be dealt with by Parliament. . . . This leads to the consideration of a most important question connected with compensation and the incidence of rating—the principle which is known by the name of betterment. It is the principle that rates should be levied in a higher measure upon the property which derives a distinct and direct advantage from an improvement instead of upon the community generally, who have only advantage of the general amelioration in the health of the district. American legislation has adopted the principle that where public improvements are effected by the local authority they ought to be able to bring in aid of the cost of the improvement any additional value conferred on the adjoining property by reason of the improvement."

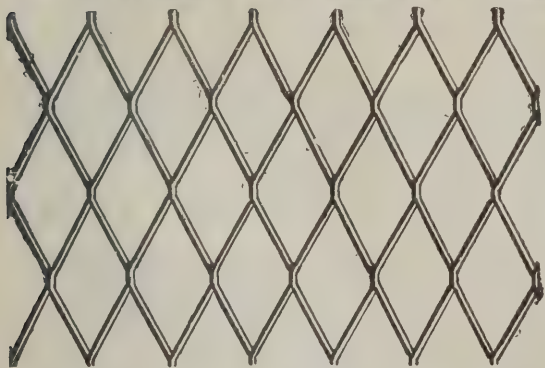
In addition to the above extracts from the report of the Commissioners, the committee desire also to place before the Corporation the following observations by Mr. Jesse Collings, M.P. (one of the Commissioners), contained in a memorandum prepared by him supplementary to the report which he had signed. In that memorandum he states that "The principle of 'betterment' which is recognised in the Artisans' Dwelling Acts, 1879-82, in cases where property belonging to the same owner is benefited should be extended. The owners of adjacent property who have been directly benefited by any public improvement should be called upon to pay such an extra rate as would constitute a fair share of the cost of such improvement. Mr. Forwood, who has had experience of the working

of this law in America, speaks of it in his evidence as 'an admirable and very fair arrangement.' At present the owners of ground-rents pay nothing directly towards the rates of a locality. It is contended that the rates for land are paid indirectly through the occupier; but, even admitting this to be the case, it is evident that all increase in the rates and all new rates must fall entirely on the householder. The ground landlord—the future value of whose property is so largely increased by no effort of his own, but by the industry and outlay of the community—pays nothing as a rule, even indirectly towards the repayment of short loans and other expenses for new improvements, or for increasing local expenditure of any kind. It should be a recommendation that all ground-rents should be directly rated in support of local burdens."

For 200 years this principle (betterment) has been worked in the United States. Windsor, in his history of Boston, tells how between 1866 and 1872 most of twenty-two millions of dollars was spent in street-widening. The Boston Improvement Act of 1866 permitted 50 per cent. of an appropriation of the property specially benefited. "Thus without hardship to the numerous individuals whose property was taken, and without large expense to the city," improvements vastly greater than those contemplated or realised in Glasgow were accomplished. A proprietor who got 100% per year from the improvements was not likely to feel aggrieved at being asked to contribute 50%. Of course, some men holding fast by the old-world ideas which enabled the landholders of Great Britain to obtain ruinous amounts as compensation from railway companies for increasing the value of the properties through which the lines were laid fought the Corporation, with results as follows:—The Chancellor told Mr. Livingston in the New York Court he could claim no damages for sustaining a benefit. "The owner of property taken is entitled to full compensation for the damage he sustains thereby, but if the taking of it for public improvement is a benefit he certainly has no claim for damages. So thoroughly is this equitable principle applied that in Massachusetts it is not uncommon for a railway company, in response to a claim for land taken by the company, to furnish and obtain the balance between that claim and a larger sum—the betterment—which the railway company had created for that land-owner."

Forty different legislatures have adopted the betterment principle, representing the keenest commercial people in the world. "Payment according to benefit" is daily becoming more firmly rooted in American law. In some States two-thirds

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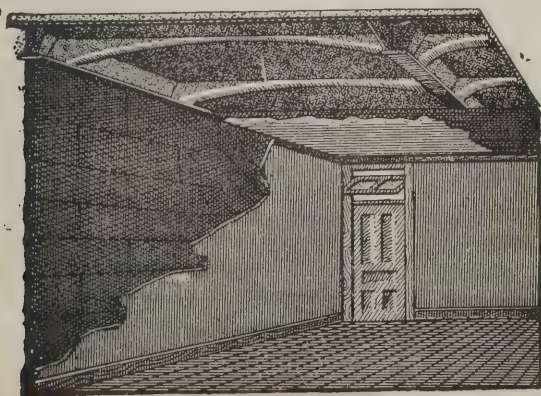
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of the cost of improvements are taken from persons benefited, and one-third from the public. Judge Stedell of Louisiana held that paying for local improvements out of general funds was inequitable, and opened a way for injustice and extravagance. He held the betterment tax to be safer as well as juster. In fact, the Supreme Courts of different States lay it down that "betterment" is not a tax, but a mere contribution for value received. This reply was given to Brown's University, which claimed exemption from betterment on the ground that its character exempted it from rates and taxes, and it had to pay accordingly. Dillon, in his handbook of American Municipal Laws, quotes the statement of a judge of the Supreme Court of Missouri that the principle of betterment has been subjected to severe analysis in every State of the Union, and adds, "It is now as firmly established as any other doctrine of American law, while the tax itself has become the usual form of assessment for new municipal work of every description. After much opposition and fierce litigation the public mind has at length everywhere acquiesced in its reasonableness and equity."

This committee asks the Town Council of "the most progressive municipality in the world" to add one more to its laurels, and, whilst the influence of landowners, aided by land conveyancing lawyers, has defeated or rendered useless by legal expenses the efforts of Manchester and London to follow the wise example of the American cities, let Glasgow show she is determined to free labour and capital from the terrible injustice of producing the harvest for the sole use of those who only contribute an ordinary share to its production. Mr. John Rae, in an article on "Betterment" in the *Contemporary*, says the betterment tax rose spontaneously out of natural considerations of equity and convenience. The seeds of the idea may have been carried across from England. As far back as Henry VIII. the germs of betterment appear, but never developed further in this country, being choked by the all-conquering tendency of legislation to favour real estate (landlords), but in America they have grown and flourished, until now there is scarce a city in the Union that does not sit under the shelter of its branches.

The principle the committee desires the Council to put into a Bill has now been accepted by the Government, and is embodied in a Bill of the London County Council, 58 and 59 Victoria (Tower Bridge Approach Bill). "The amount to be charged is 3 per cent. per annum upon one-half of the amount which the Council allege is the enhanced market value derived by said lands from the improvement."

A JEWISH SETTLEMENT IN ESSEX.

SOME time ago Mr. Robert Varty, of 90 Leadenhall Street, purchased some estates of about 1,200 acres immediately contiguous to his residence at Jarvis Hall, Rayleigh, Essex. These estates lie in the three parishes of South Benfleet, Thundersley and part of North Benfleet. Mr. Varty was able, as he told a representative of the *Westminster Gazette*, to purchase this land at a price which enables him to sell cheaper than the original holders obtained it. The reason of course was the downward tendency in prices and the increasing difficulties of the farmers to pay the tithe and other charges upon the land. Mr. Varty (who has his own remedy for agricultural depression) has cut up the estates into small plots. He has already sold about 800 acres.

When the sales were first held a few Jews were present, but last week two or three hundred Israelites attended the auction, and this number included several rabbis and prominent members of the London Synagogue. As the result of the day's sale, about 300 lots were sold, the total price realised being 3,386*l*. There was no mistaking the nationality of the purchasers, the auctioneer's lists including such names as Goldstein and Moses and other typical cognomens. All these men paid the deposit at once—some even handed over the purchase-money. According to Mr. Varty, these new Essex settlers are men in a small way in the East End. Some are tailors and shoemakers, others make small articles for the coster and the huckster, or they peddle themselves.

The plots of ground are 20 feet broad and some 160 or 170 feet in depth, sufficient to erect a house and leave space for a garden. These Jews are of Polish or Russian extraction, and by dint of years of industry in England have acquired the wherewithal to purchase in some cases several plots of ground. A glance at the lists showed that in one case 232*l*. had been paid by a Jew, but this was probably in the nature of a speculation. The plots, however, unless they were in some specially good position, fetched between 4*l*. and 5*l*.; the only other expense that the purchaser was put to was 6*d*. for a Government stamp to affix to the deed of conveyance.

It is evidently the intention of the Jews to establish a regular colony here. Plans are being got out for houses; one or two small factories are to be built, whilst an enterprising East End fish merchant is going, it is said, to build a refreshment house. Some 400 acres are still to be disposed of, and, judging by the way that Moses and his compatriots are crowd-

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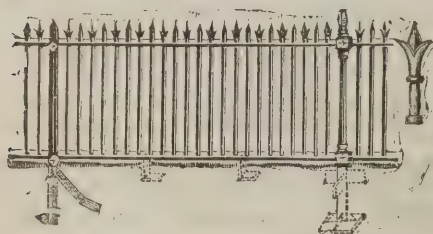
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ing into Mr. Varty's office during these days, asking particulars and filling up schedules, it seems likely that this further estate will be completely occupied by Jews.

The poorer Jews, hitherto, have hardly been suspected of rural tendencies; some of us have even come to believe that their natural atmosphere was in the reeking slums. But Mr. Varty has been making inquiries, and he finds that many of the Jews who are migrating to the country entirely of their own accord and without any extraneous assistance—this indeed is the remarkable feature of it—were originally brought up on the land, and have retained in all these years of chaffering the real heart of a peasant. One idea these people have is to build houses in which they may let lodgings for their brethren in the summer. Others will adopt small culture and go in for flowers, fruit and vegetables, for which they expect a good sale in Southend. The estate is served by two railway stations, and there is the river besides.

BILSTON WATERWORKS AND TECHNICAL SCHOOLS.

BILSTON was *en fête* on the 12th inst. on the occasion of the opening of the new and important waterworks and the technical schools. The water supply, as furnished by the Wolverhampton Town Council, having been found for some years totally inadequate to the requirements, steps were taken to secure an independent supply, land was secured at The Bratch, at Wombourne, and, water of a pure quality having been found, the necessary plant was laid down. The works opened on Thursday include engine-house, well-house, boiler-house, machine-fitting and repairing shop and stores, while the plant consists of two boilers, two engines and two sets of pumps, with the usual accessories. All the machinery is in duplicate, in case of a breakdown. The total cost of the scheme is 45,000*l.*, and the work has been designed and carried out by Mr. Baldwin Latham, M.I.C.E., of Westminster, while Mr. C. L. N. Wilson (the town surveyor of Bilston) has acted as resident engineer. The technical schools situated on the Willenhall Road, within a short distance of the town hall, have been erected on 1,433 square yards of land, which was purchased at a cost of 217*l.* The architect is Mr. C. L. N. Wilson, the surveyor to the district council, and Mr. T. Tildesley, of Willenhall, is the builder. The style is Italian, and the front elevation has been carried out in red brick and terra-cotta, and presents a very effective appearance. The

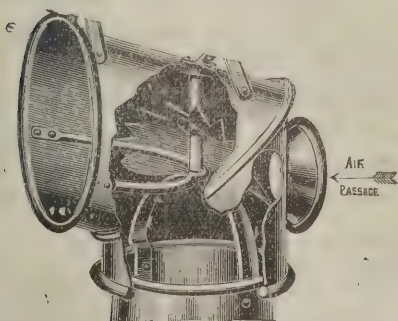
building comprises large lecture and examination-room, and fourteen small rooms, which will be used as small workshops and laboratories. The total estimated cost is 6,000*l.*

THE PUBLIC HEALTH ACT.

AT the meeting of the Association of Burgh Officials held in Dunfermline on the 20th inst., Mr. James Donaldson, the secretary, read a paper on the "The Public Health Act," which he said practically repealed all the existing Public Health Acts except one, namely, the Act of 1891. The effect of it was that, while sewers constructed under the Public Health Acts were formerly required to be paid for by occupiers, such sewers would now fall to be paid for half by owners and half by occupiers; but, on the other hand, sewers constructed under the Act of 1892 are still required to be paid for wholly by owners. Further, while water supplies provided by the Public Health Act of 1867 were in some cases (following the prison assessment) payable equally by owner and occupier and in others wholly by occupiers, they would now fall to be rated for half on owners and half on occupiers; but, on the other hand, similar works provided for under the Police Act would be levied wholly on occupiers, and, curiously enough, the rate for water supplies provided in future under the Act of 1892 would fall wholly upon occupiers. The new Act would come into operation on January 1, 1898. The assessments were imposed in September or October in each year for the year till May 15 following. In assessing for the current year he was afraid they must levy in accordance with the present Act, as the only one then in force. A new clause had been introduced into the Act providing that the ratepayers of a burgh were not to be assessed for any charges or expenses incurred by a County Council for the salaries or expenses of the medical officer or sanitary inspector appointed for the county. This removed an injustice felt in many burghs. It was provided that loans for the purposes of the Act were to be repaid within a period not exceeding thirty years. In borrowing for sewers constructed under the Burgh Police Act, the capital would not be repaid for thirty-three and one-third years, while in borrowing for similar sewers constructed in burghs under the Public Health Act the amount must be repaid within thirty years. All this meant greater trouble and confusion in dealing with borrowings and sinking funds, and no good ground existed for the difference that had been made. In concluding, the Secretary said it would be seen that, while the Public Health

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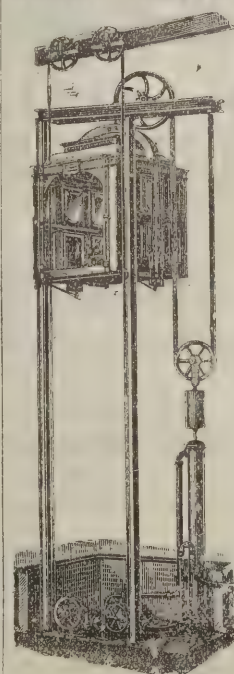
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Act might be a useful measure, it had left in an unsatisfactory state much that stood in need of amendment, and while deeply regretting that Parliament should have delayed putting matters right, they could only express the hope that the anomalies and difficulties might be removed by a Bill next session.

PROPERTY IN POSSESSION OF BUILDING SOCIETIES.

ON August 25, 1894, an Act was passed for the regulation of building societies, but in order to avoid risks which might arise from immediate application one of the sections was allowed to remain in abeyance for three years. The time having elapsed it is now in operation, and will henceforth regulate the power of building societies to receive money on deposit or as loans. Up to August 1894 building societies were by a previous Act of 1874 enabled to receive money on deposit or as loans to an amount not exceeding two-thirds of the aggregate sum which had been lent on properties by way of mortgage. The disclosures which followed the failure of the Liberator and other less famous building societies led Parliament to call for a return from all building societies of what is known as their "properties in possession." Out of 2,249 societies in England and Wales 210 failed to make any return, "notwithstanding repeated applications by the Secretary of State," whilst 681 acknowledged that their properties in possession stood in their books at 3,565,309*l.*, upon the security of which they were able to receive deposits to an amount not exceeding two-thirds of that sum. It was this startling return that induced the Government to insert in their Bill the clause which now takes effect, prohibiting building societies from receiving any money on deposit or as a loan upon the security of any property in the possession of the society, or upon any property on which the mortgage repayments are more than twelve months in arrears. The words of the clause are as follows:—

"In calculating the amount for the time being secured to a society under the Building Societies Acts, by mortgages from its members, for the purpose of ascertaining the limits of its power to receive deposits or loans at interest, the amount secured on properties the payments in respect of which were upwards of twelve months in arrear at the date of the society's last preceding annual account and statement, and the amount

secured on properties of which the society had been twelve months in possession at the date of such account and statement, shall be disregarded."

At the time of the introduction of this clause into the Bill it was fully recognised that many building societies would have to overcome considerable difficulties in complying with its provisions, and to avoid forcing societies into liquidation the House of Commons suspended the operation of the clause "until the expiration of two years from the passing of the Act," and protected existing depositors by the insertion of a proviso, "That this section shall not affect the validity of any deposit or loan which was within the limit provided by law at the time when it was received." In this form the Bill was sent to the House of Lords, where powerful representations were made to Lord Herschell, who had charge of the Bill, that two years was an insufficient time to enable many building societies to bring themselves within the limits of the new borrowing powers. As the result of these representations the House of Lords extended the operation of the clause for a further period of twelve months, making three years in all.

From the returns which have been recently made by building societies it is much to be feared that, notwithstanding the three years' grace allowed by Parliament, little or no effort has been made by some societies to reduce their deposits and loans to within two-thirds of the amount of the mortgages upon which repayments are more or less regularly paid. This is in part due to the great difficulty of realising properties in possession for the purpose of paying off loans and deposits. Although the failure of a society to reduce its loans and deposits, where they exceed the limits allowed by the new Act, may not be held to affect the validity of the loans and deposits already taken, future depositors will do well to make sure that the sum already held by a building society on deposit or loan is well within the limits allowed by the new Act. Fortunately the detailed series of accounts now required from all building societies clearly sets forth this information.

It may be mentioned that since the passing of this clause the Chief Registrar of Building Societies has reported that of the 210 societies who failed to make any return to Parliament of the properties in their possession, sixty-one have now sent in returns showing that they have properties in possession amounting to 1,117,709*l.*, and that twenty-two societies "who stated that they had no properties in possession," now acknowledge that they have such properties, amounting, however, only to 23,263*l.*

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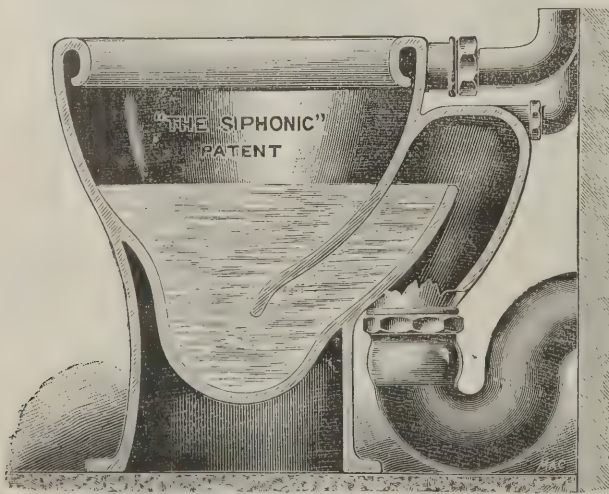
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THE EDUCATION OF ENGINEERS.*

IN this ever memorable year of the Victorian age, it is not unnatural that any one called to fill the chair I occupy to-day should experience a sense of oppression when contemplating the fruits of mechanical science during the last sixty years, and the tremendous vista, fading in the distance to a dream, of the fruits it is destined to produce before such another period shall have passed away. There would be no possibility, in the time at my disposal, even if I were qualified to attempt it, of adequately reviewing the past; and, however fascinating the thought may be, it would ill become my office to venture too far along the vista before us, lest a too airy imagination should break the bonds of that knowledge and that truth to which she must ever remain, in our rightful speculations, a helpful, if not always an obedient, handmaiden. In the year 1831 two places, the one ancient and memorable, the other young, but destined to become memorable, bore the name of York. At the first of these, amid relics of ancient Rome and lasting memorials of the better phases of Britain's Mediaeval history, were met together in that year the earliest members of the British Association. And as the sun at noonday shone on that ancient York, it rose upon the other York—a little town, scarcely more than a village, of 1,700 people, fast springing from a plain on the shores of Ontario, where the wigwag of the Chippewa had lately been; and between the two lay the Atlantic and a distance of 4,000 miles. Sixty-six years later the British Association meets in that other York, distinguished under the name of Toronto and grown into a noble city. Painfully, in stage coaches, must many of the founders of this Association have travelled to that ancient York; peacefully and amid all comfort and luxury have we from the mother country reached, at her invitation, this great city—chiefest in its people, its commerce and its university of the cities of Western Canada. Neither at the meeting in York of 1831 nor elsewhere, until many years later, was there any expectation of the possibility of these things. Six years later, about the beginning of that glorious reign of which the sixty-first year is now passing, although two or three vessels had already crossed the Atlantic under steam, it was still seriously doubted whether, without the aid of a Government subsidy of

considerable amount, a line of steamers, even for the New York service, could be permanently maintained. It was not, indeed, until 1838 that the *Great Western* inaugurated the attempt on a commercial basis, and she performed in fifteen days the voyage which is now regularly performed with complete commercial success in five. Would not the suggestion of such a change, of such a spanning of great distances, of such a consequent growth of prosperity and of culture, within the reign of a princess then approaching womanhood, have been received as the wildest of forecasts by the British Association of 1831? Yet this is but one of a multitude of results, no less startling, which the same agencies have brought about. We are now holding the second meeting of the Association in Canada, and at the first such meeting, held thirteen years ago in Montreal, some hundreds of miles nearer home, Sir Frederick Bramwell told you from this chair, in his own inimitable way, the causes of so great a change, and he pointed out to you, as I venture to point out again, that the visible instruments of that change have been forged by the men who are, or were, or ought to be, the members of Section G. To such encouragement as Section G has given is largely due the progress and triumph of applied mechanics as the natural outcome of theoretical investigation and physical research.

The Training of Engineers.

If we look back at the greatest names among the engineers and inventors of the latter part of the eighteenth century and the first half of this we find that the majority were brought up in pursuits quite distinct from the work of their after lives and by which they have become so familiar to us. There were scarcely any means whatever beyond the original thought and dogged perseverance of the worker, by which those men could attain the knowledge they used with such effect. Men of no less exceptional parts are among us now, but the whole environment of their early work has changed. We have given to the exceptional man a starting-point of knowledge which, wisely used, lifts him as high above our heads as of old, but we have given to the average man a comparatively easy means of attaining the same knowledge. We cannot insure the wise use of that knowledge, but we can at least endeavour to impart it in such a manner that the sense of right proportion shall be acquired and maintained. We have made it more difficult to distinguish between the exceptional and the commonplace—between the gold and the silver, if not between the silver and

* An address delivered by Mr. G. F. Deacon, M.Inst.C.E., President of the Section of Mechanics at the Toronto meeting of the British Association.

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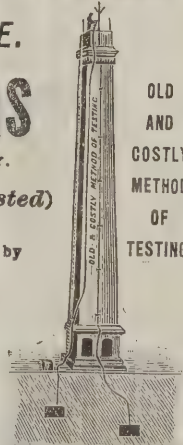
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the brass; let us be careful, so far as early guidance can control it, that the knowledge imparted to the average mind gives to that mind a fair start concerning the relations, undivided and indivisible, between true theory and sound practice. Having myself passed as an ordinary apprentice through workshops of mechanical engineering in the old days when working hours were longer than they now are—from six in the morning till six in the evening, and that, too, on the banks of the Clyde, where no special indulgence was given to what was sometimes called the "gentleman apprentice," and feeling convinced, as I still do, of the immense and permanent advantage derived from that experience, I shall not be judged to underrate its value in the case of others who have yet to choose the details of the career by which they expect to gain a place in the profession or business of an engineer. On the other hand, as a student thirty-four years ago under the late Professor Macquorn Rankine and the present Lord Kelvin, I shall not be prone to underestimate the advantages of academical training in its proper application to the profession to which I am proud to belong. In the pursuit of that profession it has fallen to my lot to observe the training as engineers of many younger men—men of variously constituted minds, but one and all bent on learning some portion of "the art of directing the great sources of power in nature for the use and convenience of man," words wisely chosen sixty-nine years ago and set out as the object of the profession in the Royal Charter of the Institution of Civil Engineers. It is a noble object, this direction of the great forces of nature for the use and convenience of man; it is an ambitious object, and one which I venture to think demands for its right performance the best energies of well-balanced minds working upon a store of knowledge which nothing but years of untiring study and observation can give. Yet there is no hesitation shown to enter the lists. The number of candidates is appalling. In the old country, at least, there certainly is not work for all, but when one points this out, anxious parents only reply that the difficulty is as great in connection with any other profession. Whether this be so or not I cannot judge, but I am persuaded that of those who do enter the business or profession of the engineer, the enormous majority are not born engineers, and cannot, in the nature of things, hope for success unless they take advantage of the best facilities open to them—the best facilities; here is the difficulty, from the multitude of facilities how are we to choose? Do not suppose that I think the training of the born engineer should not be controlled. He

will stand head and shoulders above the rest of us whatever we may do with him; but in order that his exceptional parts may not wreck him as an engineer, and in order that his energies may be rightly directed at the start, he, too, should have the advantages of that systematic training which to his less gifted brethren is becoming more and more absolutely essential to success. At the time I began practice the large majority of young engineers were left entirely to their own devices so far as the attainment of any scientific knowledge was concerned. As pupils or apprentices, articulated or not, they entered an engineer's works or office; for a certain number of years they had the run of the place and some encouragement if they worked well, but it could not, in the nature of things, amount to much more. This was a very necessary, perhaps the most necessary, element of their training; but except to the few who were so constituted that with little or no guidance they could supplement their practical knowledge with the study of principles elsewhere, it was entirely ineffectual in the production of that well-balanced attitude of mind which any person who properly assumes the name of an engineer must hold towards every engineering problem, great or small, which he is called upon to solve. And so strongly have I felt this that in the earlier days, when there were fewer schools of practical science, and when their utility was little understood, I required, wherever the matter was under my control, the insertion into the articles of apprenticeship of a clause by which, at some inconvenience to the office, the pupil was required to attend two sessions at the science classes of Glasgow University or at some other approved school of practical science, and without this condition I declined to take the responsibility attaching to the introduction into the profession of men who, in their earlier careers, from no fault of their own, had not even acquired a knowledge of what there was to learn, much less of how to learn it. More recently this course has generally become unnecessary, for in Westminster, at least, the young engineer rarely enters an office until he has acquired some knowledge of what he has to learn. He enters, in short, at a much more advanced age than formerly. When it is essential that he should be earning something soon after he comes of age, anything like a complete training is an impossibility; his work ceases to be general, and his practice is more or less confined in a much narrower sphere than need be the case if the pursuit of further knowledge continues to be his chief duty. But whatever course his circumstances may permit him to adopt, the difficulty of gaining the required knowledge in the time available

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is a serious one. This is not the place to inquire whether public school education in the mother country is, or is not, the best for the general purposes of after life, or to discuss what improvements may be made in it; and of higher education in Canada I unfortunately know little or nothing. Personally I admit the possibility of improvement in the English system, and slowly but surely improvement is creeping in, as such changes rightly find their way into institutions which have done so much for Englishmen. In this particular I lean to the conservative side, and whatever our individual views may be concerning the time spent on the study of Latin and Greek we should all probably agree that the school education of an engineer should be as thorough and liberal as for any other profession. But for the sake of a technical training to follow, this school education is often unduly curtailed, to the great after-grief in very many cases of the successful engineer, and not infrequently also in the case of the less successful engineer, who in some phases of his professional career has been only too keenly alive to the self-reproach and sense of inferiority which want of thoroughness or of time, or of both, at school has brought upon him. But at some time the boy must leave school. Let us hope that he does not aspire "to control the great forces of nature;" but if he does we must make the best we can of him. It is not desirable, at least so it appears to me, that even at this stage his training should be specialised in view of the particular branch of the profession or business he is likely to follow. The fundamental principles of any branch of mechanical engineering are broadly the fundamental principles of any branch of the profession. I hesitate to speak of civil engineering as if it were a separate branch, instead of being, as it really is, the generic name of the profession; but the training demanded for the various branches of civil engineering in its narrower sense is precisely the same as that required in its earlier stages for mechanical engineering pure and simple.

Principles, not Details.

I shall make no attempt to review the large number of excellent courses which are now available for the teaching of applied science in relation to engineering. Experience of the results as judged by the students who have come directly under my notice, and examination of many calendars has aroused various thoughts concerning them, and this thought is perhaps uppermost—Are we not in some cases attempting at too early a stage the teaching of subjects instead of principles? Complete subjects, I mean, including the practical working of details which will become the regular study of the student in the office or works of an engineer. It certainly seems to me to be so. I do not say that subject training of this kind at college may not be useful; but we have to consider whether it does not, for the sake of some little anticipation of his office work, divert the attention of the student from the better mastery of those principles which it is so essential for him to grasp at the earliest possible time, and which do not limit his choice in the battle of life to any branch whatever of the profession or business of an engineer, but which, on the contrary, qualify him better to pursue with success whatever branches his inclination or his opportunities or his means may suggest. Not one in a hundred of us can hope to emulate the careers of exceptional men in our profession, but it is sometimes useful to observe those careers, and whenever we do so we find the very reverse of specialisation. The minds of such men are impregnated with the fundamental principles which we may call the common law of our art; it has happened that their practice has been large in certain branches and small or wanting in certain others, but in any it would have been equally successful. Of no class of men can it be said with greater truth than of engineers that their standard should be sound knowledge of the principles of many things and of the practice of a few. There is some danger in the usual limitation of compulsory subjects in examinations for certificates and degrees. When an examination has to be passed subjects not made compulsory are too often entirely neglected, however important to the engineer they may be. A little learning is certainly not a dangerous thing if within its limits it is sound, and every engineer will in after life be grateful to those who in his student days insisted upon his acquiring some knowledge of the principles of such subjects as electricity and chemistry. At present it too often happens that, unless an engineering student is predestined to practise electrical work or some chemical industry, he begins life as an engineer with no knowledge of the principles of either the one or the other, and chiefly as a result of their neglect for the sake of certain subjects made compulsory for the test he has had to pass, which subjects, too, occasionally include the highly specialised favourites of a particular professor or verge too completely on perfected details which, I venture to think, cannot be rightly mastered in schools. It is natural and right that each professor of a principal subject should seek to make the best, from his own particular standpoint, of every student who attends his lectures or his laboratories; and the professor of a compulsory subject cannot be expected to encourage the inclusion, in a course

already overcrowded, of secondary or collateral subjects which are dealt with by other professors; while, on the other hand, the professors of secondary subjects, such as electricity or chemistry, not unnaturally value chiefly the students who make those subjects their principal work. For these reasons it appears to me that a certain very moderate standard in all such subjects should be made compulsory if a certificate of proficiency, whether by degree or otherwise, is to be given in engineering or even in physical science. In the teaching of mathematics within the Victorian age a considerable change has taken place, and I plead for still a little more change in the same direction where the training of the engineer is concerned. Mathematics, as taught in our public schools—let us say for the Cambridge University Tripos—may be all that is claimed for it as a mode of mental culture; but of kindred mental culture the engineer must necessarily have more than most men, and much might therefore be omitted which, to him at least, has only an abstract value, to the great advantage of his mastery over those branches which at once train his mind and give point and direct utility to his solutions. In America I understand that a college course of engineering generally includes workshop practice designed to supersede the old system of apprenticeship to a mechanical engineer. This fact and other important differences between the English and American practice have only lately come to my knowledge, and before they did so the substance of this address had been written. It might, in some particulars, require modification as applied to Canada, but it remains the result of my observations concerning the conditions of engineering education which obtain in the mother country.

Workshop Training.

A few words now in relation to that physical and mental training gained laboriously, and somewhat wastefully, as I think, at the joiner's bench, in the fitting and turning shops, the foundry and the forge, during the whole course of mechanical engineering apprenticeship. I am convinced that the kind of knowledge which comes of thoughtful chipping and filing and turning and forging, though only applied to a few of the materials with which in after life the engineer has to deal, are quite as important as tables of density and strength to his future sense of rightness in constructive design. The use of such work is not merely to teach one the parts and combinations of any particular machine; in a still higher degree it is the insensible mastery of a much more subtle knowledge or mental power, the application of the senses of sight and touch and force, it may be of other senses also, to the determination of the nature of things. (I am not going to apologise for referring to the sense of force. The vexed question of its separate existence appears to me to have been settled fourteen years ago by Lord Kelvin in his address at Birmingham on "The Six Gateways of Knowledge," and I may well leave it where he left it.) I should altogether fail to describe adequately what this mastery means. It appears to me to be inscrutable. The value and nature of the power can only be appreciated by those who have experienced it, and who have felt its defect in those of their assistants or in others who do not possess it. But the great workshop training has still further advantages. The apprentice is surrounded by skilled workers, from whose example, if he be wise, he learns a great deal; and apart from this it is no small profit to have rubbed against the British workman, to have discovered what manner of man he is, and to comprehend how little the world knows of his best parts. The whole time spent in large engineering works cannot, however, be equally beneficial; the apprentice must take the work as it comes; the most interesting or instructive portions cannot be reserved for him, and he often feels that some of his time is being well-nigh wasted. A few years ago I should not have thought it practicable usefully to substitute for such a course anything that could be undertaken in a student's workshop, however organised; but the impossibility in many cases of including such experience without neglecting something equally important has led me to view with satisfaction the introduction of workshop training into certain schools of applied science in England. Such a change cannot, of course, carry with it all the advantages of experience in the great workshop and of contact with its workers, but those advantages which it does retain may be secured in a shorter time where there is no commercial interest to be served. In Canada and the United States, as I have already said, the principle of the student's workshop has been carried considerably further. Compared with the old country, I believe the number of young assistant engineers who in proportion to the number of their chiefs can find employment in America is much greater, and that it would be practically impossible for the British system of pupilage to be generally employed. Here, therefore, the whole college training of an engineer is designed to fit him for immediate employment in some specific branch of the profession, and up to this point his training is necessarily, no doubt, more academic than in England, where the application of the principles he has acquired at college is still generally left for the office or

works of the engineer. With this difference I am not at present concerned, but I desire to reiterate what I have already said to the effect that where, as in England, the student of engineering has the opportunity of continuing his training in the office or works, it is better that his limited college course should cover all that is possible of the principles of those sciences which may prove useful or necessary to him in after life, rather than that any of them should be omitted for the sake of anticipating the practical application of certain others. The compulsory inclusion of the principles of all such subjects as chemistry, electricity, geology and many others, in science courses intended for a future engineer is desirable not only because a fundamental knowledge of them leaves open a very much wider field from which the engineer may, as opportunity offers, increase his knowledge and practice in the future, but because many of such subjects are inseparable from an intelligent understanding of almost any great engineering work. "Nothing so difficult as a beginning" may be a proverb of rather too far-reaching a nature, but it contains the suggestion of a great truth, increasing in weight as we grow older, and the beginnings of such collateral sciences should therefore find a place in every engineering student's store of early knowledge.

The Conditions of Success.

But after all, when these things have been done in the best manner—when the scientific and practical training of the engineering student has been all that can be desired, it is a matter of general experience among engineers who have closely watched the rising generation that the most successful men in after life are not produced exclusively from the ranks of those whose college course has been most successful. No doubt such men have on the average been nearer the top than the bottom, but it is an undoubted fact that when we class them according to their earlier successes or failure we find the most remarkable disparities. We find many who in academic days gave but little promise, and we miss large numbers who promised great things. These facts are not confined to the profession of the engineer, but they seem to me to be accentuated in that profession. We shall no doubt be right in attributing the disparity to differences of mental temperament and of opportunity; but does it follow that there are no faculties which may be cultivated to reduce the effect of such differences? I venture to think there are. I will instance only one, but perhaps the most important of such faculties, which in my experience among young engineers is exceptionally rare. I refer to the power of marshalling facts, and so thinking, or speaking or writing of them that each maintains its due significance and value. In the minds of many young engineers a mathematical training undoubtedly has the effect of making it extremely difficult to avoid spending an amount of time upon some issues out of all proportion to their importance; while other issues which do not readily lend themselves to mathematical treatment, but which are many times more important, are taken for granted upon utterly insufficient data, and chiefly because they cannot be treated by any process of calculation. I believe that nothing but well-directed observation and long experience can enable one to assign to each part of a large engineering problem its due importance; but much may be done in early training also, and I think ought to be done to lead the mind in broader lines, to accustom it to look all round the problem, and to control the imagination or the natural predilection for one phase from disguising the real importance of others. In the practical design and execution of important works the man will sooner or later be recognised who has the power so to formulate his knowledge, and on the same principles has succeeded in so marshalling and expressing his thoughts as to convey to those by whom he is employed just so much as may be necessary and proper for their use. Such considerations are not, it is true, a branch of mechanical science, but being essentially important to the attainment of maximum usefulness in the application of any science to the various branches of engineering which are the chief ends and aims of mechanical science, they are, I think, worthy of mention from this chair. In proportion as the engineer possesses and exercises such powers he will avoid those innumerable pitfalls to which imperfectly instructed ingenuity is so particularly liable, and to which the Patent Office is so sad a witness; and in the same proportion must always be the useful outcome of the great schools of science which have become so striking a feature of the later Victorian age. In relation to the results of applied science, I have spoken only of the steamship; add the telegraph, and I think we have the most important tools by which the present conditions of modern civilisation have been rendered possible. And more than this, I think we have, in the lessening of space and the facility for intercourse they give, the chief secret of that marvellous development of the empire which this year has so pleasantly and so memorably signalled. Is "Our Lady of" the Sunshine and "the Snows" no nearer to the mother land than sixty years ago? Are the Australias—New Zealand—no nearer to both? Assuredly they are. Would British Africa, would the Indian Empire have been possible to Britain on the

principles and the methods of Imperial Rome? Unquestionably not. Then let me say again that I claim for the objects and the work of Section G a magnificent record, an abiding power for the peace of the world, and for the unity and prosperity of the great empire to which we belong.

GLASS COLOURING BY PENETRATION.

It is proposed by M. Léon Léal to colour glass, not throughout the mass, nor in enamel fashion, but by what he calls penetration. A little silver salt is put on the surface of the glass, which is then heated up to 500 degs. or 550 degs. Centigrade (930 or 1,000 degs. Fahr.). The excess of salt having been removed, the surface appears yellow, the colour penetrating to a depth of 0.17 millimetre when the baking has lasted for about five minutes. After an hour a layer of double that thickness would be coloured; after eighteen hours the colour would have penetrated through a glass plate 1.6 millimetres (1/16 inch) in thickness. In reflected light this yellow displays a beautiful greenish or bluish fluorescence. The intensity of the colouration depends, of course, upon the quantity of salt applied. But very minute quantities suffice. To transfer a lace pattern on glass, e.g. it is only necessary to dip the lace in a 0.001 solution of silver nitrate, and then into potassium sulphide. According to *La Nature*, coloured monograms can easily be obtained in this way, and what is still more interesting, ordinary collodion negatives can be printed on glass in various colours. Silver and copper give a red; gold and iron salts have also been used. When the baking is continued for a long period the colouring matter is renewed from time to time—say, every six hours. The observation has a scientific interest as well. The rate of penetration would probably depend upon the nature of the glass, and upon the atomic volume of the metal.

IMPROVEMENTS IN NEW STREET, BIRMINGHAM.

ANOTHER link in the chain which binds old and new Birmingham together is about to be snapped by the demolition of the extensive block of premises forming the lower part of Cannon Street and Needleless Alley, together with the three shops between the two thoroughfares in New Street. This property is one of the most ancient pieces of old Birmingham existing in the centre of the city. The low-roofed, old-fashioned buildings, with the shop-fronts brought up to the street line, are in strange contrast with the modern commercial houses on either side, and their replacement by handsome shops, erected on the most modern principles, will be a conspicuous improvement to New Street. The change from the old order to the new will be witnessed with regret by the archaeologist and the student of local history, but these may derive some comfort from the reflection that there is still preserved to their thoughtful gaze a remnant of old Birmingham in the interesting block of ancient shops below the Theatre Royal. The property which is now about to be razed to the ground has a frontage to New Street of 66 feet, to Needleless Alley of 164 feet and to Cannon Street of 144 feet. It is cut off from the remaining buildings by a line which preserves the existence of the premises of Messrs. Frank Smith & Wilson in Cannon Street, and continues through to Needleless Alley, opposite the Young Men's Christian Association building. This forms an oblong piece of land which generations ago was part of the old Cherry Orchard. In the early days of the eighteenth century two houses stood upon the site. They were built by one William Guest, and in 1729 were in the occupation of William Weeley and Thomas Abell. Attached to them was a close known as Hipkins's, and there were also four little gardens, two evidently in front, because, according to the old maps and plans, these houses were some little distance removed from the main street. William Guest eventually sold the property to Samuel Russell, an ironmonger, and about the beginning of the present century the principal house was occupied by Dr. Freer, a medical man of eminence in the town. He practised there for many years, and was succeeded by a French physician, naturalised in this country, Dr. Gabriel Jean Marie de Lys; he was one of the honorary staff of the General Hospital. It is difficult to say through whose hands the second house passed; but after the house of Dr. de Lys became tenanted, some time in the "thirties," the houses were turned into three shops by the addition of business frontages which occupied the site of the gardens, and brought the shops up to the line of the street. For a few years the premises were let for a variety of purposes; but in 1845 the most important house, that formerly occupied by the medical men, was taken by Messrs. Bach & Barker, in whose family it remains to the present time. The central shop has for years been occupied by Messrs. Bostock & Co., while Mr. Baugust has rented the one at the corner of Cannon Street. As time went on the shops were enlarged by extensions at the rear, offices were built and other houses attached. Now these have become old, and in

their turn will give place to better and more imposing property. Of course, from the point of view of the archaeologist, the greatest interest centres in the old-fashioned shop of Messrs. Bach & Barker. The house itself is pretty much the same as it was when originally built nearly 200 years ago. It has become mellowed with age, but it still contains the spiral mahogany staircase and the two circular skylights which were the pride of the household in the days of Dr. Freer and Dr. de Lys.

The whole of the property now belongs to the Rev. Canon Newton, of Redditch, in whose family it has been for more than half a century. It has recently, or at any rate that portion of it which, as stated above, has a frontage to Cannon Street of 144 feet, to New Street 66 feet and to Needless Alley of 164 feet, been let on a lease for ninety-nine years to the Clarence Property Company, Limited, a syndicate which owns a number of central properties in the city. The company propose to demolish the block and to erect several imposing shops, together with offices, &c. at a total cost of at least 20,000*l.* The whole of the work cannot be undertaken forthwith, but at Michaelmas the offices in Cannon Street, the shoeing-forge so long in the occupation of Mr. Parker, and Biglio's restaurant will be handed over to destruction, the shop of Mr. Holroyd, woollen merchant, and the premises of Messrs. Bach & Barker, Messrs. Bostock & Co., and Mr. Baugust being reserved until the New Year. In January next, however, the work will be continued in earnest, and it is expected that the new pile of buildings will be completed in the autumn of 1898. It may be surprising to some people that advantage should not be taken by the authorities to have Cannon Street widened now that the structural alterations are to be carried out, but the public works committee have not interfered in the matter. The building line in Cannon Street and Needless Alley is at present very irregular, and arrangements have been made to make that line as straight as circumstances will permit. In order to do this the Corporation will give up 8 yards of land and the company will sacrifice 18 yards. This will be the means of effecting a considerable modification and improvement in the street line, and though it will not extend the width of the roadway it will enlarge the width of the pavement from a few inches to 2 feet at the narrowest point. The new buildings will be erected in accordance with the plans of Messrs. Essex, Nicol & Goodman, architects, Newhall Street. Provision is made for four shops fronting New Street, to occupy the space of the three original

buildings. They will extend to about half the depth of the site, namely, 80 feet, so that, although the shops will be narrower than those existing, they will be longer and will allow of a greater amount of floor space at the rear. The shops are to include the ground floor, a mezzanine floor, interposed in consequence of the considerable rise of the land up Cannon Street, and first, second and third storeys, the central portion over the two middle shops being continued as an extra storey to form an ornamental gable. In Cannon Street there will also be room for four shops about 70 feet in length, and running through to Needless Alley, but so arranged as to be capable of subdivision, and the portions with frontages to Needless Alley let independently if necessary. Over the shops will be built three floors, which, together with the upper storeys in New Street, will be let for professional and other offices, and approached from a staircase entrance in Cannon Street. The basements, access to which may also be obtained from Cannon Street, are to be so arranged that they, too, may be let apart from the shops. The general style of the design is a free Renaissance, and the treatment will be of an ornate character. Arrangements have already been made for three of the new shops in New Street to be occupied by the present tenants.

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at once commenced, and the tunnelling proceeded for several months for the most part through a stratum of blue clay. One morning, however, on the arrival of the workmen, it was discovered that the roof and sides of the tunnel for a length of 130 yards had fallen in, no one fortunately being injured. This unlucky circumstance obliged the proprietors to alter their plan, and have recourse to the cutting of an open road in the line of the intended tunnel, and this effort is now represented in the present Archway Road. The total capital raised for the purpose was 103,608*l.*, but for many years no dividends were paid and the tolls were barely sufficient to keep the roadway in repair. After the company had gone into liquidation, however, the investors were unexpectedly recouped by the general rise in the value of certain surplus land in the neighbourhood, and many persons who had come to look upon the script as so much waste paper received a small dividend. The present archway affords the spectator a delightful view of the country. It is about 36 feet high and half as much in width, and is formed of stone, flanked with substantial brickwork, and surmounted by three semi-arches, carrying a bridge wide enough for two carriages. From the topmost point, one is able to see with distinctness practically the whole of the City, and the dome of St. Paul's stands out as a very striking feature. Incidentally it may be remarked that when the collapse of the tunnel took place tremendous excitement was caused in the neighbourhood, and a wag issued a prospectus in which was promulgated a scheme for the removal of the hill entirely by means of a patent slide into the dale behind Caen Wood and the construction of a huge sea-water tank on the spot where Highgate now stands. Bathing machines were to be placed on hire, and it was proposed to erect in the middle of Caen Wood a house of detention for insane surveyors and attorneys. The wag suggested that the miniature sea should be stocked with herrings and sprats, and calculated that the profits arising from the sale of fish and the hiring of the bathing machines would amount annually to about 5,000*l.* To revert to the new scheme, which is the outcome of the fertile brain of Sir A. R. Binnie, the tender of Mr. C. Wall, of Chelsea, for 25,126*l.*, has been accepted, and a period of two and a-half years has been allowed for the execution of the contract. The cost is to be borne by five authorities—the London County Council, the Middlesex County Council, Islington Vestry, Hornsey District Council and the Ecclesiastical Commissioners. The Commissioners have agreed to furnish 1,000*l.*; the Middlesex County Council, Islington Vestry and Hornsey District Council will

contribute 6,500*l.* apiece, and the London County Council will make up the balance. When it is completed the new archway will consist of one handsome span of ornamental ironwork, completely covering the roadway and part of the embankments and retaining walls on either side. Owing to the proximity of the New River Company's reservoir, however, unusual care will have to be taken; but it is satisfactory to know that the foot passenger traffic down Hornsey Lane and over the archway will not be stopped during the progress of the work.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

- 18606. William Thompson, for "Improvements in bricks."
- 18853. William Burton and Joseph Burton, for "Improvements in the construction of press dies or plates for the manufacture of tiles having undercut recesses."
- 18823. William Thompson Braham, for "Casement or window fastener."
- 18737. Richard Robert Harper, for "An improvement connected with slats or laths or Venetian or louver blinds."
- 18750. Oliver Westlake, for "Improved means and apparatus for painting or otherwise coating Venetian blinds, laths, or slats; applicable also for painting boards, metal strips, and the like, other than blind laths or slats."
- 18455. Charles Henry Mersereau, for "Combined parting-rail and weather-strip for window frames."
- 18631. Henry Watson, for "Improvements in windows with combined sliding and swinging sashes."
- 18829. Abraham Fitton, for "Improvements in and connected with window sashes."

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Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

**** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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COMPÉTITIONS OPEN.

BATTERSEA.—Sept. 22.—The Vestry of St. Mary offer premiums of 100*l.*, 50*l.* and 25*l.* for the three best designs for the erection of public baths and washhouses. Mr. W. M. Wilkins, Municipal Buildings, Lavender Hill, S.W.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500*l.*, 300*l.* and 200*l.* respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

DORKING.—Oct. 13.—Plans and estimates are invited for the erection of an infirmary. Mr. George Scales, clerk to the Guardians, High Street, Dorking.

LEEDS.—Oct. 8.—The Corporation offer premiums of 100*l.*, 50*l.* and 25*l.* for the three best designs for a wholesale dead-meat market and abattoir. City engineer, Municipal Buildings, Leeds.

LOWER BEBINGTON.—Oct. 1.—The Lower Bebington Urban District Council offer premiums of 50*l.*, 35*l.* and 20*l.* for the three best designs for a scheme of sewerage for that portion of their district now being drained into the Bromborough Pool. Mr. Thomas Sproat, 5 Castle Street, Liverpool.

LUDLOW.—Oct. 1.—The Corporation offer a premium of 20*l.* for the best and most economical scheme of electric lighting for the borough. Mr. John Herbert Williams, town clerk, Ludlow.

MORECAMBE.—Oct. 1.—The Urban District Council offer a premium of 100*l.* for the best scheme of an improved and extended sewerage system. Mr. Jno. Bond, surveyor, Morecambe.

SKIPTON.—Sept. 30.—The Skipton and District Cottage Hospital committee offer premiums of 15*l.* and 5*l.* for the best designs for a cottage hospital, at a cost of 2,500*l.* Mr. W. H. Dawson, hon. sec., Skipton.

UXBRIDGE.—Oct. 30.—The Uxbridge Rural District Council invite plans for a scheme of sewerage and sewage disposal. Mr. Charles Woodbridge, 38 High Street, Uxbridge.

CONTRACTS OPEN.

ABERDEEN.—Sept. 7.—For constructing pipe sewers. Mr. William Dyack, Town House, Aberdeen.

ACCRINGTON.—Sept. 15.—For constructing filter beds, covered reservoir, engine and boiler-houses, &c. Mr. A. H. Aitken, Town Hall, Accrington.

ASHTON-UNDER-LYNE.—Sept. 7.—For constructing stone-ware pipe drains, with manholes, ventilators, &c. The North-Eastern Sanitary Inspection Association, 9 Albert Square, Manchester.

AYLESBURY.—Sept. 15.—For building retaining walls. Mr. J. H. Bradford, 2 Rickford's Hill, Aylesbury.

BALLYGOWAN.—For reroofing church. Mr. Joseph Gibson, Ballygowan, Ireland.

BASINGSTOKE.—Sept. 13.—For completion of partially constructed wall, &c. Mr. Henry Ross, 8 Victoria Street, Westminster.

BEAUMARIS.—Sept. 13.—For additions to county school. Mr. Joseph Owen, architect, Menai Bridge.

BELFAST.—For building new branch for the Home and Colonial Stores, Limited. Mr. Robert Keir, 20 George Street, Edinburgh.

BEXLEY.—Sept. 15.—For constructing pipe sewers. Mr. E. Reeve Boulter, Urban District Offices, Bexley Heath.

BEXLEY.—Sept. 15.—For supplying road materials. Mr. E. R. Boulter, surveyor, Bexley Heath, Kent.

BIRMINGHAM.—Sept. 8.—For building cottages and laundry. Mr. C. Whitwell, architect, Cannon Street, Birmingham.

BLACKBURN.—Sept. 11.—For building shop premises, Messrs. Simpson & Duckworth, architects, Richmond Chambers, Blackburn.

BOLTON.—Sept. 7.—For erection of an Inland Revenue office. Mr. Allan Paull, 6 Quality Court, Chancery Lane.

BRENTWOOD.—Sept. 6.—For erection of a boiler-house at the Asylum. The Medical Superintendent, Asylum, Brentwood.

BRIERLEY HILL.—Sept. 7.—For restoration of church. Messrs. Cossins, Peacock & Bewlay, architects, 83 Colmore Row, Birmingham.

BROMLEY.—Sept. 11.—For widening road and building retaining wall in Beckenham Lane. Mr. F. H. Norman, District Council Offices, Bromley, Kent.

BURNOPFIELD.—For building stable and pithouse. Messrs. Turnbull Bros., Leazes, Burnopfield.

CAMBERWELL.—Sept. 13.—For paving new streets. Mr. O. S. Brown, Vestry Hall, Camberwell, S.E.

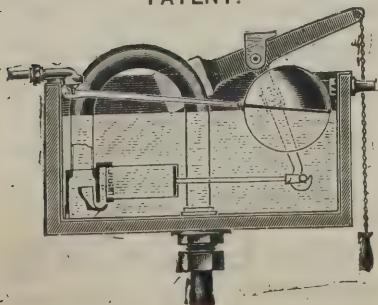
CARDIFF.—Sept. 6.—For alterations and additions to the Barry Intermediate School. Mr. T. Mansel Franklen, Glamorgan County Offices, Westgate Street, Cardiff.

CASTLETON.—Sept. 10.—For cutting stone and building churchyard walls. Mr. George Meggeson, Castleton.

CHAPEL-EN-LE-FRITH.—Sept. 11.—For taking down and rebuilding bridge over the river Noe. Messrs. Sterling & Swann, Town Hall, Chapel-en-le-Frith.

ARCHITECTS PLEASE NOTE.

PATENT.



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CHESTERFIELD.—Sept. 11.—For building four cottages. Mr. J. W. Fearn, 31 Devonshire Street, Sheffield.

CLACTON.—Sept. 15.—For paving and making-up roads. Mr. A. R. Robinson, Town Hall Buildings, Clacton-on-Sea.

CLACTON-ON-SEA.—For building pair of villas. Mr. John H. Harman, Estate Office, Marine Parade, Clacton-on-Sea.

CLONES.—Sept. 11.—For building four houses. Mr. Thomas Elliott, architect, Enniskillen.

CLOWN.—For building two houses. Mr. W. H. Wagstaff, architect, Saltergate, Chesterfield.

COVENTRY.—Sept. 6.—For enlargement of the school. Mr. T. F. Tickner, architect, Bishop Street.

DARTFORD.—Sept. 9.—For laying stoneware pipes. Mr. Wm. Harston, High Street, Dartford.

DENTON.—Sept. 11.—For paving, sewerage, &c. Mr. G. H. Newton, Market Place, Denton, Lancs.

DEWSBURY.—Sept. 9.—For alteration and additions to waiting-room of workhouse. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

DUBLIN.—Sept. 8.—For building play halls at Cabra workhouse. Mr. J. O'Neill, Guardians Office, North Brunswick Street, Dublin.

EAREY.—For building station hotel. Mr. C. Parsons, 9 Grimshaw Street, Burnley.

EASINGWOLD.—Sept. 17.—For widening and fencing road. Mr. F. J. H. Robinson, Rural District Council Offices, Easingwold, Yorks.

EAST PRESTON.—Sept. 13.—For bricklayer and plumbers' work at workhouse. Mr. H. Howard, Town Offices, Littlehampton.

EUSTON.—Sept. 14.—For widening Rectory Bridge, Euston, near Thetford. Mr. F. Whitmore, architect, 17 Duke Street, Chelmsford.

FALMOUTH.—Sept. 16.—For alterations and improvement of the Smithick Schools, boys and infants' department. Mr. W. Jenkins, clerk, Falmouth.

FELIXSTOWE.—Sept. 15.—For constructing sewers. Mr. G. S. Horton, Town Hall, Felixstowe.

FELLING.—Sept. 9.—For rebuilding Brandling Hotel. Mr. H. Miller, architect, Felling, Durham.

FINSBURY PARK.—Sept. 13.—For laying wood paving on concrete foundation. Mr. E. J. Lovegrove, Hornsey Urban District Council Offices, Southwood Lane, Highgate, N.

FOLKESTONE.—Sept. 13.—For building fifty artisans' dwellings. Mr. John White, 29 Dover Road, Folkestone.

GATESHEAD.—Sept. 6.—For erection of Nuns Lane School. Messrs. Oliver & Leeson, architects, Mosley Street, Newcastle.

GLASGOW.—Sept. 7.—For constructing gasholder tank, for the Corporation. Engineer's Office, 45 John Street, Glasgow.

GOLCAR.—Sept. 9.—For building two dwelling-houses. Mr. Arthur Shaw, architect, Golcar, near Huddersfield.

GRAVESEND.—Sept. 7.—For erection of police cells and other buildings adjoining the town hall. Mr. Chas. E. Hatten, town clerk, Court House.

HALIFAX.—Sept. 14.—For erection of a school for 230 children at Salterlee, Shibden. Mr. Joseph F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

HALIFAX.—Sept. 14.—For erection of confectionery works (covering an area of over 1,300 superficial yards) in Queen's Road and Hammond Street. Mr. Medley Hall, architect and surveyor, 29 Northgate, Halifax.

HAMPTON.—Sept. 7.—For erection of a workshop at the Bell Hill recreation-ground and for construction of steps and landing-stage at the recreation-ground on the Hampton Court Road. Mr. J. Kemp, surveyor, Park House, High Street, Hampton.

HARROGATE.—For constructing road and sewers. Messrs. Whitehead & Smetham, architects, Albert Chambers, Albert Street, Harrogate.

HEATH TOWN.—Sept. 18.—For paving and making-up road. Mr. R. E. W. Berrington, civil engineer, Wolverhampton.

HERTFORD.—Sept. 8.—For laying cast-iron water mains. Mr. J. H. Jevons, borough surveyor, Hertford.

HORNSEY.—Sept. 13.—For constructing stoneware pipe sewers. Mr. E. J. Lovegrove, Hornsey Urban District Council Offices, Southwood Lane, Highgate, N.

HUCKNALL TORKARD.—For building nurses' home. Mr. A. N. Bromley, architect, Prudential Buildings, Nottingham.

HUDDERSFIELD.—Sept. 8.—For building shop premises. Mr. W. Cooper, architect, 4 Kirkgate Buildings, Huddersfield.

IPSWICH.—Sept. 15.—For erecting emergency staircase, wing, &c., at the Co-operative Hall. Messrs. Eade & Johns, architects, Cornhill Chambers, Ipswich.

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KEIGHLEY.—Sept. 6.—For erection of church and schools of St. Barnabas, Thwaites Brow. Messrs. W. H. & A. Sugden, architects, Cavendish Street, Keighley.

KIDDERMINSTER.—Sept. 7.—For building lodge, discharging-wards, &c., at the borough hospital. Mr. Arthur Coomber, Town Hall, Kidderminster.

KILBONANE.—Sept. 11.—For building church. Messrs. W. H. Hill & Son, architects, 28 South Mall, Cork.

KING'S LYNN.—Sept. 16.—For building bridge over the river Nar. Mr. J. S. Culham, highway surveyor, Grimston, King's Lynn.

KINGSTOWN.—Sept. 14.—For alterations and additions to Town Hall. Mr. J. Donnelly, Town Hall, Kingstown, Ireland.

KNARESBOROUGH.—Sept. 7.—For supplying and fixing galvanised iron shed. Mr. James Smith, Poor Law Offices, Knaresborough.

LAMBETH.—Sept. 21.—For erecting new camp sheathing at Letts Wharf. Engineer to the Commission of Sewers, Guildhall, E.C.

LANCASTER.—Sept. 6.—For erection of classrooms and gymnasium at Ripley Hospital. Messrs. Austin & Paley, architects, Lancaster.

LANCHESTER.—Sept. 8.—For building temporary wood laundry at the workhouse. Mr. G. J. Wilson, architect, 121 Durham Road, Black Hill, Lanchester, Durham.

LLANDUDNO.—Sept. 20.—For erection of electric lighting and refuse destructor buildings. Mr. E. P. Stephenson, Urban District Council Offices, Llandudno.

LONDON.—Sept. 28.—For alterations at underground convenience. Engineer to the Commission of Sewers, Guildhall, E.C.

LORDSHIP LANE.—Sept. 13.—For supplying and fixing wrought-iron railings and gates and building dwarf walls and piers to same at the public library. Mr. O. S. Brown, surveyor to the Vestry, Vestry Hall, Camberwell.

LOWICK.—For restoration of National school. The Vicar, Lowick, Northumberland.

LYNTON.—Sept. 13.—For erection of a lighthouse, dwellings, &c., at the Foreland, near Lynton, Devon. Mr. E. G. Verity, 31 Golden Square, London, W.

MERTHYR TYDFIL.—Sept. 10.—For building vagrant wards at the workhouse. Mr. T. Roderick, architect, Ashbrook House, Clifton Street, Aberdare.

MYTHOLMROYD.—Sept. 6.—For building a vicarage house in Cragg Vale Road. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

NAILSWORTH.—Sept. 13.—For taking-down St. George's Church, Nailsworth, and for the erection of a new church on site. Mr. M. H. Newland, architect, Gloucester.

NELSON.—Sept. 7.—For erection of the Walverden Board school. Mr. Thos. Bell, architect, 14 Grimshawe Street, Burnley.

NORTHAMPTON.—Sept. 21.—For building residence. Mr. J. F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

PERTH.—Sept. 8.—For widening bridge and building stables. Mr. R. M'Killop, 12 Tay Street, Perth.

PONTARDAWE.—Sept. 29.—For building infant school. Mr. W. W. Williams, architect, 63 Wind Street, Swansea.

PONTYPRIDD.—Sept. 7.—For altering and enlarging school. Mr. A. O. Evans, architect, Post Office Chambers, Pontypridd.

PORTSMOUTH.—Sept. 21.—For alterations and additions to Board school. Mr. A. Bone, architect, Cambridge Junction, Portsmouth.

RAMSGATE.—For building four cottages. Mr. W. A. M. Valon, Ramsgate.

RHAYADER.—For building church. Mr. F. G. Evans, architect, Castle Road, Builth Wells.

RIPLEY.—Sept. 13.—For extension of school buildings. Rev. F. H. Tuke, Ripley.

ROCHDALE.—For additions to the Rochdale Carriage Co.'s premises. Messrs. Smith & Cross, architects, Town Hall Chambers, Rochdale.

ROTHERHITHE.—Sept. 8.—For building shelter at South Wharf for the Metropolitan Asylums Board. Mr. J. W. Aldwinckle, 1 Victoria Street, Westminster.

ROTHERS.—Sept. 6.—For addition to the Seafeld Arms Hotel. Mr. R. B. Pratt, architect, County Bank House, Elgin, N.B.

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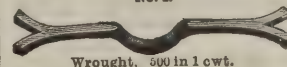
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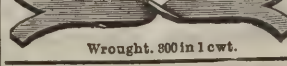
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RYTON-ON-TYNE.—Sept. 8.—For constructing culvert and road improvement. Mr. John P. Darton, Council Office, Ryton-on-Tyne.

SALTBURN.—Sept. 15.—For alterations to bridge. Mr. J. Cudworth, North-Eastern Railway Co., Darlington.

SELBY.—Sept. 13.—For excavations, concrete foundations, drains, &c., for new factory. The Yorkshire Bacon Curing Co., Limited, Selby.

SHEFFIELD.—Sept. 14.—For building ten dwelling-houses. Mr. John Clark, architect, 55 Norfolk Street, Sheffield.

SHIBDEN.—Sept. 14.—For building school for 230 children. Mr. J. F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

SHOREDITCH.—Sept. 21.—For constructing sewers. Mr. J. Rush Dixon, Town Hall, Old Street, E.C.

SOUTHAMPTON.—Sept. 14.—For constructing stoneware pipe sewers, &c. Borough engineer, Southampton.

ST. STYTHIANS.—Sept. 11.—For building school. Mr. W. Swift, architect, 23 Lemon Street, Truro.

STROUD.—Sept. 7.—For erection of a chimney-stack and flue at the workhouse. Mr. Fredk. Winterbotham, John Street, Stroud.

SWINTON.—Sept. 8.—For pointing school walls. Mr. A. J. Muirgatröyd, architect, 23 Strutt Street, Manchester.

WADSLEY.—Sept. 18.—For erection of additional wash-house, engine-room and laundry at the asylum. Mr. Cotterill, Wadsley Asylum, Sheffield.

WALES.—Sept. 11.—For the restoration of Llanfihangel-y-Creuddyn Church tower. Rev. J. P. Evans, vicar, Llanfihangel Creuddyn.

WALES.—Sept. 15.—For erection of forty-five cottages at Pontycymmer. Ffaldau Collieries Company, Limited, Cardiff.

WARRINGTON.—Sept. 20.—For erection of county asylum on the Winwick Hall Estate, Winwick, near Warrington. Mr. Fred. C. Hulton, clerk, County Offices, Preston.

WEALDSTONE.—Sept. 14.—For making roads, laying drains, &c. Mr. B. Wyand, Council Office, Wealdstone.

WELLINGTON.—Sept. 13.—For constructing cast-iron pipe sewers, &c. Mr. J. W. Littlewood, Church Street, Wellington, Salop.

WESTBURY-ON-SEVERN AND DYMOCK.—Sept. 25.—For building police-stations. Mr. M. H. Medland, architect, 15 Clarence Street, Gloucester.

WORKINGTON.—Sept. 10.—For alterations and additions to Central Stores. Messrs. W. G. Scott & Co., architects, Victoria Buildings, Workington.

WREXHAM.—Sept. 11.—For constructing new road. Mr. J. H. Swainson, 26 Holt Street, Wrexham.

WRITHLINGTON.—For building nineteen houses and shop. Mr. J. A. Beynon, architect, Coleford, near Bath.

YORK.—For building house. Mr. A. A. Gibson, 8 Cambridge Crescent, Harrogate.

YORK.—Sept. 14.—For building new stores. Messrs. Athron & Beck, architects, Doncaster.

TENDERS.

ABERTILLERY.

For building workmen's institute, gymnasium and swimming-bath, for the Tillery Collieries Institute committee. Mr. F. R. Bates, architect, 4 Commercial Street, Newport.

F. C. Morgan	£4,150	0	0
J. Bagley	3,986	11	4
J. Monks & Co.	3,984	0	0
A. P. Williams	3,968	0	0
E. Turner & Sons	3,836	6	1
Gaen Bros.	3,787	0	0
D. J. DAVIES, Newport, Mon. (accepted)	3,610	0	0

AGHALEE.

For building a dispensary and residence at Folly Hill, Aghalee, for the Guardians of Lurgan Union.

C. BOYD & SONS, Belfast (accepted) £919 0 0

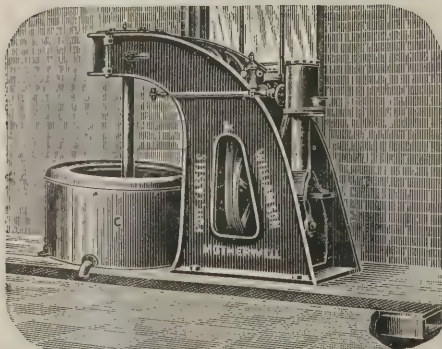
ALVERTHORPE.

For building semi-detached villas, for Mrs. S. Teale, Salisbury Villa, Flanshaw, near Wakefield. Mr. EDMUND WRIGHT, architect, Silcoates, near Wakefield.

Accepted tenders.

Flowers Bros., Wakefield, builder	£841	7	8
W. & E. Whitehead, Ossett, joiner	459	0	0
Sharp & Harper, Leeds, slater	112	0	0
H. Sanderson & Son, Ossett, plasterer	110	0	0
E. Wooller, Leeds, plumber	209	15	0
J. Callaghan, Ossett, painter	30	8	7

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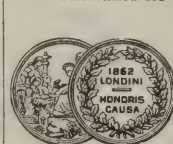
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ASHINGTON.

For laying 550 superficial yards of concrete footpath at New Hirst, for the Ashington Urban District Council. Mr. ALEX. WOOD, surveyor, Market Place, Ashington.
J. T. DOVE, Concrete Works, Newcastle-on-Tyne
(accepted) £82 10 0

ASHTON-UNDER-HILL.

For constructing surface reservoir, laying 2-inch cast-iron water-main, with standposts, &c., for the Evesham Rural District Council. Mr. J. E. WILLCOX, engineer, Union Chambers, Temple Row, Birmingham.
T. Vale £129 0 0
H. LAW, Erdington (accepted) 110 0 0

BALLYBOFEY.

For building new bank premises, for the Hibernian Bank, Limited. Mr. E. J. TOVE, architect, Strand, Derry.
D. McCAFFERY, Strabane (accepted) £1,028 15 0

BATH.

For constructing a new road leading from the Abbey Churchyard to York Street, for the City Council.
J. LONG & SONS (accepted) £1,185 0 0

BATLEY.

For works in building four houses, &c., in Knowles Street. Mr. JOHN HY. BREARLEY, architect, Batley.

Accepted tenders.

S. S. Baines, mason £400 0 0
E. Sykes, joiner 135 0 0
J. Greenwood, plasterer 40 0 0
W. H. Thompson, slater 40 0 0
Exley Bros., plumber 18 0 0

For works (except masons') in erection and completion of twelve houses, outbuildings and boundary walls in Talbot Street. Mr. J. H. BREARLEY, architect, Batley.

Accepted tenders.

C. Robinson, mason £1,000 0 0
J. W. Nettleton, joiner 380 0 0
W. Parker, plasterer 120 0 0
G. Hargreaves, slater 105 0 0
Exley Bros., plumber 39 0 0

BLACKPOOL.

For sewerage works, North Clyffe and Gynn Estates, for the Corporation. Mr. J. WOLSTENHOLME, borough engineer and surveyor.

Brunton & Son £10,089 12 9
Bell 8,789 12 10
Bentley, Son & Partington 8,318 0 0
Barry 8,297 8 2
Taylor 8,279 10 5
Underwood & Brother 8,151 0 0
Lock & Andrews 7,955 1 0
Freeman & Sons 7,527 0 9
Nuttall 7,482 16 3
Tempest 7,253 2 0
Finnegan 7,196 11 8
Farrell 6,902 0 0
Seddon 6,699 11 2
Ainscouth & Son 6,658 0 3
R. ESCOLME, Blackpool (accepted) 6,590 7 0

For street improvements on the Gynn Estate. Mr. J. WOLSTENHOLME, borough engineer and surveyor.

Nuttall £5,027 5 6
Bennie 4,307 3 6
Bentley, Son & Partington 4,005 0 6
Taylor 3,885 1 4
Freeman & Sons 3,786 12 0
Escolme 3,764 2 6
Tempest 3,592 16 0
Ainscouth & Son 3,464 7 8
R. FINNEGAN, Northampton (accepted) 3,379 1 0

BOLSOVER.

For restoration and enlargement of St. Mary's Church, Bolsover. Mr. LOUIS AMBLER, architect. Messrs. PINK & WATSON, quantity surveyors, 45 Parliament Street, Westminster.

Fisher Bros. £9,670 4 3
J. Norris & Sons 9,269 0 0
Luscombe & Sons 8,725 0 0
J. M. Thompson & Sons 8,497 15 0
Chas. Trask & Sons 8,479 6 6
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For building infants' school at Heatherlands, for the Kinson (U.D.) School Board.

Baker	£1,570	0	0
Beavan	1,479	0	0
Wallis	1,453	0	0
Burt & Vick	1,372	0	0
McWilliam & Son	1,295	0	0
Cross	1,175	0	0
F. ELCOCK, Bournemcuth (accepted)	1,130	0	0

BRIDGEND.

For building temporary wood and iron block to accommodate 100 patients at the Parc Gwyllt Asylum. Messrs. GILES, GOUGH & TROLLOPE, architects, 28 Craven Street, Charing Cross, London.

GAYLAND, Bridgend (accepted)	£4,855	0	0
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BRIGHOUSE.

For constructing a 12-inch pipe sewer in the Dewsbury and Elland main road, between Slade Lane and Clough House inn, for the highways committee. Mr. EMERSON BROOKE, borough surveyor.

H. & W. BARRACLOUGH, Brighouse (accepted)	£244	19	0
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BRIGHTON.

For painting and decorating exterior and interior of Warren Farm schools, near Brighton, for the Guardians. Mr. H. S. REED, surveyor.

Satten & Evershed	£661	0	0
Richards & Co.	584	14	6
Worsley & Co.	510	10	0
Lockyer	510	0	0
Wright & Sons	500	0	0
Holland	494	18	0
Hallett & Duke	484	0	0
Gates & Son	398	10	0
Saunders & Sons	390	0	0
BARBER & OLLIVER, Hove (accepted)	348	14	0

CHELMSFORD.

For erection of engine-house in Marketfield.

J. Gowers	£140	0	0
W. Fincham	95	0	0
J. LUMMIS & SON (accepted)	86	10	0

For erection of cast-iron tank over engine-house.

PARSONS & SONS (accepted)	£91	1	0
Whitmore & Benyon	86	10	6

CHORLEY.

For supplying and erecting a steel roof for a coal store at the gasworks, for the Corporation.

E. F. BLAKELEY & Co., Liverpool (accepted).

CROSS COP.

For work in erection of a detached villa at Cross Cop, near Morecambe, for Mr. J. Parker. Mr. JAS. MARSHALL, architect, Back Crescent, Morecambe.

Accepted tenders.

J. Nichol & Son, Rochdale, mason	£709	0	0
Baker & Overend, Eccleshill, carpenter and joiner	347	15	0
T. Hadwen, Morecambe, slater and plasterer	150	0	0
R. B. Abbott, Morecambe, plumber	73	0	0

DEVONPORT.

For building lavatories, &c., at the Royal Sailors' Home, Devonport. Mr. HENRY GEO. LUFF, architect, 64 Chapel Street, Devonport.

Strike & Hockin	£91	10	0
Oliver	19	17	0
D. SALE, Devonport (accepted)	73	0	0

For alterations to 19 Tamar Terrace, for Dr. W. Cheyne Wilson. Mr. H. G. LUFF, architect, 64 Chapel Street, Devonport.

Jenkin & Son	£398	0	0
Pile	390	0	0
Healy & Son	380	0	0
Oliver	357	0	0
W. LITTLETON, Devonport (accepted)	259	0	0

DUNDEE.

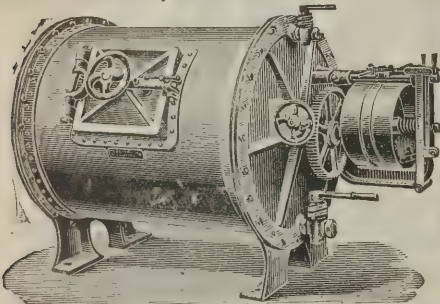
For constructing underground conveniences, for the Dundee Town Council. Mr. WM. MACKISON, burgh engineer.

Masons, bricklayers, &c.

Laing	£727	19	0
Sheach, jun.	692	15	0
Crichton	641	11	6
Anderson	623	17	9
J. BINNY & Co. (accepted)	602	5	10

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Mitchell & Son	236	1	0
D. BROWN (accepted)	205	0	0

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G. Stokes, Dungarvan £295 0 0
D. McGrath, Dungarvan 208 10 0

ECCLES.

For sewerage, tar macadam paving, kerbing and flagging in Vernon Avenue, for the highways committee.

JOHNSON BROS. & SMITH, Patricroft (accepted) £223 13 9
For building a pavilion in the recreation ground, for the parks committee.

CHAPMAN & HOLLINWORTH, Patricroft (accepted) £190 0 0

ELLENBOROUGH.

For enlarging and altering the infants' Board school, Ellenborough, near Maryport, for the Ellenborough and Ewanrigg School Board. Mr. C. EAGLESFIELD, architect, Maryport.

T. MACKENZIE, Maryport (accepted).

ERDINGTON.

For making-up new street, for the Urban District Council. Mr. J. E. WILLCOX, engineer, Union Chambers, Temple Row, Birmingham.

McVieg £860 0 0
Jones & Fitzmaurice 850 0 0
Curral, Lewis & Martin 798 0 0
Hall 790 0 0
White 650 0 0
Trentham 600 0 0
G. LAW (accepted) 599 0 0

FINCHLEY.

For street works, for the Finchley Urban District Council. Mr. F. SMYTHE, engineer and surveyor.

Hertford Road.

Crouch £947 0 0
Williams 936 0 0
Nowell 935 0 0
Griffiths 927 0 0
Crane 904 0 0
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Griffiths 739 0 0
Ballard 728 0 0
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Crouch 682 0 0
Williams 671 0 0
ADAMS (accepted) 669 0 0

Huntingdon Road.

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Nowell 921 0 0
Griffiths 916 0 0
Williams 911 0 0
Ballard 896 0 0
Crane 883 0 0
ADAMS (accepted) 858 0 0

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Nowell 241 0 0
Griffiths 236 0 0
Crane 230 0 0
Adams 228 0 0
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For the various works required in altering and enlarging the old vagrant wards at Crossland Moor Workhouse into lock hospital. Messrs. JOHN KIRK & SONS, architects, Huddersfield.

MOODY BROS., Huddersfield (accepted).

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HECKMONDWIKE.

For works required in erection and completion of warehouse and alterations at top of Heckmondwike. Mr. JOHN H. BREARLEY, architect, Hanover Street, Batley.

Accepted tenders.

Blackburn & Hannam, mason	£170	0	0
C. Illingworth, joiner	98	0	0
E. Walker & Co., plumber	42	0	0
J. M. Thornton, slater	27	0	0
W. Parker, plasterer	25	0	0

HUNTINGTON.

For constructing surface-reservoir and laying 2-inch cast-iron water-main. Mr. J. E. WILLCOX, engineer, Union Chambers, Temple Row, Birmingham.

F. Sprengel	£251	11	6
C. J. Nevitt	200	0	0
H. LAW, Erdington (accepted)	199	0	0

LIVERPOOL.

For the completion of the electric supply works at the Paradise Street Station, in accordance with the plans, specifications and quantities.

HOLME & GREEN (accepted)	£5,605	0	0
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LONDON.

For erecting union offices, Board-room, register office, &c., at Tooley Street, for the Guardians of St. Olave's Union. Messrs. NEWMAN & NEWMAN, architects, 31 Tooley Street, London Bridge, S.E. Quantities by Mr. W. T. FARTHING, 46 Strand, W.C.

Sharpe	£23,788	0	0
Williams	23,656	0	0
Downs	22,737	0	0
Wallis	22,394	0	0
Balaam Bros.	22,385	0	0
Goddard & Sons	21,544	0	0
Wall	20,767	0	0
Johnson & Co.	20,190	0	0
J. BULLERS, Bermondsey (accepted)	18,980	0	0

LONGFORD.

For drainage works, for the Sanitary Authority.

H. LEAVY, Lisduff, Longford (accepted)	£222	10	6
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NUNEATON.

For constructing a railway about two miles long, 4 ft. 8½ in. gauge, with about 80,000 cubic yards of excavation (including some rock), and average works. Messrs. THOMAS & TAYLOR, engineers, 1 Victoria Street, Westminster.

Pedrette & Co.	£18,244	11	6
S. Kavanagh	14,850	0	0
W. Neave & Sons	13,875	0	0
A. W. Smith & Sons	12,840	0	0
G. Young	12,065	0	0
F. E. Townsend	10,687	0	0
R. M. Parkinson	10,337	0	0
W. Jones	10,043	13	0
J. D. Nowell & Sons	9,863	14	6
C. BAKER & SONS, Little Wymondley, Stevenage (accepted)	9,534	13	6

PECKHAM.

For altering No. 95 Rye Lane, for Messrs. Davies Bros. Mr. JOHN JAS. DOWNES, architect, 199 Lewisham High Road, S.E.

Sims & Wood	£1,120	0	0
Jerrard & Son	890	0	0
S. R. Best	849	0	0
CHAMPION (accepted)	737	0	0

PERSHORE.

For erection of steam cooking and heating apparatus at work-house.

Ward & Son, Worcester	£232	10	0
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RHOSTYLEN.

For building three houses, for the Trustees of the Baptist chapel.

W. Jones	£396	0	0
T. JONES, Manley Road, Wrexham (accepted)	327	0	0

RUSHDEN.

For kerbing, channelling, metalling, paving and making-good Griffith Street, and kerbing, metalling and paving West Street, for the Rushden Urban District Council. Mr. WILLIAM PARE, surveyor.

Griffith Street.

Henson	£626	11	6
W. G. WILMOTT, Rushden (accepted)	570	0	0

West Street.

Henson	103	10	6
W. G. WILMOTT (accepted)	95	0	0

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For additions to the lying-in wards, &c., at the workhouse.
Messrs. JOHN HARDING & SON, architects, Canal,
Salisbury.
Vincent & Holland £430 0 0
E. Hale 345 0 0
E. Day 297 0 0
E. PEARCE & SON, Salisbury (accepted) 283 0 0

SILVERTON.

For building new house at Perry Farm, Silvertown, Devon. Mr.
T. JONES, architect, Crediton.
Amery £345 0 0
Short 305 0 0
Brook 275 0 0
PAYNE & GILLARD, Crediton (accepted) 220 0 0

ST. STEPHEN'S-IN-BRANWELL.

For building a new school, for the St. Stephen's-in-Branwell
School Board, Cornwall. Mr. SAMPSON HILL, architect,
Redruth.
GILBERT & RICHARDS, St. Stephen's (accepted) . £1,090 0 0

SWANSEA.

For rebuilding the Rose and Crown inn, Morriston. Messrs.
J. P. JONES & ROWLANDS, surveyors, 58 Wind Street,
Swansea.
Lloyd Bros. £2,400 0 0
T. Richards 2,250 0 0
D. Jenkins 2,230 0 0
Gustavus Bros. 2,180 0 0
H. Billings 2,150 0 0
J. Davies 2,020 19 0
T. Davies 1,940 0 0
WALTERS & JOHNS, Morriston, near Swansea
(accepted) 1,900 0 0

THETFORD.

For erection of cottage hospital.
Adcock & Son £775 1 5
S. Holden 774 0 6
W. J. BOUGHTON & SON, Thetford (accepted) 731 14 0

TOPSHAM.

For erecting a public clock with two dials on the tower of the
parish church.
DUPREE (accepted) £135 0 0

WANSTEAD.

For erection of a dwelling-house, Hermon Hill, Wanstead, for
Mr. G. Morley. Mr. FRED. A. ASHTON, architect,
177 Romford Road, Stratford, E.
W. Shurmur £2,185 0 0
J. & H. Cocks 2,134 0 0
W. G. Maddison 2,120 0 0
J. Jolliffe 1,897 0 0
A. E. Symes 1,750 0 0
C. SIMMONS (accepted) 1,725 0 0

BUILDING AND BUILDERS.

MR. MORHAM, the city superintendent of works, Edinburgh,
has been instructed to obtain tenders for the extension of the
City Chambers to the west so far as the foundations are laid.

THE Lancashire Asylums Board have authorised the plans
committee to accept a tender for the new buildings. Tem-
porary buildings in wood or iron to accommodate 200 patients
are also to be erected on the grounds at Rainhill.

PLANS have been prepared for a nurses' home in connec-
tion with the Leeds Infirmary at Sunny Bank.

THE new Wolverhampton Workhouse is to be erected on
a site at New Cross containing about fifty acres, which will cost
11,000l.

MESSRS. GUEST & SONS have obtained the contract for the
reconstruction and extension of the North Worcester Brewery,
Stourbridge.

THE railway station at Rhyl is to be reconstructed by the
London and North-Western Railway Company.

THE Glasgow Lunacy Board will visit homes attached to
infirmaries before selecting a plan for the nurses' home at
Gartloch Asylum, which is to cost 7,000l.

CARSHALTON PARK, containing about 100 acres, has been
sold to a company, and is shortly to be developed as a building
estate.

PLANS for a hotel containing forty-five bedrooms, assembly-
room, &c., at Wrexham, have been passed by the licensing justices.

THE new workhouse infirmary at Selly Oak, for the King's
Norton Union, designed by Mr. A. Arkell, has cost 600l. per
bed. At the new General Hospital, Birmingham, the cost was
630l. per bed.

THE Liverpool City Council have authorised the library,
museum and arts and technical instruction committee to invite
tenders for the erection of the extension of the Museum
Buildings and new Technical School.

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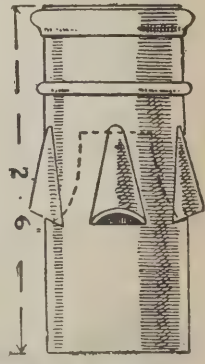
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TRADE NOTE.

AMONG the new buildings in which Messrs. Restall & Son's quick-setting Adamantine plaster has been used are the Hôtel Cambria, Aberystwith, the Art Gallery, Reading, and the Leamington and Rugby post offices. Experience throughout England during sixteen years has confirmed the claims of the manufacturers for the material as fireproof as well as damp-resisting.

ELECTRIC NOTES.

THE Court of Session, Edinburgh, including the Parliament Hall, will on the opening of next term have the electric light. Great difficulty was found in adapting the oak timber roof of the hall to hold the forty-eight lamps.

THE new promenade, Colwyn Bay, will be lighted by the aid of electricity, under the direction of Mr. R. Peers.

MESSRS. DAVIS & SOPER, 54 St. Mary Axe, have been appointed the agents to receive tenders for lighting by electricity the streets of Port Elizabeth, Cape Colony.

A FACTORY is to be erected at Brook Green, Hammer-smith, for the Incandescent Electric Lamp Company, at a cost of about 7,000*l.*, from plans by Mr. J. W. Stevens, 21 New Bridge Street, E.C.

ELECTRIC lights are about to be placed in front of St. George's Hall, Liverpool, at a cost of £553.

THE Gloucester City Council are about to apply to the Local Government Board for permission to borrow 50,000*l.* for an electricity supply and destructor works.

THE electric-lighting committee of the Coventry Corporation have modified their proposals. It is now proposed that

the electric lighting of the streets be not proceeded with, thus saving 2,000*l.*, and that a further saving of about 5,000*l.* be effected by only laying cable mains according as the necessity arises in certain directions. The suggested expenditure of 37,900*l.* will therefore be reduced to 31,000*l.*

VARIETIES.

INCANDESCENT burners are found to be so satisfactory when used for street lamps in Manchester, they are to be employed in several other streets. An anti-vibration arrangement adds to the effectiveness.

THE Technical College, Bradford, is likely to become one of the municipal institutions.

THE personal estate of the late Mr. James Stiff, of the London Pottery, Lambeth, has been valued at 19,843*l.* 19*s.* 10*d.*

IT is proposed to expend 258,000*l.* on a culvert to convey the effluent of the Manchester sewage from Davyhulme to an estuary near Walton Lock.

IN Oldbury it is expected that enough money will be obtained to erect a nurses' home as well as a technical school for Jubilee memorials.

A CARGO of pigeons has been sent from Tennessee to New Orleans for shipment to Manchester.

WHILE the bells were being chimed for the evening service at the parish church of St. Mary, Dover, one of the clappers broke and fell on the head of a lad named Wilson, severely injuring him. He was removed to the hospital suffering from concussion of the brain.

THE Bishop of London (Dr. Creighton) has consented to visit Leicester on Tuesday, October 5, in order to open the new Technical and Art School, which is now being completed in the Newarkes at a cost of about 40,000*l.*

AN occurrence, which might easily have been very serious, took place at St. Bartholomew's Hospital recently. A large number of out-patients were waiting outside the main entrance, when a quantity of plaster from the portico underneath which they were standing became detached and fell on their heads. No very serious injuries resulted, however, the worst case being that of a woman whose face was slightly cut. The injury to the portico is now being made good.

THREE puddlers were working in the Phoenix Ironworks at Hamilton, when a large mass of iron which they had taken out

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of a furnace at white heat and placed on an anvil suddenly slipped off into the water trough, causing a terrific explosion. Portions of the soft iron struck the men and flew outside the works.

CARISBROOKE CASTLE, which has undergone partial restoration as a memorial of the late Governor of the Isle of Wight, Prince Henry of Battenberg, will be opened to the public shortly.

THE Cambria Hotel at Aberystwith, which has just recently been opened, occupies a commanding position at the western end of the Promenade, opposite the pier, and has been erected from the designs of Messrs. Ewen & J. Alfred Harper, architects, of Birmingham, who have had to overcome many difficulties as regards the site in producing a noble and handsome building. The hotel is built of native stone, in the Renaissance style of architecture. The front elevation is characterised by dignity and beauty, and is relieved by an effective treatment of the entrance and windows, with massive freestone dressings, carved entablature and finely-moulded cornices. When completely finished, the hotel will accommodate a large number of guests. The interior arrangements and the furnishing are of approved modern pattern. The electric light is installed throughout the building; baths are provided on every floor, with a supply of sea water under the control of the visitor, and a hydraulic lift gives easy access to the various floors. The large entrance hall is decorated in a Pompeian style and furnished with luxurious lounges. The drawing-room, dining-room, coffee-room, billiard-room, smoking-room and other apartments are all conveniently situated and arranged and handsomely furnished; while suites of private rooms, with all the necessary conveniences, are provided.

THE new line from the North and the Midlands to London, forming an extension of the erstwhile Manchester, Sheffield and Lincolnshire—now the Great Central Railway—will, it is stated, be opened for passenger traffic not later than June or July next year. The London terminal section of the line, that has swept away so large a part of old Marylebone and St. John's Wood, is in an advanced stage. The covered ways and tunnels are now practically finished from Finchley Road to the bridge over the London and North-Western Railway. Southwards of this point the works are being carried out as speedily as possible. The covered way under Lord's Cricket Ground has been duly and punctually made, in pursuance of an agreement with the Marylebone Cricket Club, under which the

latter have largely increased their area. Active progress is being made with the Grove Road and St. John's Road bridges and with the coal yard. The foundations for the goods warehouses are now nearly all in, and those for the terminal station are in full progress. Contracts have been let for the whole of the building and roofing of the station, and the work is proceeding. This station will be faced in the Marylebone Road by the Hotel Grand Central, which, judging from the plans, promises to prove a palatial building. Wide thoroughfares are in course of formation leading to the railway, and extending from Lisson Grove to Park Road and into Marylebone Road. Turning to the southern division of the railway—that is, a length of 14 miles, extending from north of Rugby to the junction with the Metropolitan Railway at Quainton Road—the earthworks are rapidly approaching completion. Only one viaduct, that at Catesby, remains to be finished, and this is well forward. The bridge crossing the Birmingham and Oxford Canal near Rugby proceeds apace. The brickwork of the Catesby Tunnel—a tunnel 3,000 yards in length—is now completed, and trains will shortly be running through the tunnel. Twenty-five miles of the permanent way (angle line) have been laid.

THE ancient parish church of St. Mary, Gosforth, Cumberland, now undergoing restoration, has proved rich in antiquarian remains. It is not many years since the mythological character of the cross in the churchyard was elucidated. It is believed to be the tallest ancient cross in Britain, and is pronounced "one of the costliest olden roods in Europe." Of red sandstone, elaborately carved with mystic figures in bas-relief, it has withstood the storms of twelve centuries, and is in excellent preservation. The Rev. W. S. Calverley, vicar of Aspatria, made out the carvings on the four sides of the cross to be illustrative of legends in Scandinavian mythology. It is a Christian monument, and not a heathen pillar surmounted by a cross, but it is curious for its representation of Northern myths and Christian doctrines, and for the way in which one bears testimony to the other. One of the sculptures represents the Crucifixion. The remains of three other crosses, apparently of about the same age, have also been found at different times in the churchyard. During the recent alterations two hog-back or coped tombstones, supposed to be a thousand years old, have been found. One was under the foundation of the north wall, built probably in 1125. Another was found at the corner of the nave, forming the foundation of the pillar supporting the chancel arch. The one found in the

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north wall is in two pieces, and is 5 feet 6½ inches long. On one side are carved interlaced ornaments of four patterns, on the other there is a battle scene representing two hostile armies. At the head of one group stands a chief armed with a spear, a circular shield in his right hand; behind him are thirteen warriors, all bearded, and with spears over their shoulders. Opposite stands the chief of the opposing army, holding upright a pole or lance at the top of which is a triangular flag, and behind him also there are thirteen men. The second hog-back is in three pieces, and is 5 feet 1 inch long. It has quite a different character. At the apex there is a rope or twist much worn away, and between the rope is the plaited body of a serpent with the head of a wolf, open-jawed, and like those on Gosforth Cross. It gapes upon and seems to do battle with smaller serpents. In a panel 4 feet long there is a design in bold relief of two wolf-headed serpents in fierce conflict with a human figure, which subjugates or rides upon a smaller serpent, and holds one of its jaws in each hand. Hog-backs, whole or in fragments, exist at Bongate (Appleby), Aspatria, Cross-Canonby and Millom.

It is understood that the War Office asks the sum of 40,000*l.* for the site of the Infantry Barracks, Regent Road, which the Salford Corporation has been urged to acquire for the purposes of a recreation ground. The area of the site is 50,000 square yards.

THE David Lewis trustees have handed over to the Corporation of Manchester 19 acres of land at Blackley to be used as a recreation ground for children. The ground cost 8,000*l.*, and the laying of it out a similar sum. The whole expense has been borne by the trustees. A similar gift was also made to the Salford Corporation, the trustees presenting 25 acres of ground at Peel Park to be used for the recreation of children. The land cost 10,000*l.*, and the levelling, &c., 5,750*l.*

THE EMPIRE THEATRE.

THE management of the Empire certainly deserve the very ample support which is bestowed upon them by an appreciative public, for whenever one drops in at that essentially comfortable place of entertainment one may rely on having a thoroughly amusing and interesting evening, without being called upon to witness or hear anything calculated to heighten the colour in

the "cheek of the young person." Just now the bill is especially strong, comprising as it does the beautiful garden scene from the successful ballet "Monte Christo," and the Jubilee *divertissement* "Under One Flag," which, essentially a *pièce de circonstance*, is nevertheless bright and graceful, full of pretty grouping, colour and tuneful music, while its eminently patriotic tendency is highly appreciated. R. G. Knowles, whose witticisms and quaint humour have firmly established him in the affections of the public, is here, and excites continued laughter from his entrance to his exit. Prella, the ventriloquist, who ventriloquises through the medium of trained dogs, gives a very diverting turn. Miss Ada Colley, whose upper notes are simply phenomenal, has an artistic method, and wins abundant applause. Our old friend Cinquevalli seems to continually add to his repertory and to his dexterity, and the same may be said of Schäffer. Other good items of the lengthy bill include Miss Marion Lewis, vocalist, Pottinger's excellent Swedish Sextette, Paul Batty and his performing bears, the Paolis, and the realistic Cinématographic views of the Jubilee Procession and the Spithead Review.

FORESTRY IN INDIA.

IN early times the greater part of India was covered with forest, but the land not cleared for cultivation was, for the most part, denuded by over-cutting and over-grazing with burning. If denudation has not affected the climate generally, it has without doubt resulted in the drying up of springs and streams rising within the areas deprived of the shelter of a crop of trees; and this is a serious matter in connection with the question of irrigation by canals led from rivers which are not snowed, as well as in localities where damage has resulted from the formation of ravines and torrents. The permanence of the supply of timber and other forest produce for the use of the native population and for State purposes has also been endangered.

When the Government wished to take action its powers were found to be uncertain, for the destructive usages of the people had come to be regarded as inalienable rights; and it was necessary to pass a special Forest Law, which, among other things, provided for the formation of reserved forests, after a full inquiry had been made into claims, and for the regulation of proved rights within limits which would not



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endanger the permanent maintenance of the forests. The work of "settlement" is now approaching completion in several provinces.

In order to secure the forests from over-felling, and to insure that all work done may tend towards the production of the largest quantity of wood of the kind most desired, working plans are a necessity, and considerable progress has been made in their preparation. During the dry weather the forests become extremely inflammable, and vast areas have been annually burnt over from time immemorial, with the result that the crop is reduced to the poorest possible condition, or entirely destroyed. Measures have been taken to meet this great evil, and large areas are now successfully protected.

The controlling staff of the Forest Department is trained in England, but the cand dates follow a course of practical instruction in continenta State forests. The native executive officers are trained at the Imperial Forest School at Dehra Dun. What has been done could not have been accomplished by private enterprise. The Government has set an example which has been followed by several of the more important native States. Much more remains to be done, but forest conservancy in India has reached a stage at which its steady progress cannot be arrested.

THE METROPOLITAN BUILDING ACT.

THE report of the London County Council states that the Building Act committee have had to decide upon their procedure with regard to dangerous structures. The practice followed for many years has been that, upon receipt of information as to a structure considered dangerous, the architect has instructed the district surveyor to survey and certify as to the structure; and, upon receipt of his certificate, notice has been served upon the owner requiring the execution of such works as the district surveyor may consider necessary, proceedings being taken before a police magistrate in the event of the notice not being complied with. In dealing with a case in which a summons had been taken out against the owner of a dangerous structure for the recovery of expenses incurred, the magistrate dismissed the summons, taking the view that the words in section 103 (1) of the London Building Act, "where it is made known to the Council that any structure is in a dangerous state, the Council shall require a survey of such structure to be made, &c.," imply that the Council has itself to consider

each intimation that a structure is dangerous, to authorise a requisition to the district surveyor, and service of notice on the owner, and, in the event of non-compliance with the notice, to authorise proceedings. This ruling of the magistrate, if correct, would have involved an entire change in the practice hitherto prevailing, and a mass of detail work would be brought before the Council which, in its opinion, was not the intention of the Legislature. The Council, therefore, submitted the point for the decision of the High Court, and on December 10 the decision of the magistrate was reversed, and the case was sent back to him to be heard on the facts. The judges expressed the opinion that the course hitherto taken was in accordance with the Act, and that the exercise of powers compulsorily placed upon the Council must be undertaken by its properly authorised representatives without waiting for direct instructions from the Council itself in each case. Applications were received for approval of 77 plans for the formation of new streets, of which 44 were granted. For consent to the erection of buildings at less than the prescribed distance from the centre of the road 152 applications were received, of which 76 were granted and the same number refused. The total length of the new streets sanctioned by the Council is about 8½ miles, and they have received 351 applications for the erection of buildings beyond the general line of frontage in the street, of which 177 were granted. For the construction of porticoes, balconies and verandahs 142 applications were received, of which 114 were granted and twenty-eight refused. This committee has also taken in hand the question of street nomenclature—no inconsiderable task—and their labours in this direction have been heavy. No fewer than 4,032 cases of dangerous structures, the result of fires and other causes, have been reported during the year. This committee is also called upon to deal with matters arising under the Factory and Workshop Acts, 1878 to 1895, but, so far as possible, it endeavours to avoid unnecessary interference with the trade or manufacture carried on at the premises, and due consideration is always given to representations made by the owners as to this and other matters. As many as 165 factories have been inspected, and in sixty-five cases the owners were required to carry out alterations for facilitating the escape, in case of fire, of the people employed, and in several of those cases the works are in progress. Drawings of thirty-three new factories were submitted, with the view of satisfying the Council that sufficient means of escape therefrom would be provided; and in each of those cases it was determined that a certificate should be issued on the completion

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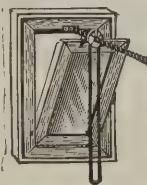
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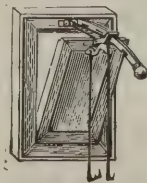
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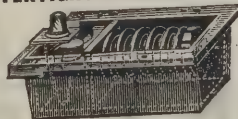


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of the building in accordance with the deposited drawings. Sky-signs are reported to be fast disappearing—in fact, the majority of the licenses expire next month. The Tribunal of Appeal, which was constituted under section 175 of the London Building Act, 1894, has, during the two years ended December 30, 1896, heard sixteen appeals, nine in the first year and seven in the second.

THE FREE LIBRARY, CAMPBELTOWN.

THE memorial-stone of the new library and museum which when completed will have cost, it is anticipated, between 8,000*l.* and 10,000*l.*, and will be a very handsome edifice, was laid on the 25th ult. by the Duke of Argyll. One of the conditions of the gift was that the Free Libraries Act should be adopted; and a resolution to this effect was adopted by the Town Council with the hearty approval of the ratepayers. The building is L-shaped, and has a frontage in Shore Street to the bay of 93 feet, and to St. John Street of 137 feet. The enclosed ground open to Shore Street is laid out as a garden to form an adjunct to the museum for the exhibition of archaeological and other exhibits not requiring cover. Internally the buildings are divided into a library or bookstore, 47 feet by 24 feet, capable of containing over 10,000 volumes; a ladies' reading-room, 24 feet by 18 feet; a general reading-room, 37 feet by 24 feet; a museum or picture gallery, 48 feet by 24 feet; and a general hall or news-room, 36 feet by 19 feet. This latter is the general vestibule, and gives independent access to each department; divided from the ladies' and general reading-room on either side, and from the library at one end by stone arches filled in with screens of timber and glass, it is covered with a lofty, open timber roof, the floor being of tilework and the upper walls of rough plaster. It forms the memorial hall of the building, and it was here, immediately behind the main entrance, that the memorial-stone was laid, and it will remain a prominent feature at the opposite end of the interior. In the library or book-store the finish is of the simplest. The book-stacks are in the centre of the floor, clear of all inside walls, and everything is done to reduce the harbour for dust and the risk of damp. The ladies' room, which occupies the corner of the site, and the octagonal side of which forms the main decorative feature of the front to the bay, though not ornate, is of richer treatment. The lower walls are lined with wood, and the ceiling is carved and moulded in plaster. The general reading-room, of which the

three oriel windows form, with the main entrance door, the principal feature of the St. John Street front, is panelled in the same way as the ladies' room, but the plaster ceiling in this case is supported by heavy wood beams. The museum or picture gallery is lighted primarily from the roof. Small side windows, which may be covered when the room is used as a picture gallery, give opportunities of suitably lighting cases containing the smaller exhibits which depend for their interest on closer inspection. Though entered through the general reading-room, the museum has an independent access from the hall through a covered way or cloister passing along one side of the garden, and it is intended that the centre of this cloister should also be used for exhibition purposes. Externally the details of the building are simple and effective; in style the work may be said to be Early Scottish Renaissance, but there is no attempt at any symmetrical architectural treatment. The different purposes of each room give character to its external appearance. The desired result is a building not interesting in itself, but one which will form a quiet retreat, and which may encourage the study of the books and antiquities which it contains. The building is from designs by Mr. J. J. Burnet, A.R.S.A., Glasgow, under whose supervision the whole of the work is being carried out.

WOOD PAVING IN LONDON.

THE Paddington Vestry has applied to the London County Council for a loan of over 12,000*l.*, to admit of extended road paving with hard Australian wood, instead of the Swedish deal blocks hitherto used, the former, though the initial cost is greater, being found more economical in the long run, on account of greater durability. It is besides, according to a report of the vestry's investigating committee, more cleanly and sanitary. The absorbing defects of soft wood, from which the hard is free, have led to complaints of bad smells, and in Marylebone, where deal has been extensively used, Dr. A. Wynter-blyth, the medical officer of health, has sought to counteract the disagreeable effluvia noticeable at times by pouring an acidified solution of sodic manganate on the road. St. Pancras, as well as Paddington, has discontinued the use of soft deal altogether, in favour of the West Australian hard wood. The special committee of the Paddington Vestry, who have thoroughly investigated the relative merits of hard and soft woods as road-making material, state that if the life of hard

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wood as against that of soft wood be estimated by its wear, they consider that at least fifteen years may be taken for hard wood against a life of six years for soft wood, on roads subject to heavy traffic. Assuming the average life of the present soft wood now laid down in Paddington to be seven years, its renewal necessitates an estimated yearly expenditure of 8,750*l.* Allowing the hard wood a life of twelve years only, the yearly renewals would cost 8,070*l.*, showing a saving of 680*l.* per annum. A longer life would show a larger saving. The committee add that there is no doubt that on roads with heavy traffic the saving would be very great. The London County Council, who fully recognise the economy of hard wood roads, will, for renewals of such material, grant a loan for seven years.

THE LONDON BUILDING ACT.

A CASE of some interest under Section 74 was recently decided by Mr. Hannay at the Marlborough Street Police Court in connection with the rebuilding of the Rising Sun Tavern, situate at the corner of Windmill Street and Tottenham Court Road. The whole of the ground storey was arranged as a bar, entered from both streets, and the first storey, all except the staircases, constituted a large billiard-room. The plans showed a single staircase, approached from the bar, leading to the first storey; and the landing was separated from the billiard-room by an enclosure, which was proposed to be of brickwork 4½ inches thick, with a door to the billiard-room, having glass panels. From this landing, but separated both from the billiard-room and from the staircase last mentioned by a 9-inch wall, a staircase led up to the upper storeys, which were to be used as sleeping rooms for the staff, &c.

The district surveyor (Mr. F. Wallen) served notice of objection on the builders, and the owner appealed in their name from such notice to the magistrate. The notice of objection of the district surveyor was to the effect that the building would exceed 10 squares in area, and would be used partly for trade purposes and partly as a dwelling, and that these two parts were not separated, in accordance with Section 74, by walls and floors of fire-resisting materials, inasmuch as there would be a common staircase belonging to both parts of the building entered from the bar, and without any separation from either part; and also that the enclosure on the first storey, being only 4½ inches thick, and having a door with glass panels, was not a proper wall of fire-resisting materials between the staircase

and landing leading to the dwelling on the one hand and the billiard-room on the other.

For the appellant it was contended that the enclosure of the staircase up to the one-pair storey and of the landing on that storey, so as to separate the ground-floor stairs from the billiard-room, was not prescribed by Section 74; but that it was sufficient to have a staircase starting from the billiard-room upwards, enclosed with a brick wall and a fire-resisting door.

In support of the district surveyor's notice of objection it was argued that such a construction as the builder proposed did not satisfy the section, which in effect required the approach to the dwelling-house portion to be entirely separated from the trade portion; that the section, though clumsily worded, effected this object by saying that "all means of approach to the dwelling-house portion should be constructed throughout of fire-resisting material;" that in this case the dwelling-house portion could not be approached except by coming through the bar either from one street or the other to the staircase, and that the bar itself was therefore a means of approach to the dwelling-house portion, and that inasmuch as the bar would presumably have glass windows and doors, &c., in it, it could not be constructed throughout of fire-resisting materials, and so must not be used as an approach to the dwelling-house portion. To comply with the section it was necessary, as the district surveyor required, to make a separate approach entirely walled off from the bar by a 9-inch wall leading from one of the streets to the staircase, and also to separate the billiard-room from the staircase by a similar wall, since in no other way could the builder provide the dwelling-house with an approach which would be fire-resisting throughout. It was pointed out that such an approach could be readily made from Windmill Street.

Mr. Hannay said that the construction proposed by the builder would produce the very evil that the clause appeared intended to prevent, viz. that in case of fire in the trade part of the building persons in the dwelling-house part would have to rush through the flames to get out of the building. In this case the bar was being used as an approach to the living-rooms, and the bar could not be made fire-resisting throughout. He accordingly upheld the requirement of the district surveyor.

In this case Messrs. Treadwell & Martin, the architects of the building, arranged that the objectionable practice of "summoning the district surveyor" was not taken, but the more proper mode of obtaining an appointment for the magistrate to hear the case and giving the district surveyor notice of

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it was adopted. In a matter like the present, arising on notice of objection under Section 150, nothing in the section warrants any summons being issued to either party.

PENALTIES IN CONTRACTS.

At the meeting of the Glasgow Corporation Police Department on August 23 the subject of the Ruchill Hospital contract was considered. The Clerk reported that, as instructed, he intimated to Messrs. Morrison & Mason, Limited, contractors, that the Corporation would hold them liable for, and insist on payment of, the penalty of 10*l.* per day, in terms of the contract for the work of the hospital since 1st ult., when the work should have been completed, till its completion, and he submitted a letter of date August 10 received by him from that firm to the following effect:—"We beg to state that the time for the completion of the works is not yet due, and therefore the penalty cannot be put in force meantime. Independent of other causes entitling consideration under the contract, we are entitled to an extension of time equal to that during which we were not allowed to proceed with the work in consequence of frost and bad weather. Under these circumstances, and in terms of the contract, it now falls to your engineer to certify the period: o which, in his opinion, the completion of the contract should be extended, and the Corporation to extend the time accordingly." The Clerk further reported that on receipt of that letter from the contractors he forthwith communicated with the city engineer, who in a letter to him of August 13 reported as follows:—"I beg to inform you that I did not at any time intervene personally, but I find from the notes kept by the clerk of works that in the two years from July 1895 to July 1897 there were 107 days on which work was discontinued from stress of weather." The Clerk further reported that under the contract between the Corporation and the contractors, which was signed by the contractors on June 5, 1895, and by the Corporation on July 1 thereafter, it is, *inter alia*, provided that the "works shall be completed within two years from the date hereof—declaring that in the event of the said works not being completed within the said period the contractors shall pay to the first party (the Corporation) a sum of 10*l.* in name of liquidated and ascertained compensation in respect of each day or part of a day during which the work is not completed . . . declaring further that if the work, or any part of it, may from time to time be suspended

during frost or bad weather at the discretion of the engineer, and by strikes of workmen, and in such cases the engineer shall certify the period to which, in his opinion, the completion of the contract should be extended, and the first party (the Corporation) shall extend the same accordingly." After discussion the sub-committee agreed to report the foregoing to the sub-committee on hospitals and the health committee. At the meeting of the health committee the minute of the hospitals committee was considered and discussed, and having heard the clerk and the city engineer thereon, and having regard to the terms of the contract between the Corporation and Messrs. Morrison & Mason, Limited, and in respect of the certificate by the city engineer, of date August 13, that the period to which, in his opinion, the completion of the contract should be extended in respect of frost or bad weather is 107 days, being the number of days on which work under the contract was, with the acquiescence and approval of the clerk of works, discontinued in respect of frost or bad weather, agreed to recommend that the Corporation extend the period of the completion of the contract to 107 working days, as from June 30 last—River-Bailie W. F. Anderson and Councillor J. Willock dissenting.

Mr. Murdoch moved the approval of the minutes.

Mr. Steele seconded.

Mr. Willock drew the attention of the Council to the minute, and stated that at last meeting the Council agreed to impose a penalty of 10*l.* per day for the period beyond the two years when the contract should have been completed. And now they found the engineer reporting that the contractors had 107 days still within which to finish their contract. It was a stupid position in which the committee had been placed, and they were apt to be told that Messrs. Morrison & Mason had got the better of the hospitals committee. He asked a month ago if the contractors had notified that the works had been stopped for any time owing to frost or stress of weather. The engineer then reported that no such document had passed. He was not against Messrs. Morrison & Mason, but there had been a grave irregularity, which reflected on the committee, and he was not going to allow this to pass or take blame for this unfortunate state of matters. He considered the contractors, so far as he knew, had done their work well, but apart from that this was a question of contract.

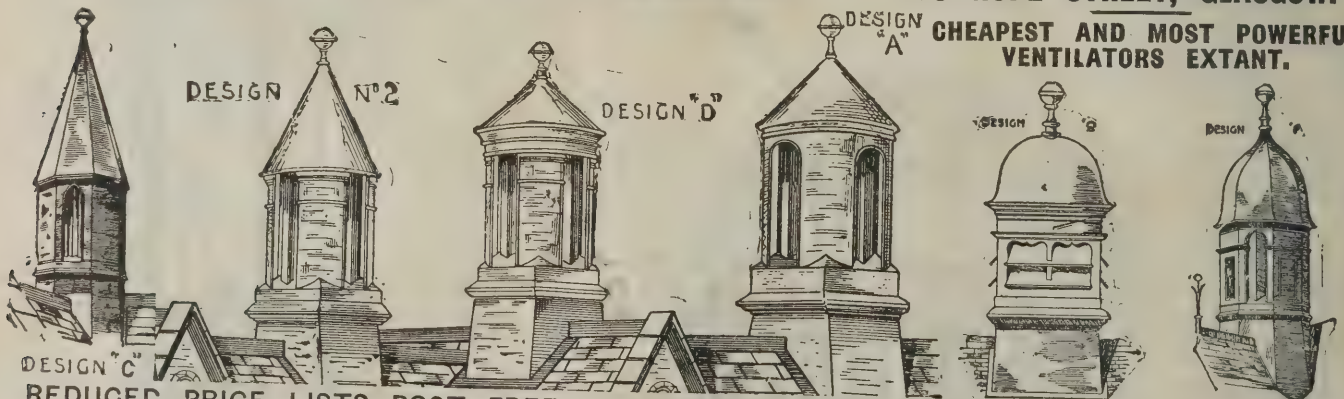
Mr. Cronin moved that the minute be taken back for further consideration.

Mr. John Ferguson seconded.

Bailie Robert Anderson said if the clerk of works had stopped

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the work at Ruchill in the interest of the Corporation, surely it was right that the contractors should get the benefit of the time the work was so stopped.

Dr. Carswell said that, looking at the terms of the contract, there was no doubt that Messrs. Morrison & Mason were entitled to be relieved of this penalty; but as a protest against the concealment which had been practised he would support the amendment.

Mr. Steele said that it was true that most of the committee were not aware of the terms of the contract, and there would be no use in sending back the minute.

Mr. Maxwell asked whether the other contractors who declined to accept the contract were aware that this clause was in the specification.

Treasurer Colquhoun asked why Mr. Macdonald and the clerk intimated that a penalty had been incurred when it was the case that 107 days' grace had to elapse.

Mr. Lindsay, the clerk, in reply to Mr. Maxwell's question, stated that the negotiations with other contractors were never so far matured as to permit of a similar clause being inserted. To the question of the treasurer he replied that he reported to the committee that the time allowed for the contract had expired, provided none of the contingencies mentioned in the report had arisen. The committee, notwithstanding, directed that the report should be printed as it appeared in the minutes.

Mr. Macdonald, the engineer, said he reported verbally to the committee that it was the case the weather had interfered with the work, and that it was a matter for their consideration whether they should enforce the penalty. But that report, like the report of the clerk, was swept aside.

Treasurer Colquhoun said it appeared to him that the Corporation had been put in an exceedingly foolish position in intimating that the penalty had been incurred. They ought to have known that there were days of grace still at the disposal of the contractors. This ought to be a lesson to the clerk of police, the city engineer and the health committee to be more careful in their future communications with Messrs. Morrison & Mason.

Bailie Battersby thought that without blaming anybody they ought to accept the inevitable and get the hospital finished as quickly as possible.

Mr. Steele said the work was almost finished, so far as the contract was concerned.

On a division the minutes were approved by thirty-four to eleven for the amendment.

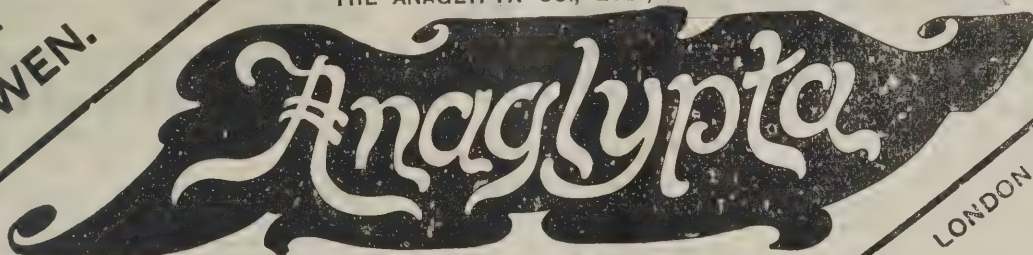
RECENT DEVELOPMENTS IN SEWAGE PURIFICATION.*

It may be thought that the term "recent" as applied to sewage purification is a scarcely necessary qualification. Sanitary work taken altogether does not go back to a very remote antiquity, and sewage purification is one of its later developments. But although we might truthfully say that all developments in this direction are modern in the extreme, such expressions are of necessity comparative, and already many processes from which much was expected have entirely disappeared or only remain embalmed in what we may call the ancient history of sanitary progress. Beginning from the time when all refuse matters were simply poured or thrown into the watercourses, the first stage in our progress was the endeavour to enrich the land by means of sewage, either by running it over the surface or by allowing it to deposit its solid matters in tanks, in the belief that the solid deposit would be most valuable manure, while the upper liquid would be practically pure. But while the direct application of sewage to land has often given excellent results, the simple process of settling was a failure, because much of the impurity was dissolved and therefore did not settle to the bottom. Next in order came the various processes which aimed at effecting this separation by the addition of some substance which would cause precipitation, and fortunes were hoped for from the manures thus to be produced. Although time and again the same result was reached—a sludge of little manurial value and an effluent far from pure—these early experiments left us with a number of precipitation processes which, with the addition of filtration, could produce a reasonably good effluent, and left us, too, the knowledge that treatment on land could produce an effluent which satisfied our requirements. Apart from developments in detail, one of the most interesting features in regard to sewage purification is the way in which science has been pressed into the service. Beginning, to all appearance, as a process which merely required some very ordinary structural arrangements for its efficient carrying out, it was not long until the resources of chemistry were largely drawn upon, and now it looks as if both the engineer and the chemist would have to occupy a position altogether subsidiary to that occupied by the omnipresent microbe, and that their operations must be directed by those to whom the habits and life history of the microbe are best

* An address delivered by Mr. Gilbert Thomson, C.E., president, at the opening meeting of the Sanitary Association of Scotland.

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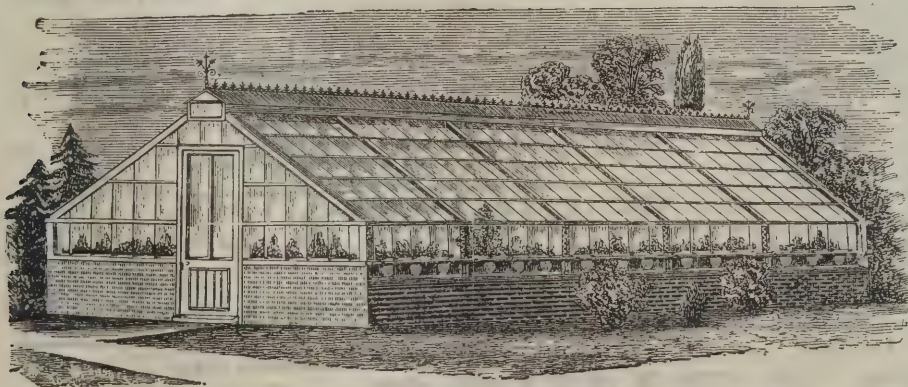


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known. While, however, it would appear as if the future progress in sewage purification would be largely dependent on bacteriological research, the new methods have not yet so completely proved their superiority as to drive the others out of the field. There are still many competing systems full of vitality, and my object is not to advocate one or another, but to show the main lines on which recent advances have been made. In considering the different principles on which purification may depend, it is well to bear in mind that no system removes the impurity in the same sense as a bale of goods is removed from a cart. To a certain extent this may be done, but there is inevitably a considerable part which it is impossible to remove, and which at best can be made harmless. In these circumstances it is, of course, quite open to consideration whether it is worth while to remove any, except perhaps by mechanical straining.

At the present time there are three chief methods of treatment—on land, by precipitation and by bacteriological methods. In the first and last of these would be combined a strictly scientific classification, but there is sufficient practical difference to warrant us in making a distinction. It may be said, indeed, that the chief development in connection with land treatment is the discovery that the purification is effected by living agencies. From the purification point of view the effect of the crop is not of great importance, whatever it may be financially. The system of land treatment still holds its own, but it is doubtful whether it will continue to do so, as there are greater chances of improvement in connection with the newer methods. It is in connection with the precipitation methods that mechanical ingenuity has had most scope. In all of these the general features are similar. A quantity of some precipitant is added to the sewage, which is then run into settling tanks so that the sludge may settle. In recent times improvements have been made in the design of the tanks so as to produce the maximum precipitating effect in the methods of removing the sludge from the tanks and in the subsequent treatment of the sludge. As to the first of these, the Cosham tank may be given as an example. The ordinary tank is rectangular or occasionally circular in shape, and the bottom is nearly or altogether flat, while the sewage either passes from one tank to another over a simple system of division walls, or remains quiescent in the tank which it first enters. The Cosham tank, on the other hand, consists of a number of cells and the sewage passes from one to another through what are called "floculent flues." At Nuneaton, which is said to produce the foulest

sewage in England, excellent results are obtained, and there was a marked contrast between the stream of exceedingly foul sewage entering the works and the effluent which entered the small stream and which appeared to contribute to its purity rather than to its pollution. Those in charge of the Nuneaton works put much more stress on the construction of the tanks than on the particular substance used as a precipitant, and they believe that their present success, after a number of failures, is due to the working of the floculent flues. The disposal of the sludge is one of the serious difficulties in precipitation works. In its raw state it can scarcely be disposed of even for nothing, and any treatment involves cost. The method adopted in Glasgow, of drying it sufficiently to form a fairly portable manure, gives a prospect of some return.

The processes which meantime are attracting most attention are those which produce no sludge, or, in other words, which go on the principle of decomposing and reducing to harmless forms all the substances contained in the sewage. They recognise the fact that these changes are associated with the life of certain minute organisms, and they therefore endeavour to have the changes carried out as speedily as possible, by providing conditions suitable to the activity of these organisms. Two developments of this idea have been brought somewhat prominently before us of late—the bacteriological filter and the septic tank. These both depend on the action of the microbes which live on sewage; but they differ in this respect, that while the bacteriological filters depend on one class of these microbes—those which require air or oxygen for their support—the septic tank depends on the so-called anaerobic microbes—those which want no air—and it is only when they have done their best with the sewage that it is handed over to the tender mercies of their aerobic brethren in the filters. The septic tank, in other words, is really a preliminary to passing the sewage through a form of bacteriological filters. The principle of the bacteriological filters is a perfectly simple one. Resembling somewhat an ordinary filter turned upside down, they are so constructed as to allow the sewage to penetrate into them and also to allow air to have free access throughout the mass. Beginning with little or no power of purification, the filter gradually rears, as it were, a colony of microbes, which is supplied with suitable food in the shape of sewage, and which literally eats the sewage that is turned into the filter. The reversal of the ordinary construction of the filter is for the purpose of avoiding the coating over of the surface, and the consequent exclusion of air which would result if the

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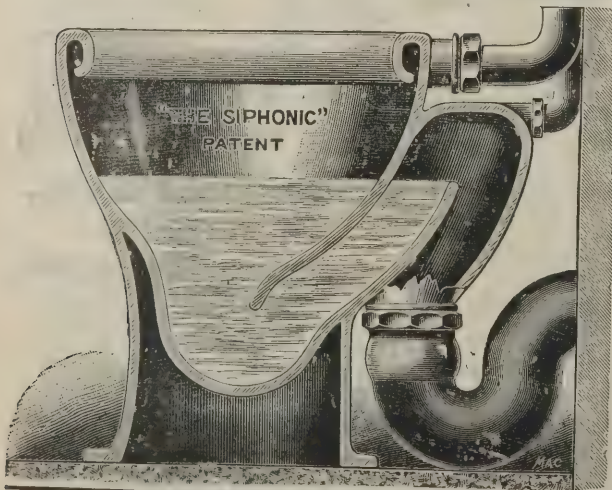
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filter were constructed with fine material at the top. The whole construction is simply a concentrated land filter, with the soil replaced by another material—coke, coke-breeze and the like—suitable for lodging the microbes. The septic tank process is a little more elaborate. When the sewage has entered the tank it is excluded from light and air. The heavier suspended matter falls to the bottom, the lighter rises to the top. The anaerobic microbes which have gradually developed in the tank, the condition being favourable for their existence, attack the sewage microbe, and by their aid putrefaction takes place with considerable rapidity. After taking about twenty-four hours to pass through the tank the sewage reaches the outlet, is run over aerating troughs, and is finally filtered. The anaerobic microbes which are unfortunate enough to pass out with the sewage are killed by the air, and the filter, being already stocked with those which flourish in air, has a clear field to work on. I visited the Exeter works in the early part of this year, one of the chief objects being to see whether such a mode of treatment could be carried out without any outward indication of the exceedingly offensive process going on in the tank. The works proved to be quite as inoffensive as a well-managed sewage works usually is. An ingenious mechanical arrangement is in use, by which the stream of sewage was automatically turned on to filter after filter, but it seemed to me not unlikely that by some modifications in the filtering arrangements a more uniform effluent might be produced.

That we have not yet reached a final settlement of the sewage question is proved by the fact that within the last few weeks we have seen by the newspaper reports that works on each of the three leading methods referred to have been adopted or recommended. This is, of course, so far due to the differences in local conditions, but it suggests also the probability that meantime there is so little to choose between the best representatives of the various systems that causes more or less accidental may be sufficient to turn the scale in favour of any of them.

LAUNDRY MACHINERY AND MOTOR CAR EXHIBITION.

At the exhibition now on at the Agricultural Hall, to which we were able to refer only very briefly in our last issue, many of the exhibits in the laundry section possess very considerable interest, and principal among these we may mention those of Messrs. Macintosh, Meikle & Co., Limited, 52 Queen Victoria

Street, E.C., who are showing a pressure-washing machine of 275 shirts capacity and one of 200 shirts capacity. In these machines the outer casing is constructed of steel boiler plates, and the interior cylinder of hard-rolled perforated brass sheets; the inner cylinder has brass sliding doors with brass lifters, the door openings being made the largest size possible compatible with safety; the outer doors are also of the largest size possible, and are so constructed as to be steam-tight and to be opened and shut with the greatest facility. The perforations in the inner cylinder are embossed by a special process, so that no metallic raw edges are left to come into contact with the clothes and so damage them during the washing operations. The gearing is automatic in action and simple in construction, and it is so arranged that, in the event of the clutch or lever not being properly fastened into position, the machine automatically stops itself by the time one revolution is completed. The machines are fitted with safety-valves, which are set to blow off at about 10 lbs. pressure per square inch. These two machines are a novelty from the manner in which they are driven.

A patent water-motor is employed for the purpose; no belts are necessary, and the machines can be placed entirely irrespective of existing shafting, and complete access is given all round the machines. One non-pressure washing machine, 275 shirt capacity, and one non-pressure washing machine of 200 shirt capacity driven by belting from the main shaft are also shown. These are built of metal similarly to the above, but are not constructed to withstand steam pressure. The doors in these machines are built of the full width of the cylinder. In both classes of machine hand-turning gear is fixed, in order that the inner cylinder may be brought into position with the opening in the outer drum; upon the openings being brought into line the machine automatically locks itself. These, and the previous machines, are made in all sizes, with capacities varying from 100 to 250 shirts. One four-roller ironing machine, with all latest improvements, is also shown, driven by the above-mentioned patent water-motor, whereby the machine can be placed in any position irrespective of existing shafting, thus permitting complete access all round the machine, and it also avoids the protecting of belts. The improved Decoudun ironing and finishing machine, with cylinder 108 inches and 2 feet in diameter, driven by belt, is constructed to give a high finish and perfect drying in one passage through the machine. The new pattern body ironer, with rollers having parallel motion, is exhibited for the first time.

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- | | |
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AND NUMEROUS OTHERS.

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Messrs. Watson, Laidlaw & Co., 98 Dundas Street South, Glasgow, have a large and varied assortment of hydro-extractors or centrifugal machines. The machines are all of the "Weston" or "self-balancing" type, and embody several important improvements on the original "Weston." The types exhibited do not exhaust all the possible forms of hydro-extractors, and are only illustrative of those types which have found most favour amongst laundrymen. Four methods of driving these machines are shown, namely, by steam-engines on the machine, by main belting, by hand-power and by water-power. Every size of machine made by this firm can be driven by steam, belt, or water, and the smallest sizes by any of the four mentioned methods. These extractors require no expensive foundations and the oiling arrangement is a special feature in their construction, all bearings being on the self-oiling principle; the dropping of oil on the contents of the machine, therefore, is rendered impossible. No. 1 is a 48-inch suspended hydro-extractor driven by a steam engine fitted to the frame of the machine. The engine does not drive direct, but the power is transmitted by means of a belt, thus permitting the running of the engine at a moderate speed and effecting considerable saving of steam. Nos. 2 and 3 show two suspended hydro-extractors for belt-driving. No. 2 is a 36-inch suspended machine, and is one of the most handy and the most suitable size of machine for general purposes in laundries. No. 3 is a 24-inch suspended hydro-extractor, which, although it is shown arranged for belt-driving, can also be supplied fitted with a small engine instead of the belt-gear. No. 4 shows the kind of basket which is utilised when chemical or granular substances are to be dried; it is fitted with a valve in the centre, which allows the dried contents to be emptied through the bottom of the cage into any convenient receptacle. These baskets can be fitted to any of the suspended machines. No. 5 consists of two sizes of hand-power hydro-extractors. These machines are eminently suited to the requirements of the proprietors of smaller laundries who may be desirous of purchasing high-class machinery for their establishments. The small size is 12 inches in diameter and the large size has a diameter of 18 inches. No. 6 consists of two sizes of oil-extracting machines used for extracting the oil from iron and other turnings; by its use a large saving in oil is effected. These machines can also be utilised to get the bulk of oil out of oily cotton and other wastes, and in places where oily rags are washed it saves a very large quantity of benzine. No. 7 shows a 36-inch pivot hydro-

extractor for belt-driving. This new form of extractor is very popular in laundries, dyeworks, &c., for the reason that it occupies very little space, and is entirely self-contained. No. 8 is a 27-inch pivot hydro-extractor of the same type as No. 7; it is suitable to be driven by belting or by a small steam-engine at the side; if desired the engine will be supplied instead of the belt-gear. Nos. 9, 10 and 11 are other specimens of circular machines. Other of the firm's specialties comprise steel disc pulleys for belts and ropes, a self-oiling swing bearing, &c.

Messrs. Doulton have a stand at which they are showing their well-known white enamelled and cane-glazed ware in wash-tubs, either single or in ranges, lavatories, &c.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

18948. John Thomas, for "Improvements in bolts or locks for doors and the like."

19015. William Edward Ison, for "Improvements in sash-fasteners."

19025. Herman Priester, for "Improved apparatus for closing doors."

19038. Frank Hewlett, for "Improvements in lock nuts."

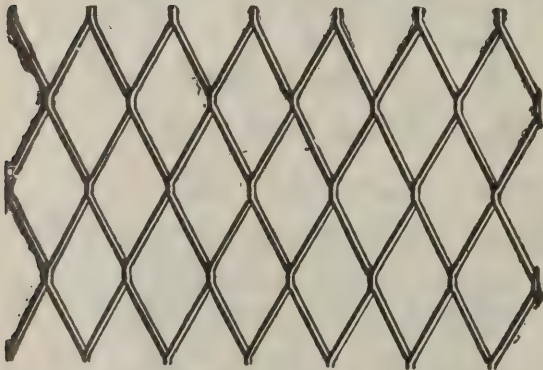
19106. George Vincent Maxted and Christopher McDermott, for "Improvements in mould-sanding machines, more particularly for use in the manufacture of bricks."

19298. John Rule and Emma Butson, for "Improvements relating to the preparation of mosaic slabs or tiles, and in the foundations or backings for same."

19302. Mark Glover Malpas, for "Improvements in kilns or ovens for firing potter's ware, bricks, tiles and such like, and for calcining various substances."

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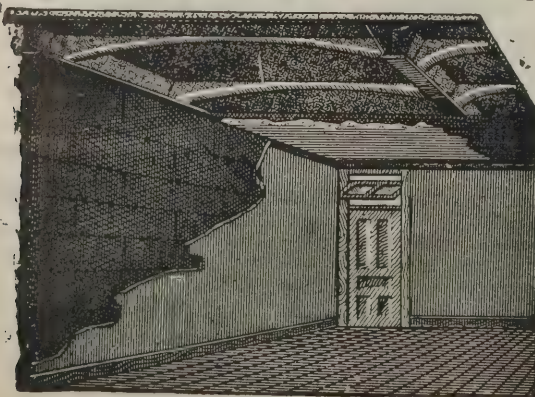
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The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.

Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

For Advertisement Scale, see page xiii.

COMPETITIONS OPEN.

BATTERSEA.—Sept. 22.—The Vestry of St. Mary offer premiums of 100l., 50l. and 25l. for the three best designs for the erection of public baths and washhouses. Mr. W. M. Wilkins, Municipal Buildings, Lavender Hill, S.W.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500l., 300l. and 200l. respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

CARLISLE.—The School Board offer premiums of 20l. and 10l. for designs for school to accommodate 550 boys. Mr. S. Cartmell, 27 Lowther Street, Carlisle.

DORKING.—Oct. 13.—Plans and estimates are invited for the erection of an infirmary. Mr. George Scales, clerk to the Guardians, High Street, Dorking.

FRINTON-ON-SEA.—Sept. 24.—The School Board invite designs for school to accommodate 150 children and allow of a future extension for 300 children. Mr. A. R. Chamberlayne, Station Road, Clacton-on-Sea.

LEEDS.—Oct. 8.—The Corporation offer premiums of 100l., 50l. and 25l. for the three best designs for a wholesale dead-meat market and abattoir. City engineer, Municipal Buildings, Leeds.

LOWER BEBINGTON.—Oct. 1.—The Lower Bebington Urban District Council offer premiums of 50l., 35l. and 20l. for

the three best designs for a scheme of sewerage for that portion of their district now being drained into the Bromborough Pool. Mr. Thomas Sproat, 5 Castle Street, Liverpool.

LUDLOW.—Oct. 1.—The Corporation offer a premium of 20l. for the best and most economical scheme of electric lighting for the borough. Mr. John Herbert Williams, town clerk, Ludlow.

MERTHYR TYDFIL.—Sept. 30.—The School Board offer a prize of 10l. for the best plan of erecting a second floor to the infants' school. Mr. E. Stephens, School Board offices, Merthyr Tydfil.

MORECAMBE.—Oct. 1.—The Urban District Council offer a premium of 100l. for the best scheme of an improved and extended sewerage system. Mr. Jno. Bond, surveyor, Morecambe.

SKIPTON.—Sept. 30.—The Skipton and District Cottage Hospital committee offer premiums of 15l. and 5l. for the best designs for a cottage hospital, at a cost of 2,500l. Mr. W. H. Dawson, hon. sec., Skipton.

UXBRIDGE.—Oct. 30.—The Uxbridge Rural District Council invite plans for a scheme of sewerage and sewage disposal. Mr. Charles Woodbridge, 38 High Street, Uxbridge.

CONTRACTS OPEN.

ACCRINGTON.—Sept. 15.—For constructing filter beds, covered reservoir, engine and boiler-houses, &c. [Mr. A. H. Aitken, Town Hall, Accrington.

ACCRINGTON.—Sept. 14.—For building business premises. Messrs. Sames & Green, architects, 65 Northgate, Blackburn.

ACTON.—Sept. 23.—For additions to Board school. Mr. Edward Monson, architect, Acton Vale, W.

ALFORD.—Sept. 14.—For rebuilding house. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

ARUNDEL.—Sept. 20.—For building labourers' cottages on the Duke of Norfolk's estate. Mr. Heveningham, Estate Building Office, Arundel.

AULT HUCKNALL.—Sept. 24.—For building school, &c. Messrs. Rollinson & Sons, architects, 13 Corporation Street, Chesterfield.

AYLESBURY.—Sept. 15.—For building retaining walls. Mr. J. H. Bradford, 2 Rickford's Hill, Aylesbury.

BARNSELY.—Sept. 15.—For alterations to business premises. Mr. H. Crawshaw, architect, 13 Regent Street, Barnsley.

BASFORD.—Sept. 20.—For construction and maintenance of stoneware pipe sewers. Mr. H. Walker, Newcastle Chambers, Nottingham.

BASINGSTOKE.—Sept. 13.—For completion of partially constructed wall, &c. Mr. Henry Ross, 8 Victoria Street, Westminster.

BATLEY.—Sept. 15.—For building cottages. Mr. W. Hantock, architect, Branch Road, Batley.

BEAUMARIS.—Sept. 13.—For additions to county school. Mr. Joseph Owen, architect, Menai Bridge.

BEXLEY.—Sept. 15.—For constructing pipe sewers. Mr. E. Reeve Boulter, Urban District Offices, Bexley Heath.

BEXLEY.—Sept. 15.—For supplying road materials. Mr. E. R. Boulter, surveyor, Bexley Heath, Kent.

BIRMINGHAM.—Sept. 18.—For constructing brick culverts and pipe sewer. Mr. John Price, Council House, Birmingham.

BOOTLE.—Sept. 30.—For building school. Messrs. Cox & Marmon, architects, 11 Dale Street, Liverpool.

BOURNEMOUTH.—For building Wesleyan church and schools. Mr. R. Curwen, architect, 112 Hamilton House Bishopsgate Street Without, London, E.C.



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ESTIMATES FREE.



BRADFORD.—Sept. 28.—For building seven houses and house and shop. Mr. Samuel Robinson, architect, 15 Cheap-side, Bradford.

BRISTOL.—Sept. 15.—For improvements to carriage and footways. Mr. T. L. Lewis, Parochial Offices, St. George's, Bristol.

BROMBOROUGH.—For building detached villa. Messrs. Bell, Williams, Son & Co., 40 North John Street, Liverpool.

BROMSGROVE LICKEY.—For building residence. Mr. F. J. Yates, architect, 1 Newhall Street, Birmingham.

BROWNHILLS.—Sept. 14.—For making-up road. Mr. J. H. Shaw, Public Buildings, Brownhills, Staffs.

CAMBERWELL.—Sept. 13.—For paving new streets. Mr. O. S. Brown, Vestry Hall, Camberwell, S.E.

CARLISLE.—For building warehouses. Mr. T. Taylor Scott, architect, Carlisle.

CHADWELL HEATH.—Sept. 28.—For building foundations, lodges, &c., in connection with lunatic asylum. Mr. Lewis Angell, Town Hall, Stratford.

CLACTON.—Sept. 15.—For paving and making-up roads. Mr. A. R. Robinson, Town Hall Buildings, Clacton-on-Sea.

CREWE.—For furnishing and fitting-up technical institute. Mr. J. A. Jenkins, Municipal Offices, Crewe.

DOUGLAS.—Oct. 2.—For constructing brick and stoneware pipe sewers. Messrs. Stevenson & Burstal, 38 Parliament Street, Westminster.

EASINGWOLD.—Sept. 17.—For widening and fencing road. Mr. F. J. H. Robinson, Rural District Council Offices, Easingwold, Yorks.

EAST PRESTON.—Sept. 13.—For bricklayer and plumbers' work at workhouse. Mr. H. Howard, Town Offices, Littlehampton.

ELGIN.—Sept. 17.—For building artisans' dwellings. Mr. Geo. Sutherland, architect, Elgin.

ERDINGTON.—Sept. 29.—For making roads. Mr. H. H. Humphries, Public Hall, Erdington, near Birmingham.

EUSTON.—Sept. 14.—For widening Rectory Bridge, Euston, near Thetford. Mr. F. Whitmore, architect, 17 Duke Street, Chelmsford.

FALMOUTH.—Sept. 16.—For alterations and improvement of the Smithick Schools, boys and infants' department. Mr. W. Jenkins, clerk, Falmouth.

FARNHAM.—Sept. 15.—For repairing bridge. Mr. E. Crundwell, Rural District Council Offices, South Street, Farnham.

FELIXSTOWE.—Sept. 15.—For constructing sewers. Mr. G. S. Horton, Town Hall, Felixstowe.

FINSBURY PARK.—Sept. 13.—For laying wood paving on concrete foundation. Mr. E. J. Lovegrove, Hornsey Urban District Council Offices, Southwood Lane, Highgate, N.

FOLKESTONE.—Sept. 13.—For building fifty artisans' dwellings. Mr. John White, 29 Dover Road, Folkestone.

FORRES.—Sept. 27.—For additions to hydropathic establishment. Mr. John Forrest, architect, 129 High Street, Forres, N.B.

GLOUCESTER.—Sept. 25.—For laying stoneware pipe sewers, with manholes, ventilators, &c. Mr. J. F. Trew, County Chambers, Gloucester.

HALIFAX.—Sept. 14.—For erection of a school for 230 children at Salterlee, Shibden. Mr. Joseph F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

HALIFAX.—Sept. 14.—For erection of confectionery works (covering an area of over 1,300 superficial yards) in Queen's Road and Hammond Street. Mr. Medley Hall, architect and surveyor, 29 Northgate, Halifax.

HALIFAX.—Sept. 29.—For building dwelling-house. Messrs. C. F. L. Horsfall & Son, architects, Lord Street Chambers, Halifax.

HEATH TOWN.—Sept. 18.—For paving and making-up road. Mr. R. E. W. Berrington, civil engineer, Wolverhampton.

HEBDEN BRIDGE.—Sept. 18.—For constructing pipe sewers. Messrs. Newton, 17 Cooper Street, Manchester.

HORNSEY.—Sept. 13.—For constructing stoneware pipe sewers. Mr. E. J. Lovegrove, Hornsey Urban District Council Offices, Southwood Lane, Highgate, N.

HORTON.—Sept. 17.—For alterations and repairs to Lask Edge chapel. Mr. Herbert Clews, Horton.

IPSWICH.—Sept. 15.—For erecting emergency staircase, wing, &c., at the Co-operative Hall. Messrs. Eade & Johns, architects, Cornhill Chambers, Ipswich.

KENDAL.—For building cycle-enamelling-house. Mr. J. Stalker, architect, 57 Highgate, Kendal.

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KING'S LYNN.—Sept. 16.—For building bridge over the river Nar. Mr. J. S. Culham, highway surveyor, Grimston, King's Lynn.

KING'S LYNN.—Sept. 17.—For constructing sewer. Mr. R. H. Aldham, Rural District Council Offices, King's Lynn.

KINGSTOWN.—Sept. 14.—For alterations and additions to Town Hall. Mr. J. Donnelly, Town Hall, Kingstown, Ireland.

KIRKLEATHAM.—Sept. 24.—For building reading-room. Mr. E. A. Whiphham, architect, 59 High Street, Stockton-on-Tees.

LAMBETH.—Sept. 21.—For erecting new camp sheathing at Letts Wharf. Engineer to the Commission of Sewers, Guildhall, E.C.

LANCASTER.—Sept. 15.—For extending stables and workshops. Mr. T. C. Hughes, Town Hall, Lancaster.

LEEDS.—Sept. 15.—For alteration to roof of gas governor-house. Mr. R. H. Townsley, Municipal Offices, Leeds.

LEEDS.—Sept. 20.—For building warehouse, &c. Mr. T. Winn, architect, 70 Albion Street, Leeds.

LEEDS.—For sinking well. Mr. W. S. Braithwaite, architect, 6 South Parade, Leeds.

LEWISHAM.—Sept. 21.—For building fire brigade station. Architect's Department, London County Council, Spring Gardens, S.W.

LLANDYFAEN.—Sept. 21.—For constructing waterworks. Mr. R. S. Lewis, 16 Rhosmaen Street, Llandilo.

LLANDUDNO.—Sept. 20.—For erection of electric lighting and refuse destructor buildings. Mr. E. P. Stephenson, Urban District Council Offices, Llandudno.

LONDON.—Sept. 28.—For alterations at underground convenience. Engineer to the Commission of Sewers, Guildhall, E.C.

LORDSHIP LANE.—Sept. 13.—For supplying and fixing wrought-iron railings and gates and building dwarf walls and piers to same at the public library. Mr. O. S. Brown, surveyor to the Vestry, Vestry Hall, Camberwell.

LYNTON.—Sept. 13.—For erection of a lighthouse, dwellings, &c., at the Foreland, near Lynton, Devon. Mr. E. G. Verity, 31 Golden Square, London, W.

MANCHESTER.—Sept. 14.—For building a brickwork bridge. City Surveyor, Manchester.

MIDDLESBRO.—Sept. 15.—For building children's hospital and porter's lodge. Messrs. Lofthouse & Sons, architects, 62 Albert Road, Middlesbro.

MORLEY.—Sept. 20.—For painting buildings, gates, railings, &c., at Dartmouth Park. Mr. M. H. Sykes, Town Hall, Morley.

MORLEY.—Sept. 20.—For sewerage and kerbing streets. Mr. H. H. Sykes, Town Hall, Morley.

NAILSWORTH.—Sept. 13.—For taking-down St. George's Church, Nailsworth, and for the erection of a new church on site. Mr. M. H. Newland, architect, Gloucester.

NEATH.—Sept. 20.—For building schools. Mr. J. C. Rees, architect, St. Thomas's Chambers, Church Place, Neath.

NORTHAMPTON.—Sept. 21.—For building residence. Mr. J. F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

NORTHOWRAM.—Sept. 21.—For building residence. Mr. J. F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

PLYMOUTH.—Sept. 18.—For constructing and fitting-up an underground convenience. Mr. James Paton, Municipal Buildings, Plymouth.

PLYMOUTH.—Sept. 22.—For heating and ventilating municipal buildings. Mr. James Paton, Municipal Buildings, Plymouth.

PONTARDAWE.—Sept. 29.—For building infant school. Mr. W. W. Williams, architect, 63 Wind Street, Swansea.

PONTLOTTYN.—Sept. 18.—For building 65 dwelling-houses. Mr. William Jones, Board Schoolhouse, Pontlottyn, Wales.

PONTYPOOL.—For building two dwelling-houses. Mr. C. Foxwell, 14 Wainfelin Road, Pontypool.

PONTYPRIDD.—Sept. 22.—For altering and enlarging schools. Mr. A. O. Evans, Post Office Chambers, Pontypridd.

POPLAR.—Sept. 15.—For paving streets. Mr. L. Potts, 117 High Street, Poplar.

PORTADOWN.—Sept. 18.—For building Masonic Hall. Messrs. J. J. Phillips & Son, 61 Royal Avenue, Belfast.

PORTADOWN.—For building convent. Mr. J. J. M'Donnell, 27 Chichester Street, Belfast.

PORTSMOUTH.—Sept. 21.—For alterations and additions to Board school. Mr. A. Bone, architect, Cambridge Junction, Portsmouth.

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RIPLEY.—Sept. 13.—For extension of school buildings. Rev. F. H. Tuke, Ripley.

ROCHDALE.—Sept. 15.—For building stables. Mr. T. B. Ball, Gasworks, Rochdale.

ROCHESTER.—Sept. 15.—For making-up street. Mr. W. Banks, Guildhall, Rochester.

ROTHES.—For building Town Hall. Mr. R. B. Pratt, County Bank House, Elgin.

SALFORD.—Sept. 16.—For reconstructing roof over yard at Pendleton Town Hall. Mr. S. Brown, Town Hall, Salford.

SALFORD.—Sept. 16.—For painting exterior of sanatorium. Mr. S. Brown, Town Hall, Salford.

SALTBURN.—Sept. 15.—For alterations to bridge. Mr. J. Cudworth, North-Eastern Railway Co., Darlington.

SELBY.—Sept. 20.—For excavations, concrete foundations, drains, &c., for new factory. The Yorkshire Bacon Curing Co., Limited, 1 Abbey Place, Selby.

SHEFFIELD.—Sept. 14.—For building ten dwelling-houses. Mr. John Clark, architect, 55 Norfolk Street, Sheffield.

SHEFFIELD.—Sept. 16.—For painting and decorating Central Free Library. Mr. Chas. F. Wike, Town Hall, Sheffield.

SHIBDEN.—Sept. 14.—For building school for 230 children. Mr. J. F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

SHOREDITCH.—Sept. 21.—For constructing sewers. Mr. J. Rush Dixon, Town Hall, Old Street, E.C.

SHOTLEY BRIDGE.—Sept. 21.—For building cottage homes. Mr. C. A. Sharp, architect, 24 Grainger Street West, Newcastle.

SOUTHAMPTON.—Sept. 14.—For constructing stoneware pipe sewers, &c. Borough engineer, Southampton.

ST. ALBANS.—Sept. 27.—For heating and ventilating Campfield Works. Mr. G. P. Smedley, architect, 110 St. Martin's Lane, London, W.C.

SWANAGE.—For building hotel. Messrs. Pearce & Offer, Dorsetshire Bank Chambers, Bournemouth.

TAUNTON.—Sept. 17.—For alterations and additions to Taunton Co-operative Society's premises. Mr. F. W. Roberts, architect, 2 Hemmet Street, Taunton.

WADSLEY.—Sept. 18.—For erection of additional wash-house, engine-room and laundry at the asylum. Mr. Cotterill, Wadsley Asylum, Sheffield.

WALES.—Sept. 15.—For erection of forty-five cottages at Pontycymmer. Ffaldau Collieries Company, Limited, Cardiff.

WALSALL.—Sept. 25.—For constructing earthenware pipe sewer. Mr. John R. Cooper, town clerk, Walsall.

WALTHAMSTOW.—For building cottage residences. Mr. E. Beaumont, architect, 78 Fleet Street, London, E.C.

WARRINGTON.—Sept. 20.—For erection of county asylum on the Winwick Hall Estate, Winwick, near Warrington. Mr. Fred. C. Hulton, clerk, County Offices, Preston.

WATER FULFORD.—For building farmhouse. Mr. D. Cayley, 7 Blake Street, York.

WEALDSTONE.—Sept. 14.—For making roads, laying drains, &c. Mr. B. Wyand, Council Office, Wealdstone.

WELLINGTON.—Sept. 13.—For constructing cast-iron pipe sewers, &c. Mr. J. W. Littlewood, Church Street, Wellington, Salop.

WESTBURY-ON-SEVERN AND DYMOCK.—Sept. 25.—For building police-stations. Mr. M. H. Medland, architect, 15 Clarence Street, Gloucester.

WHITEHAVEN.—Sept. 21.—For rebuilding house. Messrs. Moffatt & Bentley, architects, Whitehaven.

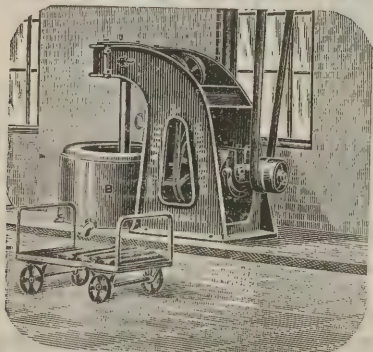
WREXHAM.—For additions to National schools. Mr. Plant, Wilderness Works, Wrexham.

YORK.—Sept. 16.—For building cycle factory. Messrs. Penty & Penty, architects, Clifford Chambers, York.

YORK.—Sept. 29.—For widening and laying-down railway. Mr. C. N. Wilkinson, North-Eastern Railway Company, York.

A PORTION of one of the piers of the old bridge over the Jed at Canongatefoot, Jedburgh, has been taken down in consequence of its having been in a dangerous state, and is being rebuilt. This bridge, which is believed to belong to the twelfth century, is said to have been built to afford the means of transit for the stones used in the erection of the abbey. The bridge is a strongly built structure, with three ribbed arches, but for many years it has been used only for foot passengers.

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For erection of a workshop for the technical department of the School Board.

Accepted tenders.

McLaren & Nairn, mason	£384	0	0
Alexander Scott, joiner	155	0	0
Brand, slater	45	2	6
Dyer, plumber	26	13	8
A. S. Matthewson, painter	14	19	6
Total, £625 15s. 8d.			

BATH.

For taking-down old building and erecting art gallery and reference library. Mr. J. M. BRYDON, architect.

	A	B
Higgs & Hill, London	£16,980	40 30
Estcourt & Sons, Gloucester	14,993	90 12
W. Downs, London	13,700	75 7
A. J. Beavan, Bedminster	13,600	60 10
Hayward & Wooster, Bath	12,797	100 6
Cowlin & Sons, Bristol	12,790	100 25
J. LONG & SONS, Bath (accepted)	12,222	300 50

A. Allowance for material on site.

B. Allowance for tenant's fixtures, White Lion Tap.

For furnishing the pump-room in the baths.

Chedzoy	£403	11 0
C. Angel	401	16 9
Lock Bros.	357	10 0
Evans & Owen	351	19 0
Lavertons, Limited	351	5 0
Allen & Sons	339	12 0
E. MILLARD, Bath (accepted)	306	4 0

BULK.

For alterations and repairs at Moorside Farm, Bulk, for Mr. W. H. Dalton. Mr. J. PARKINSON, architect, 67 Church Street, Lancaster.

Accepted tenders.

W. Richardson, Lancaster, joiner	£115	0 0
R. Hall, Forton, mason	111	16 0
R. Hall & Son, Lancaster, slater	96	0 0
W. Abbott & Co., Lancaster, plumber	24	0 0

BRIXHAM.

For erecting new National Provincial Bank of England premises, Fore Street, and painter and glazier work in connection with same. Messrs. NORMAN G. BRIDGMAN & WALTER H. BRIDGMAN, architects, Torquay, Paignton and Teignmouth. Quantities by Mr. VINCENT CATERMOLE BROWN, of Paignton.

For the building works.

Goss Bros.	£1,100	0 0
E. P. Bovey	1,044	0 0
G. Webber & Maunder	933	0 0
Hazlewood Bros.	921	0 0
H. WEBBER & SONS, Paignton*	908	0 0

* Accepted with amendments.

For painting works.

Goss Bros.	70	0 0
H. Webber & Sons	49	0 0
Hockings	46	10 0
Pearse	42	18 10
H. May	30	15 0

CLAYTON-LE-MOORS.

For paying about 350 yards of granite in Whalley Road, for the Clayton-le-Moors Urban District Council. Mr. ARTHUR DODGEON, surveyor.

Exors. of A. Broadley	£109	7 6
W. H. Bury	105	0 0
CHADWICK BROS., Blackburn (accepted)	100	12 6

Do not include granite setts.

CONGHAM.

For restoration of St. Andrew's Church, Congham, Norfolk. Mr. HERBERT J. GREEN, architect, 31 Castle Meadow, Norwich.

First Contract.

Cornish & Gaymer, North Walsham	£642	4 2
W. J. Larner, East Dereham	507	4 6
J. BODDY, Swaffham (accepted conditionally)	503	0 0

CORSHAM.

For erecting a drinking fountain, for the Mayo Memorial committee. Mr. HAROLD BRAKSPEAR, architect, Corsham.

Rudman	£117	0 0
C. F. OSBORNE, Corsham (accepted)	105	0 0

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For erecting an oak paling fence with iron posts along the boundary of the Grammar School property in Shepherd's Lane, Dartford, for the Urban District Council. Mr. W. HARSTON, surveyor.

Thames Sawmills Co., Erith	£232	10	0
Rowland Bros., Bletchley	140	13	0

DEVONPORT.

For constructing a sewer in Paradise Road. Mr. JOHN F. BURNS, borough surveyor.

J. Shaddock	£523	2	6
A. N. Coles	512	12	8
C. L. Duke	449	3	1
H. Kerswill	416	0	0
T. SHADDOCK, Plymouth (accepted)	397	10	3

For building St. Levan Wesleyan chapel, Stuart Road. Mr. W. N. RICHARDS, architect, 29 St. Aubyn Street, Devonport.

S. Roberts	£3,291	0	0
C. V. Doidge	3,260	1	2
G. Shellabear & Son	3,150	0	0
Laphorn & Co.	3,072	0	0
J. Partridge	3,959	0	0
A. R. Lethbridge & Son	2,990	0	0
T. Jenkins & Son	2,966	0	0
W. E. Blake	2,950	0	0
F. C. Ambrose	2,929	1	0
T. Wray	2,928	0	0
J. Finch	2,857	0	0
H. Kerswill	2,828	12	3
H. E. Skinner	2,761	5	1

Same in Brick.

Shellabear	3,247	0	0
Laphorn	3,185	0	0
Lethbridge	3,150	0	0
Partridge	3,159	0	0
Doidge	3,097	2	10
Roberts	3,091	0	0
Jenkins	3,056	0	0
Kerswill	3,032	14	5
Blake	2,999	0	0
Wray	2,952	0	0
Finch	2,897	0	0
Ambrose	2,880	14	2
Skinner	2,861	5	1

DAWLISH.

For erection of a cattle shed at Longden Farm, for Mr. G. Ermen. Messrs. NORMAN G. BRIDGMAN & WALTER H. BRIDGMAN, architects, Torquay, Paignton and Teignmouth.

Brickwork.
REYNOLDS, Starcross (accepted).

Carpentry.
BLACKMORE, Dawlish (accepted).

DONCASTER.

For building proposed new workhouse at Balby, for the Guardians of Doncaster Union.

R. Arbottle	£83,424	17	10
J. L. Miller	74,295	11	0
Williamson & Co.	74,242	1	6
J. H. Vickers, Limited	71,834	0	0
W. Hives & Co.	69,013	0	5
W. J. Robertson	67,964	11	0
W. Anelay	67,240	0	0
S. Warburton	66,420	0	0
Walker & Slaytor	65,035	0	0
B. Graham & Sons	64,394	13	0
H. Arnold & Son	60,600	0	0
Jackson Bros.	60,249	17	6
Architect's estimate	47,000	0	0

Tenders referred to the building committee.

DUNDEE.

For building a chimney-stack at the hydraulic engine-house, for the Dundee Harbour Trustees.

W. ANDERSON, Dundee (accepted) £219 16 6

ERITH.

For erection of the new bank premises for the London and County Bank at the corner of High Street.

Pryer & Co.	£4,888	0	0
Wallis & Sons	4,830	0	0
Strong & Sons	4,651	0	0
Gunning	4,324	0	0
W. H. Gaze	4,287	0	0

GRIMSBY.

For painting and distempering the workhouse, for the Guardians.

J. W. Finney £267 11 0
G. COLLIER, Great Grimsby (accepted) 265 0 0

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Accepted tenders.

(Contract No. 1) W. Grisdale, Leeds, £137 17s. 6d.
(No. 2) W. Walker, £95 10s.
(No. 3) J. Walker, £103.
(No. 4) J. Walker, £107.

LLANDAFF.

For supplying and laying about 3,200 yards of iron and stone-ware pipe sewers, with manholes, lampholes, flushing-tanks, syphons, valves, &c., for the Llandaff and Dinas Powis Rural District Council. Mr. W. FRASER, engineer, 17 Queen's Chambers, Cardiff.

Batchelor & Snowden	£2,276	1	6
G. H. Munday & Son	2,273	8	3
F. Ashley	2,214	19	0
Williams & Thomas	2,167	13	0
J. Wood	2,044	14	0
Barnes, Chaplin & Co.	2,024	9	11
E. H. Page	1,835	10	10
MACKEY & DAVIES, Cardiff (accepted)	1,799	3	4
Engineer's estimate	2,000	0	0

LONDON.

For alterations at the Queen's Head Public-house, Barking, E. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, London, E.C.

W. J. Maddison	£1,350	0	0
A. Webb	915	0	0
W. Harper	910	0	0
S. SALT (accepted)	878	0	0

For alterations and additions to warehouse, York Road, Camden Town, for the Cocoa and Chocolate Company, Limited. Mr. EUGENE C. BEAUMONT, architect, 78 Fleet Street, E.C.

G. Neal	£638	0	0
H. Brown	569	0	0
Brown & Harris	562	0	0
Bennett	548	0	0
Rutherford & Son	535	0	0
H. M. DOVE (accepted)	490	0	0

LONDON—continued.

For erection of a detached house, George Lane, South Woodford, N.E. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, London, E.C.
W. MUNDY (accepted) £736 0 0

For repairs and decorations at the Empress of India Public-house, South Hackney, N.E. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, London, E.C.

Williams & Co.	£630	11	6
W. Harper	580	0	0
S. Salt	559	0	0
T. Osborn & Sons *	467	0	0

* Accepted, with slight modification.

For alterations, additions, fittings, &c., at the City Arms public-house, Devons Road, Bromley, E., for Messrs. Holt & Co. Mr. FRED. A. ASHTON, architect, 177 Romford Road, Stratford, E.

G. & H. COCKS (accepted) £2,300 0 0

For erection of eighteen dwelling-houses in South Street, Ponders End, N., for Mr. W. Langman. Mr. FRED. A. ASHTON, architect, 177 Romford Road, Stratford, E.

C. SIMMONS (accepted) £4,140 0 0

For painting Edmonton workhouse, for the Guardians.

A. Porter	£853	0	0
Tremaine & Piper	800	0	0
C. Mantor	650	0	0
H. Knight & Son	597	0	0
W. Hobbs & Son	560	0	0
J. Garrard	386	0	0

MAIDSTONE.

For new boiler and alterations at the Workhouse.

W. J. Fraser & Co.	£280	0	0
R. Dann	229	10	0
Jesse Ellis & Co.	214	10	0
T. King	214	10	0
C. Watson	200	0	0
Anderton & Sons	199	0	0
W. Williams & Sons	178	10	0
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architects, Torquay, Paignton and Teignmouth.
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For building cottage residences, Chester Road, for the Freehold
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EUGENE C. BEAUMONT, architect, 78 Fleet Street.

F. NOAKES, Canning Town (*accepted*). £3,500 0 0

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For supplying heating apparatus in the Beeches Road school.

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For builders' work in connection with same.

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TRADE NOTES.

THE new intermediate schools, Llandrindod Wells, Radnorshire, are being warmed and ventilated by means of Shorland's patent Manchester grates, exhaust roof ventilators and special inlet tubes.

CONTRACTORS would do well to examine the "Ebor" patent horse-shoe before the winter sets in, although it is no less efficient in summer. By the use of it horses must suffer much less inconvenience than with ordinary shoes, and that means that more work can be done by them. The offices of the company are at 25 and 29 Coleman Street, but shoeing-forges in which the "Ebor" shoe will be used are being opened throughout the country.

ELECTRIC NOTES.

THE Rotherham Town Council have resolved to apply to the Board of Trade for a provisional order empowering the Corporation to supply electricity for lighting and other purposes.

THE Blackpool Town Council have decided by eleven votes to seven that the overhead electric system be substituted for the conduit system now in use on the local tramways.

THE Dover Corporation electric trams started running on Monday, the first carriage conveying the Mayor and several members of the Corporation.

SOME members of the Manchester Corporation have gone on a visit to the Continent to inspect various electrical workings. They purpose visiting several towns in France, Germany and Belgium, and will take special note of all appliances for electric traction.

AT a late meeting of the electric-lighting committee of the Town Council of Edinburgh the engineer reported that the applications for electric light since May 18—the close of the financial year—amounted to 24,663 lamps of 8 candle-power.

AT the forthcoming exhibition to be held by the Photographic Society at the rooms of the Royal Society of Painters in Water-Colour in Pall Mall, Messrs. J. Bulbeck & Co., of 166 and 167 Strand, will have a very fine exhibit of architectural photographs. Those of Her Majesty's Theatre, which will shortly be reproduced in *The Architect*, are well worth the attention of the architectural profession.

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BUILDING AND BUILDERS.

BATHS are about to be erected in Leith at a cost of 10,906*l*.

A CHAPEL is to be erected, at a cost of 5,000*l*., in connection with the Bridgend County Asylum at Park Gwyllt.

TWO members of the building committee of the New Infirmary, Selly Oak, say the cost of the building for 250 patients was 55,000*l*., or 220*l*. per bed, instead of 600*l*., as stated.

MR. J. WEBB, of Handsworth, has obtained the contract for the new schools in Rookey Road, for the Handsworth School Board, the cost being 11,333*l*.

AN English syndicate, operating in real estate in America, has acquired 200 acres of building land in the town of Depew, and will erect 350 dwelling-houses on their property.

THE tender of Messrs. B. Cooke & Co., of London, amounting to 11,841*l*., has been accepted by the Brighton Corporation for the erection of groynes and wooden breastwork for the protection of the foreshore to the east of the site of the Chain Pier.

THE Roman Catholic Bishop of Southwark recently laid the foundation-stone of a Catholic church at Redhill. It is to take the place of the old church, which had become much dilapidated.

A NEW swimming-bath for the north side of Edinburgh is proposed to be erected at Saxe-Coburg Place, Glenogle Road, on the lines of the bath at Dalry, with certain modifications to suit the ground. The estimated cost is between 10,000*l*. and 12,000*l*.

THE Coatbridge Dean of Guild Court has passed the plans of a new Roman Catholic church to be erected at the corner of Buchanan Street and Dundryan Road. It will accommodate 1,000 worshippers and is to cost 10,000*l*. The building has been designed by Messrs. Pugin & Pugin.

PLANS were submitted to the Altrincham Town Council for the erection of 120 houses on the Linotype estate at Broadheath, and approved, the chairman of the building committee remarking that they were built with every regard to the comfort and convenience of the workpeople.

THE "Queen Victoria Board School," Sedgley, was opened on Tuesday. The building is of brick, with moulded brick and corner-stone dressing. The largest class-room will be utilised as a board-room. The total cost of the schools, which will provide accommodation for 970 children, is over 7,000*l*., including 5,950*l*. the contract price for the building, 1,000*l*. for land

and boundary walls and 300*l*. furnishing, &c. Mr. A. P. Brevitt (Wolverhampton) was the architect, and Mr. T. Jones (Sedgley) the builder.

THE foundation-stone of new offices and board-room for Bucklow Union has been laid at Knutsford. The erection of the buildings, which are estimated to cost 4,500*l*., forms part of an extensive scheme contemplated for some years of rearranging the workhouse.

THE annual meeting of the Leeds Master Builders' Association was held at the Royal Exchange, Leeds, on the 7th inst., Mr. W. Nicholson presiding. The following officers were appointed for the ensuing year:—President, Mr. W. Nicholson; vice-president, Mr. J. Walker; and secretary, Mr. E. Schofield. It was stated that the Association is in a very strong and healthy condition, notwithstanding the recent strike of bricklayers and labourers, the membership having largely increased since last year. Amongst other important business, it was unanimously decided that the Association should join the Yorkshire Federation of Builders, the next meeting being held in Leeds on the 16th.

VARIETIES.

MR. H. E. HOARE has purchased Danbury Palace and the surrounding estate from Mr. Seth Taylor.

GRANGEGORMAN Female Prison in Dublin is about to be converted into an auxiliary to the Richmond Lunatic Asylum.

A PARISH Institute is to be erected near the church at Kingston, Portsmouth.

A PETITION is in course of preparation by the county councils and other public bodies of Wales for the introduction of the arms of Wales in the armorial bearings of the nation.

SIR EVERETT MILLAIS, son of the late Sir John Everett Millais, president of the Royal Academy, succumbed to inflammation of the lungs on Tuesday night.

THE folly on Chatham Hill called "Jezreel's Tower" has again failed to find a purchaser. The highest offer at the auction was 3,950*l*., although the breaking-up value is said to be 6,000*l*.

A SITE has been secured in Paisley on the Greenlaw estate for the new Eye Infirmary which Provost Mackenzie is presenting to the town. The ground value has been purchased to save annual burthens on the institution. It is expected that the infirmary will cost 5,000*l*.

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THE Glasgow Archæological Society on Tuesday visited Linlithgow. The church of St. Michael was described by Mr. Honeyman, R.S.A., who has had charge of the restoration.

THE admission fees now paid for entrance to the historical apartments of Holyrood Palace are to be abolished after April 1 on the understanding that the magistrates and Council of Edinburgh will extend the present police assistance to the six days a week during the summer months free of expense, also that the hours of admission to the apartments will be from 10 A.M. to 5 P.M.

M. RODIN has finished the sketch model of a new monument of Victor Hugo, which he has been commissioned to erect in the Panthéon, Paris. The poet is represented as enveloped in flowing robes ascending his pedestal, while Iris, the messenger of the gods, floating over his head, points out the way, and sea nymphs wave their welcome. Another statue of Victor Hugo, by the same artist, was exhibited in the last Salon. He is now executing it in marble, and when finished it is to be placed on a low pedestal in the Luxembourg.

THE Blackpool Town Council, at the monthly meeting on the 7th inst., decided that the town clerk should seek, by an Improvement Bill to be introduced in Parliament next session, for compulsory powers for the acquisition of property running along Market Street, Upper West Euston Street and Lytham Street. This includes two hotels and a number of large business establishments, all of which are to be demolished in order to enlarge the market. The sum required to carry it out will be considerable.

IMPORTANT works are now in progress at Edinburgh Castle in connection with the erection of a new military hospital, for which a grant of 18,000*l.* was recently voted by Parliament. The site of the operations is at the north-west corner of the ground towards Princes Street and Castle Terrace. The new buildings will be treated in the Scottish style of architecture, and will occupy the place of the stores and magazine which formerly occupied this site. The interior arrangements will be of the most approved description for comfort and efficiency, in accordance with the best modern ideas, and the building, it is expected, will be ready for occupation within one year. The north block will be occupied solely by wards, while the south block will be occupied by doctors' and attendants' rooms, stores, &c. The whole of the sanitary fittings will be placed in conveniently situated specially constructed annexes. The kitchen apartments will be situated in a detached block con-

nected to the main buildings by a covered glass corridor. The contract for the whole work has been entrusted to Mr. Colin Macandrew, Lauriston Gardens.

COLLAPSE OF SCAFFOLDING.

ON Saturday, the 4th inst., the ceremony of laying the foundation-stone of the chancel arch column of the new Roman Catholic church at Shieldmuir, near Wishaw, was performed with the customary rites by Bishop Maguire. When finished the church will be a handsome and commodious structure, and will have seating accommodation for 1,000. The building is designed in the Early Decorated style, and will consist of chancel, nave, side chapels, aisles, baptistery, sacristies, confessionals, &c. The internal length is 125 feet, 58 feet in width, and the internal height 58 feet. Red sandstone is being used in the construction, and the estimated cost is 6,250*l.*, the designs being by Messrs. Pugin & Pugin. There was an attendance of nearly 2,000 in the building when the ceremony took place. Two large scaffoldings, accommodating fully 500 each, had been erected at each side of the building. The bishop conducted the usual service, invoking a blessing on the stone and putting it into position. The jar within the cavity of the stone contained current newspapers, directory of Scotland, manuscript history of the parish, giving population, description of boundaries, chapels, schools, together with the names of the bishop and other Church functionaries within the diocese. While the bishop was addressing the assemblage the proceedings were abruptly terminated by a somewhat alarming accident. Part of the north scaffolding, unable to bear the stress put upon it, suddenly gave way and about 150 people were precipitated to the ground, a depth of fully 15 feet. Almost a panic ensued, great terror and excitement prevailing among the large crowd of women and children present; but with commendable presence of mind the bishop and priests, assisted by several policemen, managed to maintain order. When the excitement had subsided it was found that the mishap had resulted less seriously than was at first feared, the supports of the scaffolding having broken the fall to a great extent. Fortunately no person was underneath the erection at the time it gave way. A large number, however, were badly bruised. The Wishaw ambulance waggon was sent for immediately after the accident, but as it was subsequently found that none of the injuries were very serious, the waggon was not required.

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The saving in time, labour and material by using this paint is enormous. A Builder, for instance, instead of using three or more coats of ordinary paint, coupled with a coat of varnish, and waiting a considerable time between each for it to dry, and paying labour for each, can with a much smaller quantity of "The Pittman Paint" accomplish all he needs. He can paint a house in the morning and it can be moved into in the afternoon with impunity. Moreover, the paint will not require renewal for a great length of time.

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NEW CATALOGUES.

THE catalogue of special sanitary and hydraulic apparatus and castings and other patent specialties of Messrs. Adams & Co., the sanitary engineers of London, York, &c., suggests the perfection which they have obtained in one of the most important classes of manufactures. They are able to say that the great bulk of sewer-flushing syphons used in England and abroad were produced by them. The apparatus represents applications of hydraulic science, and on that account the catalogue is worth study, and will be found invaluable in the offices of all engineers who are connected with sanitary works. Care is taken to keep the apparatus as simple as possible, and as the parts are liable to be roughly handled, provision is made to insure strength. This is especially seen in the penstocks and flap valves. One section of the catalogue is devoted to Adams' patent sewage lift, which has been adopted in several towns, and has realised all that was expected from it. The illustrations can be easily understood by those who are not possessed of technical knowledge, and the catalogue should be brought under the notice of sanitary committees and others who have assumed the responsibility of dealing with the sanitation of towns.

About a year ago we noticed a new drain-pipe devised by Mr. Plummer, architect, Newcastle-on-Tyne. The specialty consisted in the lower part having a smaller diameter than the upper part. This pipe is now manufactured by Oates & Green, Limited, of Halifax. They also possess many other patents of their own and of others. Among them are an automatic waste water-closet, the "Skroy" closet, the "Flekker" closet, the "Zafila" latrine, the automatic box latrine, various tipper boxes, ventilators, traps, valves, &c. They also manufacture glazed pattern bricks, with excellent and suitable ornament,

patent inlet bricks, and a whirlpool heater for large baths. The prices are exceptionally moderate, and would be impossible unless a very large sale was certain.

WORKMEN'S DWELLINGS IN LIMERICK.

AT the meeting of the Limerick Corporation held on the 2nd inst., the Mayor presiding, Bishop O'Dwyer attended in reference to the scheme for erecting workmen's dwellings in the old part of the city. The estimated cost he said was 10,000*l.*, and Mr. James Fitzgerald Bannatyne, D.L., would contribute 2,000*l.*, while the firm would give another 1,000*l.* Mr. Alex. W. Shaw, J.P., would give at least 1,000*l.*, and Lord Iveagh would subscribe 1,000*l.* on condition that the remaining 9,000*l.* were forthcoming. Bishop O'Dwyer had also obtained promises of support from Messrs. Denny, and he had no doubt that the entire capital would be forthcoming. The Local Government Board have sanctioned the scheme and obtained the necessary statutory powers from Parliament for the undertaking. After some conversation the city architect was directed to take the necessary steps for putting the scheme into operation by arranging for the compulsory purchase of sites and premises preparatory to the erection of the new buildings.

A NEW DEVELOPMENT IN THE STONE AND GRANITE TRADES.

IN confirmation of a paragraph inserted by us a month or two back, we now learn from a reliable source that the amalgamation of several important stone and granite quarries in the West of England has been completed, and the company has been duly registered as the Hard Stone Firms, Limited.

The capital is 100,000*l.* in 10*l.* shares, with no founders' shares, debentures, or preference shares. This combination may be regarded as a natural development of the Bath Stone Firms (though essentially distinct), whose business has been so successfully managed that in 1896 a dividend of 9½ per cent. was declared, their 10*l.* shares being quoted at 19½*l.* Five of the directors of that company will be on the board of the Hard Stone Firms, and Mr. John T. F. Turner is the secretary of both companies.

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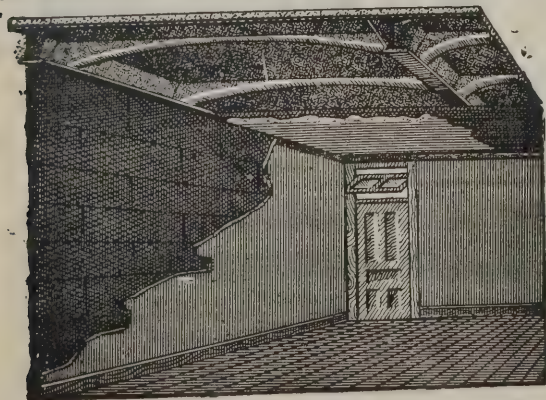
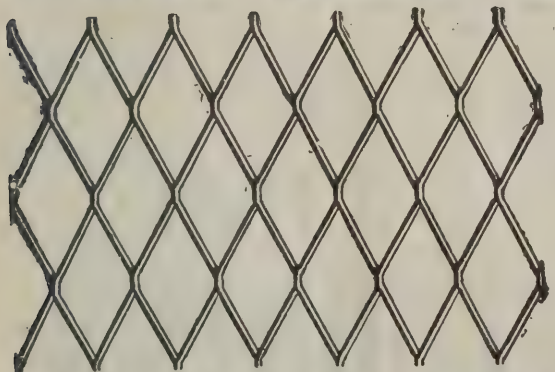
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Westminster and Cardiff, and Mr. John Wainwright, of Shepton Mallet, were requisitioned to report upon and to value all the properties, and Messrs. J. & A. W. Sully, of Queen Victoria Street, E.C., with Messrs. Ham, Dennehy & Butcher, of Bath (all chartered accountants), duly audited and certified the accounts.

We are not surprised to learn under the above circumstances that there was no necessity for appealing to the public to subscribe for shares, nor that the directors, through the ready response of the shareholders of the Bath Stone Firms and their own subscriptions, were able without delay to go to allotment, thus saving the heavy expenditure of newspaper advertising, diffuse circulation of prospectuses, &c.

The quarries now the property of the Hard Stone Firms, Limited, are as follows:—

The Pennant Quarries at Fishponds, Stapleford and Hallatrow, belonging to the Bristol Pennant Firms, Limited.

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The Street Quarries, situate at Street, near Glastonbury, belonging to Messrs. Clothier & Seymour.

The products of the foregoing quarries are admittedly of great value for engineering and architectural work, and the demand for them has for several years been largely in excess of the output.

In addition to the above-named works, the amalgamation includes the De Lank Granite Quarries, near Bodmin. These quarries produce the celebrated Cornish granite, of which the new Eddystone Lighthouse, the Tower Bridge and other large well-known engineering works have been constructed. It has been for many years used in the post offices and police stations, e.g. the General Post Office, St. Martin's-le-Grand (basements), and the new Scotland Yard (doorway).

The 200 horse-power developed from the river De Lank is available for polishing, turning and sawing machinery, and direct railway communication recently completed connects with the ports of Fowey and Wadebridge. These are undoubtedly economies which should facilitate trade.

Road kerbing and paving setts made from this granite are now gradually superseding Norwegian and other foreign rock, as De Lank is of equal if not greater durability; while instead of wearing smooth and slippery after a few months of vehicular and foot traffic, this granite wears rough, thus giving the important desideratum of improved foothold.

Borough engineers and surveyors, as well as elected members of corporations, and the public generally, will share with us the feeling of satisfaction that it will no longer be necessary to import from and pay to foreign countries for kerbing and setts which our own countrymen can produce at the De Lank quarries.

The directors of the Hard Stone Firms are all well known in the commercial world as experienced men of business, and there would appear to be an absence of the usual ornamental names on the board. Mr. Herbert Pictor is the chairman, as he was of the Bristol Pennant Firms, Limited; he and the following gentlemen are also directors of the Bath Stone Firms, Limited:—Messrs. Cripps, R.E., Giles, J. Sumsion and J. T. F. Turner. Mr. T. Kyffin Freeman, F.G.S., of the firm of Freeman & Freeman, 200 and 202 Phoenix Street, N.W., and Westminster, will be the director in London.

THE JEWISH SETTLEMENT IN ESSEX.

ACCORDING to the *Essex Herald* the Israelites are flocking in still greater numbers to buy land at Benfleet. About 450 attended the first sale held on the new Thundersley Manor estate, adjoining the Kent Hill and Thundersley Park estates, where the former sales were held. In spite of the heavy rain over 300 plots were sold, chiefly, but not entirely, to Jews, and the amount realised was 2,852*l*. No fewer than 300 applications to attend the sale had to be refused, because it was felt that it would be impossible to accommodate more than actually went. Probably, if train, tent and provisions had been adequate, there would have been from 1,000 to 2,000 Jews down for the sale, and most of them intending buyers.

It is proposed to hold sales on the estate every Wednesday up to the end of October, by which time over 3,000 plots of land will no doubt have been disposed of. So far the vendor's trouble has been to convince those wishing to attend the sales that it is impossible for him to accommodate more than 400 or 450 at any one sale.

It is evident that the Jews are going to turn Essex land to good account. Already preparations are being made for the building of houses and factories. A syndicate of Jews has bought a block of land of some 27 acres at the back of the estate to convert into brick and tile works and factories. There

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is quite a land mart in Jewry; the Israelites are buying and reselling at considerable profit to those who have come later "into the field," but the plots are not used as mere counters. Buyers have a keen appreciation of the advantages of one plot over another. And so far as the old inhabitant, the Essex labourer, is concerned, he is no sufferer—quite the contrary, for he is now getting from 3s. to 5s. a week more than he had before.

THE SANITARY CONGRESS.

THE sixteenth Congress of the Sanitary Institute is to be held at Leeds from the 14th to the 18th inst. A very large local committee has been formed, of which the Lord Mayor of Leeds (Sir James Kitson, M.P.) is the chairman, and the Town Hall, the Yorkshire College and other buildings have been placed at the disposal of the Congress for meetings. A considerable number of delegates, representing the War Office, county councils, county boroughs, urban district councils, sanitary authorities, rural district councils, port sanitary authorities, school boards, universities, societies and medical bodies, have been selected to attend. No effort has been spared at Leeds to secure that the gathering shall be successful, and the Institute in London has been at work for some time. The council, of which Sir Douglas Galton is chairman, has now almost completed the arrangements.

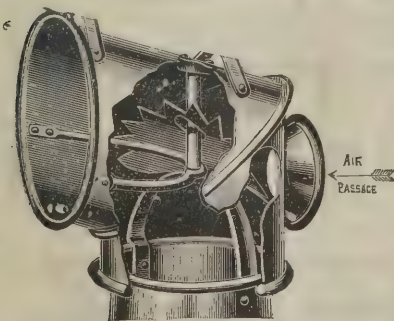
The president of the Congress is Dr. Robert Farquharson, M.P., who will deliver his inaugural address in the library of the Yorkshire College at three o'clock on Tuesday, September 14. The subject will be "Some Defects of Modern Civilisation, with Hints for the Improvement of the Human Race." An exhibition of sanitary appliances will be opened in the Camp Road buildings in the evening of the same day. The second day will be occupied with a series of conferences, six in number. In every case the president will deliver an address, and papers will follow. The conference on river pollution will be presided over by Major Lamorock Flower, sanitary engineer to the Lea Conservancy Board. Amongst his recommendations will be found one in favour of the creation of a central inspector of sources of water supply. Papers on the general question, and on the purification of trade effluents, are also to be read. The conference of municipal representatives will be presided over by Mr. Councillor B. Womersley, chairman of the Leeds sanitary committee, whose address will be local and

historical. Papers are promised dealing with the subjects of the Church and Sanitation, Working-Class Dwellings in Belfast, the Influence of Large Towns on the Sanitary Progress of neighbouring Small Towns and other matters. Medical officers of health also meet in conference under Dr. Edward Seaton, and there is a considerable list of papers referring to Small Isolation Hospitals, Poisoning by Tinned Foods and its Prevention, &c. Dr. Sykes (St. Pancras) will contribute a paper on Artisans' Dwellings as affected by Customs and Inland Revenue Acts; and the Assistant Professor of Public Health at University College, Mr. H. Kenwood, M.B., will detail some experiments showing that formic aldehyde vapours effectually disinfect rooms quickly and without affecting the colours and textures of fabrics. Mr. Thomas Hewson will preside over the conference of municipal and county engineers. Subjects for discussion comprise the Disadvantages and Dangers of Combined Drainage, Sanitary Aspects of Wood Pavement, Storm Water Drainage, &c. The sanitary inspectors will meet under Mr. Peter Fyfe, chief sanitary inspector of Glasgow, at the School Board offices. The ladies' conference on domestic hygiene will meet in the Methodist New Connexion hall. The day's work will be followed by a conversazione and reception by the Lord Mayor in the Art Gallery in the evening.

The three sections will begin their work on the Thursday and continue it on the Friday. Mr. Pridgin Teale will preside over and address the section on Sanitary Science and Preventive Medicine. The subjects for papers comprise:—Sanitation in Relation to Food Supply, Infant Mortality, Hygiene in Elementary Schools, Sewage in Estuaries, and the Amendments and Administration of the Vaccination Acts. Section II. deals with Engineering and Architecture. Its proceedings will be opened with an address from its president, Mr. Lewis Angell. The topics of the papers will include Sewage Filtration, Disposal and Purification, Fever Hospitals, Baths and Washhouses. Section III.—Chemistry, Meteorology and Geology—has for its president Mr. W. Whitaker, who is to offer suggestions about federation for water-supply. On Thursday the lecture to the Congress in the Albert Hall will be given by Mr. H. Percy Boulnois, city engineer of Liverpool, on Some Sanitary Advances in Municipal Engineering. The Congress will conclude with a lecture by Mr. Philip Boobbyer, medical officer of health, Nottingham, on the Essentials of Popular Hygiene. The Sanitary Exhibition will remain open until October 9.

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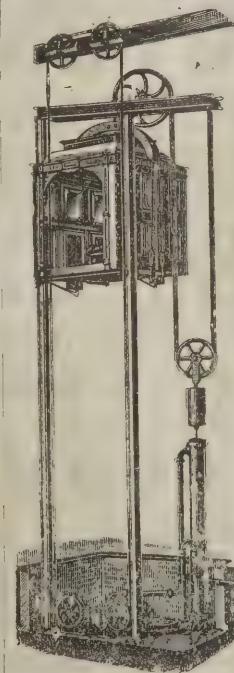
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ALHAMBRA, BLACKPOOL.

THERE is no holding Blackpool back, says a correspondent of the *Leeds Mercury*. She goes cheerfully and easily, from one large enterprise to another. Indeed she is quite equal to having two or three great schemes on hand at once. Her purse is apparently as elastic as her ambition is high. This queen of western health resorts deals airily in hundreds of thousands of pounds sterling, the while her less fortunate or more calculating sisters boggle over sums that are tiny by comparison. Yet Blackpool is not satisfied; while the enlightened and public-spirited municipality are hard at work on improved drainage schemes that will tend to make the place healthier than ever—if such a thing be possible—and are making vast improvements on the foreshore by the building of a substantial sea-wall at a cost of something like 100,000*l.*, to say nothing of contemplating a widening of the existing promenade at an expenditure that would simply appal a more conservative and slower-going community, private enterprise is stalking along at a pace quite as breathless. It was announced yesterday that a start is to be made at once with the erection of the Alhambra that is to rise on the site of the existing Prince of Wales's Theatre. The architects of this new venture are Messrs. Wylson & Long, of King William Street, London, and by their courtesy we are in a position to furnish some details which will serve to show the character of the scheme, the carrying out of which will involve an outlay of considerably over 100,000*l.* Indeed, the contracts just let exceed that sum. Messrs. Wylson & Long are no mere experimenters in this class of work. They have gained a well-deserved reputation for theatrical architecture, and their connection with the affair is an ample guarantee that everything will be carried out on first-class lines. This firm were responsible for the Oxford Music Hall in London, for the Empire at Bristol, which ranks as the finest building of its kind in the West of England, for a theatre at Bath, and they now have on hand two handsome music-halls in South London. Nor are they strangers to Blackpool, for the recent extensions at the Pavilion were made in accordance with plans they prepared.

The design of the Alhambra is exceedingly rich, and it is to be executed in the most generous fashion. The company are going to allow no cheeseparing; everything is to be of the best. The elevation to the Promenade will be very striking, and will unquestionably prove a notable addition to the architectural features of Blackpool, and if one may be forgiven for saying so, even Blackpool can afford to make room for a few more

good ones. The architects have adopted the Renaissance style—there is nothing but Renaissance nowadays—and treated somewhat freely. The result is admirable. The façade is well “broken,” and contains not the least suspicion of dullness or of the commonplace, while stone is to be employed, and this will be relieved by marble pillars supporting arches that are to cover a spacious balcony. The main entrance will, of course, be in front. This leads to a fine hall, in which the booking offices will be situated. To the left will be a splendid circus, and above it a palatial dancing-hall; on the right a gorgeous variety theatre. To these add an arcade and five shops, and the scheme is complete.

The circus is, perhaps, the most important part of the building. It will be seated to accommodate at least 2,000 people, whose every comfort and convenience will be studied to the utmost. There will be two entrances—one from the Promenade and the other from Bank Hey Street. The ring is to measure 60 feet by 40 feet, and arrangements are to be made whereby a portion of this area can be transformed at will into a bath, in which swimming entertainments can be given. The stabling for the horses will be situated under the tiers of seats. The dancing-hall overhead has been more or less an afterthought, but Messrs. Wylson & Long have succeeded in adding it without in any way destroying the symmetry of their original plans. This hall will extend from front to back of the building, and, if experience goes for anything, is bound to prove attractive to Blackpool's fleeting population, and mayhap to that portion of it which is residential. The variety theatre on the opposite side of the building will be replete with all that is modern. Without being gaudy, the decorations will be elaborate; in fact, it promises to be one of the best halls in the country. Doubtless the management will take very good care that the performance is worthy the surroundings. With regard to the exterior, it may be added that the intention is to place handsome balconies on the first and second floors running the whole length of the building, the one 7 feet and the other 5 feet wide, so that those who attend the “shows” may come out occasionally and obtain a whiff of fresh sea air. The capital of the company who are erecting the Alhambra is 220,000*l.* The tender of Messrs. Whitehead, of Blackpool, has been accepted for the erection of the general building work, furnishing and decorations at a cost of 76,200*l.*, and that of Mr. Samuel Butler, of Leeds, for the constructional ironwork at a cost of 12,788*l.* Messrs. Shoolbred's tender for the seating is 6,500*l.*

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LABOURERS' COTTAGES.

In a communication to the *Land Magazine* on this subject, Mr. Bolton King says:—There is no question that concerns the agricultural labourer more than the provision of good cottages. There has probably been a levelling-up of their standard almost everywhere of late years; sanitary authorities have been more active, and the depopulation of the villages has allowed the worst cottages to tumble down. But now that the depopulation is checked—at least in some districts—the supply is often unequal to the demand, and there is a large number of indifferent cottages past repair, which sanitary authorities are slow to condemn, because their destruction would drive their inmates away or cause overcrowding in the remaining houses. Thus there is a serious need of more cottages in many villages, not only to replace cottages that ought to be pulled down, but to supply a present scarcity. But it is well at the outset to face the difficulties, and social enthusiasts are too often ready to assume that local authorities only want permissory powers to rush into cottage-building. It is disagreeable, no doubt, to be told that it is impossible to build well-constructed five-roomed cottages to pay 3 per cent., but such is unfortunately the case. I have had myself considerable experience in building labourers' cottages, and I believe the figures I give are below rather than in excess of the average cost. Every cottage should, in the interest of health and decency, have two rooms downstairs and three bedrooms however small upstairs. The outer walls should be $13\frac{1}{2}$ inches thick, and, unless the bedrooms are to be intolerably hot in summer, the roof should be tiled and not slated. There must be a small pantry indoors, and closet, pigstye and hovel out of doors. There should be a quarter acre of garden ground, in the interest of the landlord no less than the tenant, for the cottagers will pay additional rent for it much in excess of the agricultural value of the land. For this reason it is undesirable to build cottages in rows. Now the plainest pair of cottages on these lines costs 300*l.* (I have myself never built for less than 305*l.*) Their outbuildings, constructed of rough planking and corrugated iron roofs, cost about 50*l.* The value of half-acre of land, which must necessarily be frontage land, cannot be put at less than 15*l.*, and would often be more. Then there is the cost of paths, sometimes of roads, of water-supply and of drainage. The expenses of these will vary very considerably. In my own case roads and paths cost in rough figures 13*l.*, water 10*l.*, drainage 11*l.* per pair of cottages.

The total cost of a pair of cottages will, therefore, be:—

Cottages 300*l.*, outbuildings 50*l.*, land 15*l.*, roads, water, drainage (say) 35*l.*; total 400*l.*

Now for the return. I charge 6*l.* per cottage. In most agricultural districts this is the maximum cottage rent. My rates average 2*s.* 8*d.* in the pound, insurance 4*s.* 2*d.* per pair of cottages, and repairs average one guinea per cottage.

The income, therefore, from a pair of cottages is:—Rent, 12*l.*; less rates 1*l.* 12*s.*, insurance 4*s.* 2*d.*, repairs 2*l.* 2*s.*—total, 3*l.* 18*s.* 2*d.*, leaving a net rental of 8*l.* 1*s.* 10*d.*

This makes the net return for outlay 2*o*2 per cent. I do not believe that it will be found possible to reduce the cost much below the figures given above, and I believe it is the universal experience of persons building healthy well-constructed cottages that they will not pay 3 per cent. If therefore such cottages are to be built in villages, one of two things must happen. Either the cost of building must be materially reduced, and this can be done only by finding a cheaper building material. I am no expert to pronounce on the possibility of this; but some public-spirited individual or body might do worse than offer a substantial prize to any person who could discover the desiderated material. Or we must face the fact that cottages have to be built at a loss, and recognise that it is to the public interest to provide decent homes for the people, even if it means an additional burden to the rates. I think it is impracticable to wait till labourers can afford to pay a higher rent. In the present condition of agriculture any rise of wages is more than problematical, and I think that those who know village life will agree that it will be long before the labourer is able or willing to pay more than 6*l.* for his cottage. I speak, of course, for the Midlands and South. Circumstances are different in the North, where wages are higher and work more regular.

THE RESTORATION OF ANCIENT CHURCHES.

THE following suggestions by an amateur appear in the *Church Times*—

So much irreparable mischief has formerly been done to our churches under the guise of restoration that no apology is needed for an earnest endeavour to put clergymen and churchwardens on their guard in this matter. In so doing I have no intention of making libellous statements or insinuations, but am content to let bygones be bygones and counsel precautions in the future.

Doubtless church restoration is usually entered into on the part of the clergy and churchwardens with the very best of inten-

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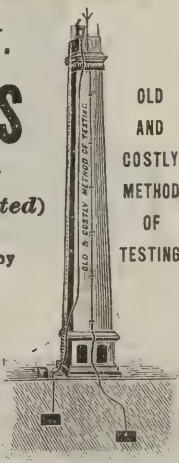
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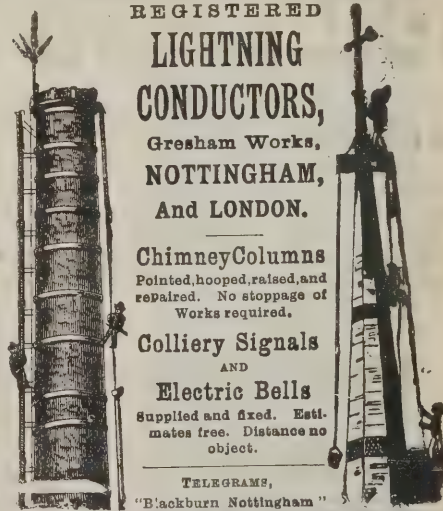
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tions and with much honesty of purpose. But honesty of purpose is one thing, and a practical knowledge of the principles of church restoration is another. The custodians of our churches should make themselves acquainted with the various styles of church architecture, so as to be ready for the combat which may be necessary in order to prevent vandalism or the introduction of new uncharacteristic work into our churches.

A difficulty may arise in that the particular church in hand presents varying styles of architecture at different points—one part is Early English, another is Perpendicular and so on. Very well. If it is original work the probability is that although the styles vary the general character as to extent of ornamentation, elaboration or plainness is preserved, so that the general effect not only does not suffer, but the variation of style reveals to the initiated many points of interest. Restore and copy what you find is original work, and throw new designs for alterations to the winds.

Generally speaking, as little new work as possible should be introduced, true restoration consisting of simply repairing and renewing only those portions which are decayed or unsafe, faithfully copying the better preserved portions of the original work. It very rarely, indeed, happens that all traces of the original mouldings, stringings, tracery, &c., have disappeared, but if they have, copies can be obtained from a church of similar style elsewhere, and the nearer such an one can be found the better. It is a great mistake to design new work for old churches (unless extreme care is taken), for even if the style is correct for the period, you may find out too late that the elaborate tracery of a new window in your plain church painfully attracts the attention, to the equally painful detraction of the original work. Such a window, however good it may be in itself, looks, as it is indeed, entirely out of place.

Anything new which is likely to absorb attention to the detraction or exclusion of other portions must be utterly condemned. It will not blend. What is required is honest restoration, not alteration. Beware of going in for what is termed a "general restoration," that is, handing over the venerable structure to either architect, builder, or contractor, and letting him do the lot in one job; resulting in a spick and span, brand new, cheap and nasty modern revolution in tiled work, bricklayer's pointing, flimsy joinery, &c., with all the latest improvements; utterly unrecognisable as part and parcel of the grand old church. Better by far to personally super-

intend the village carpenter and mason in simply copying and repairing, especially as high finish and servile accuracy are not required in a plain church, but only good wrought work as it leaves the tool; no filing, rasping, sandpapering, or polishing up. Take my advice and restore your church by degrees—in detail—and not by wholesale jostling of arts in disorder and confusion.

A good plan is to employ a competent church architect, and let him prepare a complete scheme or specification of restoration, and plans and details of any new works which may be considered to be necessary to its ultimate completion as a whole, and divide the work into various portions, with an approximate estimate of the cost of each section. These papers, if satisfactory, can be kept for reference and use when required.

Attend to one thing at a time and devote your constant personal supervision to the work; do it thoroughly well, employing good individual artisans to individual trades, and use only the very best of materials.

Don't be in a hurry, and if you have to build up new work against old work, do it a little bit at a time, and rest it to set and settle, or build it in cement and well washed road sand in equal parts. Remember that cement swells in setting, and is therefore better for underpinning, walls, &c., than mortar, which shrinks in setting. But good mortar is not to be despised for ordinary use. New masonry and rubble-work cannot be done too slowly, nor grouted too frequently whilst the work is in progress. The surface of the old work should be well hand-picked and roughed to a new face to form a clean key, and thoroughly well wetted to secure adhesion. Eschew all such iniquities as iron corrosive ties to masonry, especially secret ones; and let everything you do be honest and fair and above board. Do not, on any account, attempt concealment, or, worse still, deception; let everything show and be left to look what it is, and the result will be satisfactory. I remember a case in point which will well illustrate my meaning. A builder once suggested painting a piece of lead flashing to match the colour of the tiles on the roof. The architect replied, "Oh, no! anyone who understands the work will know that the flashing is necessary, and expect to find lead there."

Architects should not be recompensed by the acreage of their plans, drawings and specifications, or by commission on the amount of the cost of the work, but for the skill they display

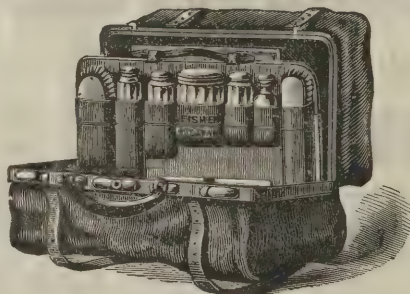
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Any estimate which may be prepared should never be slavishly adhered to.

Competition contract is fatal to good work, and stands self-condemned, as it is only to be expected that the acceptance of the lowest tender risks the satisfactory completion of the work, there being great scope and temptation in such material as concrete and hidden work to save expense to the contractor. The labourer is worthy of his hire; therefore do not tempt honesty to stumble by a dishonest attempt to obtain the best of the bargain.

Architects sometimes have fads; one rejoices in tracery, another introduces ironwork, another goes in for a particular kind of stone (instead, perhaps, of using the local material of which the church is built), and so on, and do not consider that the work is satisfactory until one or other has been introduced. This feeling must, if necessary, be sunk in favour of true restoration.

Never attempt the impossible task of improving upon the original, nor humiliate the dignity of humble work by endeavouring to make it tell a lie.

English oak is the standard wood for our church work, but foreign is much used, being milder and easier to work. Chestnut was formerly frequently used, but it fails and decays at the knots. Quarry stone should be of similar kind to the original, if that is suitable and procurable.

The most important matter in a church is the state of the foundations of the walls, piers and columns. Years ago graves and vaults used to be dug (inside as well as outside) sometimes quite close to the walls. In such a case it is necessary to underpin the walls—in short lengths at a time—and carry the foundations down in good cement concrete to a solid bottom below the depth of the graves or vaults. Also to lay the surface of the ground outside the walls to a fair fall outwards, providing suitable lead (not cast-iron) rain-water down pipes and drainage to a distance. If possible, lay the highest part of the fall (next the walls) well below the floor line, and provide ventilation beneath any hollow floors.

After the foundations have been seen to, look well round the walls, from a constructive point of view, and see if you can detect any weakness or want of stability. The line of columns and main piers should run from the foundations to the principals of the roof without a break in order to carry the weight straight down, and only intermediate weight should be borne by the arches, which, in their turn, should be well secured against thrust at the springing points by massive masonry, rubble-work or buttresses. Sometimes arches have been thoughtlessly formed by cutting through solid work at a vital point, involving great insecurity to the building. Well examine the buttresses and see if they are properly bonded by the quoins. The set-offs and weatherings of buttresses frequently give out, and should be set right by good large bonding stones beneath the stringing.

These remarks will also apply to the tower, and if there exists any excrescence in the shape of a Georgian spire, use your influence to have it taken off.

The general appearance of the building should be one of massiveness (in preference to lightness) of construction. Many old churches are built considerably out of truth as to orientation, plan and elevation. Do not attempt to conceal such apparent errors, as they were probably intentional. The orientation of a church is determined by pointing to the rising of the sun on the morning of the day of its patron saint, which, varying considerably according to time of year, accounts for apparent error, and in many churches the chancel is symbolically deflected.

Do not try to point up flint or rubble-work with the trowel, bricklayer fashion, but after filling up the joints flush with the flints, finish by drawing round the flints a short wooden lath. Well wet all old rubble-work and masonry in adding new work or pointing, or the new work will not adhere. It is a good plan (especially if funds are low) to leave stone carving of corbels, &c., to be finished *in situ* later on. Any plastering should be rendered in gauged stuff, and be floated, not trowelled, well wetting the walls as before mentioned.

In even rude flint or rubble-work courses should be maintained, and new work should, as far as possible, be carried up *en masse*, and not be left down in places for future completion of the mass of stonework. In very thick work it was a common practice to carry up the outer faces of the flintwork a certain distance and shoot in the middle portion; but this is inadvisable, as the process of shooting in is apt to bulge the outer faces, as, in order to secure adhesion, it must be done whilst the faces are yet in a green state; if they are allowed to set before shooting in there is no proper amalgamation or cohesion; likewise, good bonding of such work is impossible.

All quarry stonework must be laid on its proper bed, and care must be taken to provide suitable kinds of stone to stand weather and weight.

The roofs next claim attention. Look at these first from a constructive point of view, as in the cases before mentioned, and ascertain if they are the original or bastard ones, and act

accordingly. In the matter of lead gutters it is not sufficient that good laps and falls should be given, but insist also upon having good, deep drips, or the gutters will fill with frozen snow, and when it begins to melt the water will run back over the laps and get in. Have plenty of outlets of good dimensions, and do not let the plumber lay the roof lead in sheets of too large a size, or the expansion and contraction will cause the lead to crack. Provide that the water does not discharge or splash on other roofs, but carry it down as before mentioned. Have good flashings where required, and get rid of the roof water in the shortest available distance, as long falls are usually slight falls, and are undesirable from many points of view. It is not sufficient to simply provide a fair water-way, but a good margin must be allowed for blockage. Avoid square elbows in down pipes, awkward turns in gutter work and lodgments for snow. Let common sense dictate. The upper edges of flashings and gutters should be properly protected against the possibility of becoming loose, either by stepping into the walls, or by being covered by a narrower supplementary flashing built or let into the wall and folded over.

The capitals of columns and the tracery of windows were formerly often worked in a soft kind of stone called clunch, but in restoration a much better material is desirable.

The tracery and lights of old windows are seldom exactly true; therefore in ordering new lead lights it is best to cut a paper pattern or tinplate to fit in full size, marking the inside and outside, and the order and number of the lights. Send also a rough sketch of the window—the maker to allow for the grooves in the stonework.

The seats and fittings of a church should be of a substantial and suitable character, and the former should not, as is too often the case, be made up of joiner's work and finished with a length of moulding stuck on the top and elbow. It is a pity that poppy-head bench ends do not receive more attention.

Intersections of mouldings in church woodwork should never be mitred, but may be scribed; or, in restoring old work, the joints should be of the square and butt kind, and the moulding worked on the solid endwise of the grain to complete the intersection.

Doors should be hung with long smith-wrought clasp eyes and hooks, and not with butt joints and sham clasps of cast-iron screwed on, which are worse than useless. The doors should be well braced to prevent drooping, and all outer upper edges of rails should be well bevelled to shoot rain. Remains of old carvings or screen work should be carefully preserved and restored (renewing only defective portions), even if the cost is greater than that of entire new work. Every detail of fittings and new work must be carefully considered as to proportion and style. Provide ventilation in lead lights, and see that a small channel communicating by pin-holes with the external window-sills is made at the bottom of each light, to allow condensed water to escape without steaming down the inside sills and walls.

Do not disfigure the church by tiers of hot-water pipes, and see that lamps or gas-fittings are fixed so as not to do injury by heat, nor must mouldings or ornaments be cut away for them.

Ancient internal tombs, monuments and brasses should be carefully preserved from injury by railing them in, whilst for the more modern floor slabs—if liable to defacement by traffic—permission should be sought to enable them to be removed and placed elsewhere or on the walls, or, if too large, the inscriptions to be copied on a tablet. Internal vaults should be examined and dealt with to render them safe, and if possible the contents should be removed or embedded in solid concrete.

Bells exercise so great a strain on a tower as to call for serious consideration. The lower they are placed the better for the tower, as long as they are not steeple-bound. They should be made to swing in counteracting positions to each other, and the walls should not be cut away for the bells to swing, nor should the upper part of the bell-frame touch or be wedged against the walls. Illuminated clock faces require large weakening holes to be cut through the walls, which are apt to endanger the safety of the tower, in which case they should not be allowed to be made.

A great difficulty in old churches is where to put the organ. On no account put it into an organ chamber, which, besides entailing great expense, ruins the tone of the instrument; see also that the case is in keeping with the character of the building, and not of the nature of a huge cupboard—a miracle of ugliness—which impairs and retards the tone of the instrument. The less case the better.

If at any time a defect or settlement should appear, attend to it without delay, and keep your eye on the gutters, down pipes and discharge of water.

It is hoped that these few hints may help the reader to avoid some of the greater pitfalls of modern church restoration, and enable him to assist in the preservation of what is left of the good old work by arresting the hand of the destroyer and mutilator, so that our churches may be handed down to posterity as creditably as it is possible now to do.

LIVERPOOL ELECTRIC TRAMWAYS.

At a special meeting of the Liverpool Corporation Tramways committee, just held, a communication was read from Mr. Pearson, the electrical engineer of New York, intimating that his numerous contracts precluded him from accepting any position under the Corporation, even in a consultative capacity. It was therefore unanimously agreed, after considerable discussion, that the chairman and deputy chairman be authorised to approach Dr. John Hopkinson, electrical engineer, of Manchester and London, with the view of arranging with him to undertake the designing and all the work connected with the construction of the experimental electric tramway line on the Dingle and Prince's Park routes. Dr. Hopkinson has had a wide electrical experience, one-half of the electrical haulage systems in the kingdom having been laid down under his supervision.

THE NATIONAL HARBOUR AT DOVER.

THE selected list of contractors who will tender for the construction of the national harbour at Dover have received an intimation that the plans and specifications of the works are ready. According to them the tenders should be in the hands of the Government authorities in a few weeks from the present time. The work at the eastern and western ends of the harbour will be proceeded with simultaneously so as to expedite the construction. The lengthening of the Admiralty pier seaward, which will form the western arm, is to be proceeded with at once, as it is necessary for the protection of the enlarged continental and commercial harbour which is being constructed by the Harbour Board. Before the eastern arm can be commenced a considerable area of the foreshore under the cliffs is to be reclaimed.

ARTISTIC STEEL WORK.

FROM a very early period of the world's history the production of ironwork in artistic and attractive forms has been a staple and most important industry. Tubal Cain, who, according to an old poem, was "a man of might in the days when earth was young," is supposed to have been one of the earliest artificers in iron, though, as the poem already quoted says, he appears to have chiefly "fashioned the spear and shield," each of which articles, though intended for use in war, yet afforded opportunities for elaborate and artistic ornamentation.

The spear and shield are, however, no longer in the category of lethal weapons, and instead the modern worker in iron devotes his skill to the production of ornamental ironwork for more peaceful purposes, though even in this direction important changes have taken place. Time was when ornamental ironwork was produced by manual skill, as witness the Mediæval smiths' motto, "By hammer and hand all arts do stand." In this, however, as in many another handicraft, delicate and perfected machinery bids fair to replace manual skill.

A very striking instance of this is to be found at the Victorian Exhibition, which is now being held at the Crystal Palace, or, to speak more correctly, at the stand thereat which is occupied by the exhibits of Messrs. H. & F. Bönten, of 8 Elder Street, Bishopsgate. Here may be seen ornamental ironwork in many forms and designs, and applied to many different purposes. But before mentioning—it would be quite impossible to detail—these purposes, it will be well to point out what this new ironwork is.

It is, then, wrought-iron rolled into more than two thousand different sections (or patterns), which can be utilised in a great variety of ways and applied to almost any purpose, whether constructional or ornamental, and whether for interior or exterior work. Some of the special merits of this new ironwork are lightness, indestructibility, cheapness and beauty. Besides these, however—though they are merits of no inconsiderable value—the wondrous adaptability of the new product is almost phenomenal. For instance, a section—which is of course rolled flat or in form of a moulding—can be twisted into a spiral column, and with the best result as regards strength and elegance.

Or two or more sections can be twisted together, when, as they would be of different patterns and might be of different metals, the effect would be very striking and effective. No welding is required when this intertwining is effected, as the sections grip of themselves. Thus spiral columns, large or small, can easily be made, and that either solid or hollow. A pillar to carry a gaspipe or electric lead, and a pendant for a gaselier, a covering for a water-pipe—these and many other hollow cylinders can easily be produced.

Solid work, too, is quite as readily made. From a simple banister to a heavy warehouse column anything and in numberless designs and combinations can be produced. Nor is this all. Girders, joists and other constructional work, whether for building or engineering, can be produced by this new ironwork, and thus any such work which by force of necessity or for convenience is left exposed may be made elegant and attractive.

For flat work the sections are equally adapted and in equally surprising variety. At the exhibit there is a splendid doorway made in three sections, of different but harmonious designs, the whole having a very fine effect. One advantage of Messrs. Bönten's system when applied in this way is that no masonry is necessary. There is also at the Palace a model of a shop-front all in this art ironwork. Front, fascia, door, window fanlight, all complete and perfect. The introduction of glass offers no difficulty, for the channels can be made to take glass of any thickness, and thus verandahs, shop-fronts, windows and glazed work of every description can be made elegant and artistic. Indeed, for shop-fronts this iron is specially suitable, as the sections are made with roller-blind channels attached, while the frame for the glass is also ornamental, and thus is produced a wrought-iron window which is at once handsome and inexpensive.

Another important merit of this ironwork is the fact that art metal-work would be a more appropriate title, as it can be made in iron, copper, brass, gun-metal, or aluminium, while, of course, any combination of these could be effected, and that whether twisted or in the flat. Thus, a small section in brass could be run in the hollow of a larger one in iron, while ornamental studs could be introduced with the best results.

But there is really no apparent limit to the kaleidoscopic forms in which the metals could be produced or to the purposes for which it could be used. At the Palace are several instances of this, for the exhibits include the large door frame already mentioned, two handsome frames for gates, an artistic staircase with ornamental spandrels, door knockers and pulls, stair treads, hollow cylinders for covering pipes; all these and many others down to a simple umbrella-stand, and a beautiful fire-screen, the panels of which are of coloured spar.

Altogether the exhibit of Messrs. Bönten is one of the most interesting and valuable which has ever been submitted to the notice of builders, engineers, and especially of architects. Those of our readers who may wish to inspect it should take an early opportunity, as the exhibition will close in October.

CHAT MOSS.

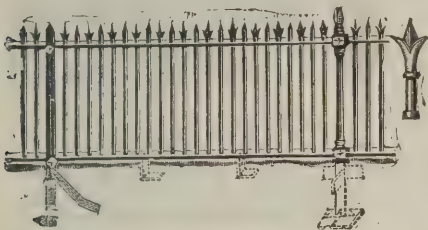
CHAT MOSS, through the engineering work of George Stephenson, is known everywhere, but it will in the future, says the *Manchester Guardian*, be of more particular interest to Manchester as part of the estate which considerations of health have caused the City Council to secure for the citizens. Chat Moss is a great property, for it extends over 2,600 acres. Those figures may convey little meaning to some people, who will, perhaps, form a better idea of the size of the Moss from the statement that it is $3\frac{1}{2}$ miles long by $2\frac{1}{4}$ miles broad. Or, as Alexandra Park measures 60 acres, the city is, at Chat Moss, in possession of a tract of land forty times bigger than its biggest place of recreation. The Moss is about 7 miles from Manchester, its easterly boundary being $5\frac{1}{2}$ miles from the Exchange. It was bought by the City Council in August, 1895. The purchase money, with the legal expenses, amounted to 139,350*l.* 8*s.* 8*d.* But as almost the whole of the estate was then held by leaseholders on ninety years' leases, which did not expire until February of this year, the City Council, by its health committee, can only be said to have had actual possession of the Moss for six months. It should not be concluded that Manchester has taken over such a great sweep of morass and wild bog as is described by Harrison Ainsworth in his account of the fugitive flight across the Moss. The original leaseholders of ninety years ago were men of energy. They drained and cultivated the greater portion of the bog land and intersected it with roads. No fewer than 1,900 acres of the Moss are already under cultivation. Four hundred acres of the estate are really outside the borders of the Moss, and these have long been in agricultural use. Thus there are only 200 acres of wild moss remaining in their natural condition, and even these have been drained in places. A good part of them has been planted with trees and made into an excellent cover. Any stray fox might do worse than light on this piece of well-trenched wild land, where he would find a sufficiently mysterious "earth," and, what is of more moment, a plentifully stocked pheasantry.

The estate has been bought for Manchester from sheer necessity. Many thousands of tons of garbage and nightsoil are collected annually that must, from their very character, be disposed of rapidly, cleanly and economically. A large proportion is treated at the Holt Town works, in the north of the city, but there dwellings have been and are being erected rapidly. They are closing round the works, and the cleansing committee some time ago decided that they must look for accommodation elsewhere. Carrington Moss, which, as explained the other day, has been developed by the committee into a fine agricultural property, was made productive almost wholly by the use of this collected refuse, of which, according to a return prepared in 1893, more than 315,000 tons have altogether to be dealt with every year. A proportion of about 20 tons per acre will be still sent annually to Carrington, which contains 1,100 acres. The receptive capacity of mossland in its natural state

is, for some years, practically unlimited, but when brought under cultivation the land must, of course, be treated with some respect for scientific farming. The condition of Chat Moss at present is such that no doubt it will for several years have a receptive capacity for nightsoil of 30 tons per acre annually. On the smaller holdings, which produce immense quantities of vegetable produce of all kinds, the farmers are awaiting the development of the estate by the city authorities. They have now to haul their manure by a slow and expensive process of cartage from one of the nearer railway stations, or along the ten miles of road from the Corporation dépôt at Water Street to their farms. Green vegetables especially cannot be produced as they should be on this land without abundant manure. The root crops need it also. The City Council or the cleansing committee have these immense daily stores of a commodity highly necessary to productive vegetable farming. The farmers absolutely require it, and by the purchase of Chat Moss, together with Carrington, the committee, of which Mr. Richards is the responsible head, appear to have overcome a not inconsiderable difficulty in an effective and economical manner.

Next to the problem of the purchase of the land itself now disposed of must be placed the provision of a means of distribution of removable soil. It scarcely need be written that the carriage of heavy and cumbrous matter of the kind requires careful consideration. As regards conveniences for cheap approach, the situation of Chat Moss is admirable. Its south-eastern boundary reaches close down to the Ship Canal. A little above the Barton Bridge, on the Chat Moss side of the canal, a considerable length of the old river bed, from which, when the canal was made, the Irwell was diverted, has been left open and disused, except as a gathering ground for the surface water from the land near. This old river bed is only divided by the canal bank from the canal itself. On the northern or Moss side of the disused bed the committee have erected a lay-by, or wharf, about 100 yards long. The work has been done in stone, with a good foundation, and when cranes or other hoists have been provided the city will own a serviceable wharf, scarcely more than 100 yards from the Manchester and Liverpool high road. This will be the receiving dépôt for Chat Moss. Water will reach the wharf by the simple expedient of a cutting through the canal bank, and the height of the water at the wharf side will therefore be exactly of the height in the canal. The end of the old bed of the river, of course, will be dammed, and the wharf will actually lie in a dock formed of a portion of the

old bed. This wharf is 7 miles distant from the Corporation yard in Water Street, which also lies alongside the river, and from which the soil will be sent down to the wharf by barge or steamer as is now done at Carrington. The manurial matter having been thus conveyed to the fringe of the Moss, the only remaining question is one of its efficient distribution to the farms. For that purpose a light railway will be constructed under the supervision of the committee. It has been found impossible to obtain the consent of the local authority to a level crossing. A tunnel will be carried under the high road to Liverpool, and the line of the light railway laid thence to the Moss, with junctions from which sections of the line will run to different quarters. These lines will, in fact, be laid in all directions to the length of, perhaps, 20 miles, in order that the branch services of soil may be available for the use of every farmer. The roads which had already been laid, or partially laid, by the leaseholders will be put into sound condition, a work, indeed, with which some progress has been made already. One of these roughly formed roads traverses the Moss from east to west, and it is of good width. It will serve presently as the principal way through the whole estate, by which the farmers will reach the high road with carts containing produce for the city market. All the details of this interesting scheme, under which the Corporation will provide a self-contained light railway system for the whole estate on a principle that has yet only been suggested elsewhere, have been worked out by the sub-committee in whose special charge the Moss has been placed, at the head of which is Mr. Alderman Grantham. Mr. Grantham has spent much time and care on the matter. The financial aspect of the question—as well as the material advantages which will be gained by the city—has been kept in mind. The old leases having in some instances been sold, or bargained away in one or another form, the committee have found it necessary to consider the conditions of each tenancy—there are over fifty tenants—and readjust the rents. They have been partly guided in their decisions by the rates and conditions on other similar property near, and have excellent service done them in this matter and in the general disposition of plans for the improvement of the land and buildings by Mr. R. D. Callison, the head of this department of the Corporation service. The rents, as adjusted, are slightly lower than under the old tenancies. They may be put, roughly, at 2*l.* per acre per annum. The whole amount required for wharves, roads, railways, homesteads, repairs and rolling stock has been estimated by Mr. Callison at 55,000*l.*



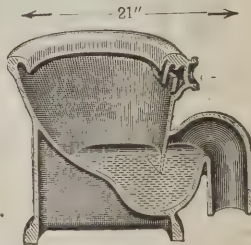
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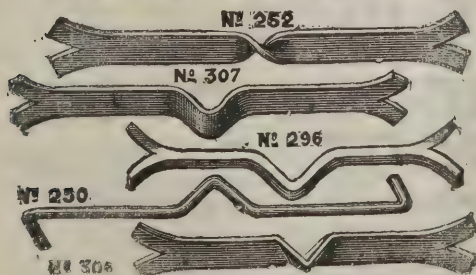
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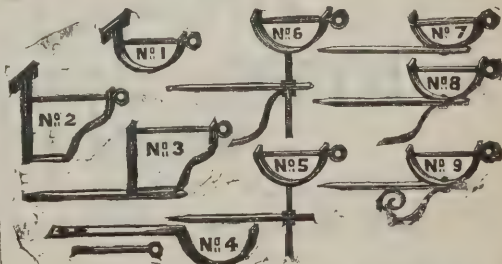
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The entire outlay on the 2,600 acres of land will, therefore, scarcely reach 200,000*l.* The Corporation were empowered by the Local Government Board to purchase the estate on terms which would extend the repayment of the money borrowed, principal and interest, over fifty years, and the purchase-money was obtained at 2½ per cent. The cost for a year of the interest and proportion of capital repayable on both the purchase-money and the money to be raised for wharves, roads, railways and other matters is estimated as 5,960*l.* The annual income from the receivable rents is 4,772*l.* 3*s.* 2*d.*, showing a deficit on the amount estimated as necessary for the repayments of 1,187*l.* 16*s.* 10*d.* By this estimate, however, no account is taken of the income from the sale of soil or manure, which will be available for use, practically at the side of the field gates, at about 1*s.* 3*d.* per ton. The cost of sending the manure to, and distributing it on, the estate will be about 1*s.* per ton, and the difference in the cost and the sale price will necessarily prove an addition to the revenue. It has been also estimated that when the light railway has been completed 50,000 tons of night soil may be placed on the land every year. There appears little limit to intensive farming, especially as applied to vegetable culture, and the future of Chat Moss can, therefore, be regarded with equanimity.

Those who, within the past few years, have taken the road which, in an almost straight course, runs from Astley station southward across the Moss to Irlam will perhaps have observed one of the most peculiar of the odd colonies occasionally found in country districts. The spongy, shifting Moss has a depth in places of more than 30 feet. Even where shallow it is the despair of the builder, and the old cottages that stand off the road are wholly of wood, planked together. The sinking of the Moss has curiously twisted them; their floors have had the knack of disappearing and in some instances they are in a deplorably insanitary condition. Even the homesteads built of wood are dwarfed in height, small and unsuitable for their purpose. New houses and cottages of brick, with yards and stabling, are therefore being raised. It has not been thought wise or economical to delve below the Moss and lay the brickwork on solid ground. Short baulks of timber, creosoted, have been laid transversely on the face of the Moss, exactly in the form of a foundation. Above these is a stout beam of oak, laid lengthwise, and on this the brickwork has been raised. If the Moss should sink under any part of the building the task of renewing the bottom range of timber will not be difficult. These homesteads already give an appearance of completeness

to the land which hitherto had been entirely lacking. Their erection was, of course, for a well-ordered community an absolute necessity. A service of drinking water by pipes connected with the Manchester supply has been laid, and the use for household purposes of the brackish water of the Moss or of rain collected by some hasty means is no longer necessary. In the six months that have elapsed since the estate came into the hands of the committee the progress has, in fact, been remarkable, and when the railway lines have been laid and the roads completed another object-lesson in municipal enterprise will be at the city gates.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

19412. Sherdon Schiermann, for "Improvements in blind-rollers."
 19458. Moses James Adams, for "Improvements in valves and fittings for lavatory and other purposes."
 19526. Levi William Crouch, for "Improvements in sash-cord fasteners."
 19542. James Thomas Mason and William Hunter Hardy, for "Improvements in tiles for roofing and like purposes."
 19566. Edward William Hebermaas, for "Improvements in sash-locks."
 19657. Ellas Leak, for "Improved cases or appliances for use in containing or supporting tiles and the like whilst being fixed."
 19705. Friedrich Adolph Hanna, for "An improved closet-seat."
 19753. Charles John Brooke, for "Improvements in fasteners for window-sashes."

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Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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For Advertisement Scale, see page xiii.

COMPETITIONS OPEN.

BATTERSEA.—Sept. 22.—The Vestry of St. Mary offer premiums of 100*l.*, 50*l.* and 25*l.* for the three best designs for the erection of public baths and washhouses. Mr. W. M. Wilkins, Municipal Buildings, Lavender Hill, S.W.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500*l.*, 300*l.* and 200*l.* respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

CARLISLE.—The School Board offer premiums of 20*l.* and 10*l.* for designs for school to accommodate 550 boys. Mr. S. Cartmell, 27 Lowther Street, Carlisle.

DORKING.—Oct. 13.—Plans and estimates are invited for the erection of an infirmary. Mr. George Scales, clerk to the Guardians, High Street, Dorking.

FRINTON-ON-SEA.—Sept. 24.—The School Board invite designs for school to accommodate 150 children and allow of a future extension for 300 children. Mr. A. R. Chamberlayne, Station Road, Clacton-on-Sea.

LEEDS.—Oct. 8.—The Corporation offer premiums of 100*l.*, 50*l.* and 25*l.* for the three best designs for a wholesale dead-meat market and abattoir. City engineer, Municipal Buildings, Leeds.

LOWER BEBINGTON.—Oct. 1.—The Lower Bebington Urban District Council offer premiums of 50*l.*, 35*l.* and 20*l.* for the three best designs for a scheme of sewerage for that portion of their district now being drained into the Bromborough Pool. Mr. Thomas Sproat, 5 Castle Street, Liverpool.

LUDLOW.—Oct. 1.—The Corporation offer a premium of 20*l.* for the best and most economical scheme of electric lighting for the borough. Mr. John Herbert Williams, town clerk, Ludlow.

MERTHYR TYDFIL.—Sept. 30.—The School Board offer a prize of 10*l.* for the best plan of erecting a second floor to the infants' school. Mr. E. Stephens, School Board offices, Merthyr Tydfil.

MORECAMBE.—Oct. 1.—The Urban District Council offer a premium of 100*l.* for the best scheme of an improved and extended sewerage system. Mr. Jno. Bond, surveyor, Morecambe.

SKIPTON.—Sept. 30.—The Skipton and District Cottage Hospital committee offer premiums of 15*l.* and 5*l.* for the best designs for a cottage hospital, at a cost of 2,500*l.* Mr. W. H. Dawson, hon. sec., Skipton.

UXBRIDGE.—Oct. 30.—The Uxbridge Rural District Council invite plans for a scheme of sewerage and sewage disposal. Mr. Charles Woodbridge, 138 High Street, Uxbridge.

CONTRACTS OPEN.

ACTON.—Sept. 23.—For additions to Board school. Mr. Edward Monson, architect, Acton Vale, W.

ARUNDEL.—Sept. 20.—For building labourers' cottages on the Duke of Norfolk's estate. Mr. Heveningham, Estate Building Office, Arundel.

AULT HUCKNALL.—Sept. 24.—For building school, &c. Messrs. Rollinson & Sons, architects, 13 Corporation Street, Chesterfield.

BASFORD.—Sept. 20.—For construction and maintenance of stoneware pipe sewers. Mr. H. Walker, Newcastle Chambers, Nottingham.

BATH.—Sept. 21.—For erection of a steam laundry, stables, &c., at Twerton. Mr. Ernest J. White, Northgate Chambers, Bath.

BIRKENHEAD.—For erection of proposed mortuary. Mr. Joseph Young, surveyor, 78 Stanley Terrace, New Ferry, near Birkenhead.

BLETCHINGLEY.—Sept. 22.—For enlargement and alteration of the workhouse. Mr. Frederick Elliff, architect, Caterham, Surrey.

BOOTLE.—Sept. 30.—For building school. Messrs. Cox & Marmon, architects, 11 Dale Street, Liverpool.

BOVEY TRACEY.—Sept. 25.—For erection of a school building at Heathfield. Messrs. J. W. Rowell & Son, architects, Newton Abbot.

BRADFORD.—Sept. 20.—For erection of business premises in Ivegate. Mr. J. Ledingham, District Bank Chambers, Bradford.

BRADFORD.—Sept. 28.—For building seven houses and house and shop. Mr. Samuel Robinson, architect, 15 Cheapside, Bradford.

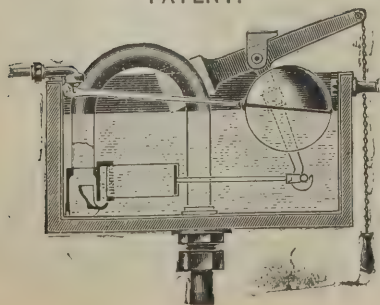
BRENTWOOD.—Oct. 2.—For erection of a boiler-house and extension of the clerk's offices at the asylum. The Medical Superintendent, Asylum, Brentwood.

BRISTOL.—Sept. 20.—For erection of schools, Ashley Down, Horfield. Messrs. Walter S. Paul & James, architects, 15 Clare Street.

BRISTOL.—Sept. 18.—For building schools. Mr. J. A. Beynon, architect, Coleford, near Bath.

ARCHITECTS PLEASE NOTE.

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BURNLEY.—Sept. 29.—For erection of a memorial fountain, Queen's Park. Borough surveyor, Town Hall, Burnley.

CAMBERWELL.—For erection of a pair of semi-detached villas in Benhill Road. Mr. S. Evans, architect, 36 Heron Road, Herne Hill, S.E.

CASTLEFORD.—Sept. 21.—For alterations and additions to dwelling-house and shops, Carlton Street. Mr. Arthur Hartley, architect, Carlton Chambers, Castleford.

CASTLEFORD.—Sept. 23.—For erection of a cart-shed in Wheldale Lane. Mr. W. Green, surveyor, Council Offices, Castleford.

CRAMLINGTON.—Sept. 22.—For erecting a dwelling-house. Messrs. Boulds & Hardy, architects, Market Place, Morpeth.

CHADWELL HEATH.—Sept. 28.—For building foundations, lodges, &c., in connection with lunatic asylum. Mr. Lewis Angell, Town Hall, Stratford.

CORNWALL.—Sept. 22.—For erection of a residence on a site situate between Port Isaac and Port Gaverne, Cornwall. Messrs. Wise & Wise, architects, Launceston.

DOUGLAS.—Oct. 2.—For constructing brick and stoneware pipe sewers. Messrs. Stevenson & Burstal, 38 Parliament Street, Westminster.

EBCHESTER.—Sept. 25.—For erection of sixteen houses. Hamsterley Colliery Offices, Ebchester, R.S.O.

ERDINGTON.—Sept. 29.—For making roads. Mr. H. H. Humphries, Public Hall, Erdington, near Birmingham.

FEATHERSTONE.—Sept. 24.—For erection of boundary walls, laying-out walks, and grounds required in the addition of one acre of land to the Featherstone Cemetery. Mr. W. Hamilton Fearnley, architect, Station Lane, Featherstone.

FORRES.—Sept. 27.—For additions to hydropathic establishment. Mr. John Forrest, architect, 129 High Street, Forres, N.B.

GATESHEAD.—Sept. 21.—For rebuilding the boundary wall and henhouse at the workhouse for the Guardians. Mr. George Craighill, clerk, Poor Law Union Offices, Prince Consort Road, Gateshead.

GLOUCESTER.—Sept. 25.—For laying stoneware pipe sewers, with manholes, ventilators, &c. Mr. J. F. Trew, County Chambers, Gloucester.

GREAT YARMOUTH.—Sept. 25.—For erection of two houses, Wellesley Road. Mr. Chas. G. Baker, architect, Town Hall Chambers, Great Yarmouth.

HALIFAX.—Sept. 29.—For building dwelling-house. Messrs. C. F. L. Horsfall & Son, architects, Lord Street Chambers, Halifax.

HALIFAX.—Oct. 4.—For erection of a drapery warehouse and offices in Rawson and Powell Streets. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HARPENDEN.—Sept. 29.—For erection of police station. Mr. Urban A. Smith, county surveyor, 41 Parliament Street, S.W.

HARROGATE.—Sept. 22.—For erection of a residence, Park Drive. Messrs. S. E. Smith & J. Tweedale, architects, 12 South Parade, Leeds.

HEXHAM-ON-TYNE.—For building square chimney 75 feet high. Messrs. John Fenwick & Sons, Hexham-on-Tyne.

HOLBEACH.—For erection of public hall, for the Holbeach Public Hall Company, Limited. Mr. Joseph Sawyer, 63 Chancery Lane, London, W.C.

IRELAND.—Oct. 4.—For erection of a stationmaster's office at the passenger station, Banbridge, and for alterations to the station; also construction and erection of platform roofs at Banbridge and at Clones, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

KIRKLEATHAM.—Sept. 24.—For building reading-room. Mr. E. A. Whipham, architect, 59 High Street, Stockton-on-Tees.

LAMBETH.—Sept. 20.—For construction of a movable wooden floor and platform for entertainment purposes over the pond of first-class swimming-bath. Mr. A. Hessel Tiltman, 6 John Street, Bedford Row, W.C.

LAMBETH.—Sept. 21.—For erecting new camp sheathing at Letts Wharf. Engineer to the Commission of Sewers, Guildhall, E.C.

LEEDS.—Sept. 20.—For building warehouse, &c. Mr. T. Winn, architect, 70 Albion Street, Leeds.

LEEDS.—For extension of mill premises, East Street. Messrs. Ambler & Bowman, architects, 9 Park Place, Leeds.

LEWISHAM.—Sept. 27.—For erection of lunatic wards at the infirmary, High Street. Mr. Robert Williams, architect, 17 Effingham Road, Lee, S.E.

LEWISHAM.—Sept. 21.—For building fire brigade station. Architect's Department, London County Council, Spring Gardens, S.W.

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LLANDYFAEN.—Sept. 21.—For constructing waterworks Mr. R. S. Lewis, 16 Rhosmaen Street, Llandilo.

LLANDUDNO.—Sept. 20.—For erection of electric lighting and refuse destructor buildings. Mr. E. P. Stephenson, Urban District Council Offices, Llandudno.

LIMERICK.—Sept. 22.—For sundry works at the city dispensary. Mr. J. O'Malley, 10 Glentworth Street.

LISKEARD.—Sept. 24.—For erection of a villa. Mr. John Sansom, architect, Liskeard.

LIVERPOOL.—Sept. 27.—For additions, alterations, sanitary and other improvements to the Lodge Lane Baths. Mr. W. R. Court, engineer, 15 Great George Square.

LLANELLY.—For additions and alterations to Brynawel, New Road. Mr. W. Griffiths, architect, Llanelly.

LONDON.—Sept. 28.—For alterations at underground convenience. Engineer to the Commission of Sewers, Guildhall, E.C.

LONG EATON.—For alteration of a shop. Mr. Ernest R. Ridgway, architect, Long Eaton.

MIDDLESBROUGH.—Sept. 21.—For alterations and improvements to the Albert Park Hotel. Mr. J. Mitchell Bottomley, architect, Middlesbrough.

MORLEY.—Sept. 20.—For painting buildings, gates, railings, &c., at Dartmouth Park. Mr. M. H. Sykes, Town Hall, Morley.

MORLEY.—Sept. 20.—For sewerage and kerbing streets. Mr. H. H. Sykes, Town Hall, Morley.

NEATH.—Sept. 20.—For building schools. Mr. J. C. Rees, architect, St. Thomas's Chambers, Church Place, Neath.

NEWBURY.—For alterations and new offices at the Atlas Brewery. Mr. J. H. Money, architect, The Broadway, Newbury.

NORTHAMPTON.—Sept. 21.—For building residence. Mr. J. F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

NORTHOWRAM.—Sept. 21.—For building residence. Mr. J. F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

ORMSKIRK.—Sept. 28.—For erection of board-room and offices on land adjoining the workhouse. Messrs. Willink & Thicknesse, architects, 14 Castle Street, Liverpool.

PLYMOUTH.—Sept. 22.—For heating and ventilating municipal buildings. Mr. James Paton, Municipal Buildings, Plymouth.

PONTYPRIDD.—Sept. 22.—For altering and enlarging schools Mr. A. O. Evans, Post Office Chambers, Pontypridd.

PONTARDAWE.—Sept. 29.—For building infant school. Mr. W. W. Williams, architect, 63 Wind Street, Swansea.

PORTSMOUTH.—Sept. 21.—For alterations and additions to Board school. Mr. A. Bone, architect, Cambridge Junction, Portsmouth.

PUDSEY.—Sept. 27.—For erection of a cabinetmaker's workshop in Occupation Lane. Mr. William Davey, 27 Brunswick Road, Pudsey.

RAVENSTHORPE.—Sept. 20.—For building artisans' dwelling-houses. Messrs. S. Wood & Son, architects, Cheapside, Heckmondwike.

ROTHERHITHE.—Sept. 29.—For building a shelter at South Wharf. Mr. T. W. Aldwinckle, architect, 1 Victoria Street, Westminster, S.W.

SCOTLAND.—Sept. 28.—For erection of public hall for Lumphanan. Clerk to the Parish Council, Lumphanan.

SEAFORD.—Sept. 30.—For alterations at sewage pumping station, and fixing additional machinery, for the Seaford Urban District Council. Mr. B. A. Miller, 3 Clinton Place, Seaford.

SELBY.—Sept. 20.—For excavations, concrete foundations, drains, &c., for new factory. The Yorkshire Bacon Curing Co., Limited, 1 Abbey Place, Selby.

SHOREDITCH.—Sept. 21.—For constructing sewers. Mr. J. Rush Dixon, Town Hall, Old Street, E.C.

SHOTLEY BRIDGE.—Sept. 21.—For building cottage homes. Mr. C. A. Sharp, architect, 24 Grainger Street West, Newcastle.

SLIGO.—Oct. 7.—For new flagging and door of pump-house. Mr. W. T. Vernon, registrar, Board Room, County Infirmary, Sligo.

ST. ALBANS.—Sept. 27.—For heating and ventilating Campfield Works. Mr. G. P. Smedley, architect, 110 St. Martin's Lane, London, W.C.

STOCKTON ON-TEES.—For erection of power-house buildings, smoke stack, jetty, &c. Mr. Clifton Robinson, engineer, Bridge Road, Stockton-on-TEES.

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TUNBRIDGE WELLS.—Sept. 27.—For enlargement of boiler-house at Pembury, four miles from Tonbridge and Tunbridge Wells Stations. Mr. T. E. W. Mellor, Town Hall, Tunbridge Wells.

WALES.—Sept. 27.—For erecting a chapel at Pencoed. Rev. Stephen Jones, Coychurch, Bridgend.

WALES.—Oct. 1.—For erection of police station buildings, with cells and petty sessions court, at Redditch. Mr. Henry Rowe, county surveyor, Worcester.

WALES.—Sept. 20.—For erection of mixed schools at Resolven for 528 children. Mr. J. Cook Rees, architect, St. Thomas Chambers, Church Place, Neath.

WALSALL.—Sept. 25.—For constructing earthenware pipe sewer. Mr. John R. Cooper, town clerk, Walsall.

WESTBURY-ON-SEVERN AND DYMOCK.—Sept. 25.—For building police-stations. Mr. M. H. Medland, architect, 15 Clarence Street, Gloucester.

WARRINGTON.—Sept. 20.—For erection of county asylum on the Winwick Hall Estate, Winwick, near Warrington. Mr. Fred. C. Hulton, clerk, County Offices, Preston.

WHITEHAVEN.—Sept. 21.—For rebuilding house. Messrs. Moffatt & Bentley, architects, Whitehaven.

WILTON.—Sept. 20.—For building a laundry and other work in connection therewith at the workhouse. Messrs. John Harding & Son, 51 Canal, Salisbury.

YORK.—Sept. 29.—For widening and laying-down railway. Mr. C. N. Wilkinson, North-Eastern Railway Company, York.

In view of the experiment to be made with the trolley system of electric traction on the Springburn section of the Glasgow Corporation tramway system, a new type of car is in course of construction at Coplawhill. In front it will have a platform for the conductor. Then will follow a compartment similar to that of the car in ordinary use. At the rear of it will be a footboard forming a platform, which will separate the closed part of the car from a section which will have open sides, a covered top and bulkheads fore and aft. This will form a smoking-compartment, which can be open in summer and closed in winter. At the rear end of the car will be another platform for those who wish to smoke in the open air. There will be no seats on the top of the car, so that the difficulties in regard to low bridges will be obviated.

TENDERS.

ABERDEEN.

For the construction of pipe sewers, with ventilating manholes, &c., in Burns Road and Forest Avenue. Mr. WILLIAM DYACK, burgh surveyor.

Burns Road.

A. McKay, Laurelwood Avenue£18 3 0

Forest Avenue.

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For sewerage works at the workhouse fever hospital.

A. CLYDE, Linenhall Street (accepted) . . .£39 0 0

BIDEFORD.

For removal of the old cottages and excavations for the new cattle market. Mr. H. CHOWINS, borough surveyor.

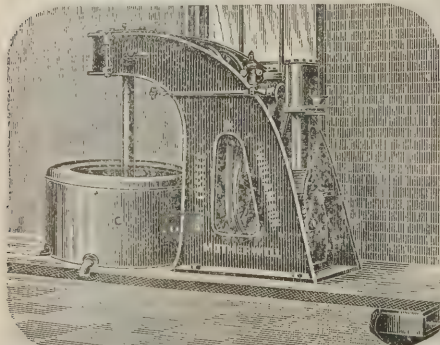
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T. HORROCKS, 113 Greenwich Road, Walton, Liverpool (accepted).

BOURTON-ON-THE-WATER.

For erection of hall and reading-room.

Bartlett Bros., Witney	£1,997	18	0
W. J. Bloxham, Banbury	1,997	0	0
W. Barnes, Witney	1,580	0	0
Hartwell & Sons, Bourton-on-the-Water	1,530	0	0
A. Clifford & Son, Bourton-on-the-Water	1,497	10	0

BRADFORD.

For erection of stable for sixteen horses.

W. BINNS, Swan Arcade (accepted).

For erection of a clear ice factory, cold storage and chill-rooms, for the Bradford Clear Ice and Cold Storage Company. Mr. FRED HOLLAND, architect, 11 Parkinson Chambers, Hustlergate, Bradford.

Accepted tenders.

Linde British Refrigeration Co., Limited, London, refrigerating plant and engine.

T. Shackleton & Co., mason.

A. Taylor, plasterer and concreter.

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C. Howroyd, plumber and glazier.

J. Bagshaw & Sons, Limited, iron and steel work.

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T. H. Hewitt, painter.

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BRIGHTON.

For erection of groynes and other works in connection therewith upon the foreshore, Madeira Road, Brighton, for the Town Council. Mr. FRANCIS J. C. MAY, borough surveyor.

Pedrette & Co. £15,282 14 8

J. Parsons & Son 12,500 0 0

B. COOKE & Co., 16 Victoria Street, Westminster (accepted) 11,841 0 0

BRIDLINGTON.

For new board room and offices for the Board of Guardians of the Union.

J. SAWDON (accepted) £1,250 10 0

COLNE.

For the construction of refuse-destroyer, engine-house, mess-room, &c., and offices at the proposed health dépôt, Burnley Road. Mr. T. H. HARTLEY, borough surveyor.

J. & P. LANCASTER, Colne (accepted).

CRICKLEWOOD.

For alterations to shop and premises at 23 The Parade, High Road. Mr. JOHN SPINK, architect, 64 Holborn Viaduct, E.C.

Sage & Co. £516 0 0

Neal 328 0 0

E. Wheeler 314 0 0

SUMNER & Co. (accepted) 295 0 0

Architect's estimate 276 0 0

DOVER.

For alterations and additions to wards, &c., at the hospital. Messrs. FRY & GARDENER, architects, Cannon Street, Dover.

G. F. Keeler £631 17 0

G. Lewis & Sons 625 0 0

W. Bromley 619 0 0

J. Parsons 611 10 0

AUSTEN & LEWIS, Randolph Gardens (accepted) 597 0 0

HAILSHAM.

For drainage works, for the Hailsham Rural District Council. Mr. JOSEPH HUXLEY, surveyor, Winter House, Hailsham.

Wright & Co. £219 0 0

Stonestreet 99 0 0

Saunders & Co. 85 0 0

T. RICH, Hailsham (accepted) 72 0 0

HASLINGDEN.

For construction of tanks, conduits, &c., for artificial filter-beds. Mr. H. LEONARD HINNELL, engineer, 41 Corporation Street, Manchester.

E. TEMPEST, Oak Lane, Marple, as per schedule of prices (accepted).

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J. Musgrove	£495	0	0
COWPER & HENDERSON, Jarrow (accepted)	489	15	0
Surveyor's estimate	509	17	3

For excavating, levelling, sewerage, macadamising, paving, channelling, cementing, &c., in various streets.

M. D. Young	£1,254	9	1
T. CALLAGHAN, Jarrow (accepted)	1,224	18	7
Surveyor's estimate	1,293	19	11

KEDDINGTON.

For new lead gutters, &c., to roofs of the workhouse at Keddington.

M. Brown	£225	0	0
H. Mitson	180	0	0
F. Hicks	168	0	0
F. C. THURMAN (accepted)	135	0	0
Dean & Harper	131	1	0

KINGSWOOD.

For stables and storerooms at Hopewell Hill. Mr. JNO. MACKAY, architect, Kingswood, near Bristol.

J. Wiltshire & Sons	£397	0	0
J. Wilkins	397	0	0
S. Lovell	380	4	0
J. Wilkins	378	12	9
J. Hatherley	375	0	0
Hughes & Weeks	370	0	0
S. Williams	368	0	0
F. Martin	364	0	0
Stock & Haynes	350	4	6
R. ROGERS, Kingswood (accepted)	336	7	6

KNARESBOROUGH.

For laying about 1,033 yards Pateley kerbing, 10 inches by 8 inches, and constructing footpath from Bilton Bar to the Little Wonder Inn, along the Knaresborough and Skipton main road.

C. Middleton	£256	0	0
W. Annakin	186	0	0
F. U. SIMPSON, Burton Leonard (accepted)	162	2	0

KNARESBOROUGH—continued.

For supply and fixing of a galvanised iron asphalte shed at quarry, Pannal.

W. Harbrow	£118	0	0
J. Mitson	102	4	0
Motley & Green	92	2	6
Humphreys	90	0	0
E. J. Hawkins	85	0	0
A. Dougill & Co.	76	15	6
E. F. Blakey & Co.	76	15	0
Wann & Charlsworth	75	10	0
Cross & Cross	71	10	0
F. MORTON & Co., Liverpool (accepted)	68	0	0

LE CESTER.

For construction of about 350 lineal yards of brick sewers, 30 lineal yards of pipe sewers with manholes, lampholes. Mr. E. GEO. MAWBEY, borough engineer and surveyor.

J. Holme	£1,335	12	5
Bentley & Loch	1,156	4	6
J. E. Johnson & Sons	1,079	16	3
H. Mason & Sons	1,037	8	0
T. Philbrick	988	7	2
JOHNSON & LANGLEY, 1 Burfield Street (accepted)	937	9	3

LYNN.

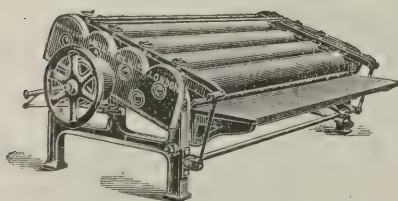
For constructing a culvert in Mill Fleet and filling up the Fleet.

Botterill, Aylsham	£7,023	0	0
H. B. & A. F. James, London	4,940	15	9
R. M. Parkinson, Peterborough	4,687	0	0
Read & Wildbur, Lynn	4,441	0	0
H. COLLINSON, Lynn (accepted)	4,320	0	0
Pedrette & Co., London	3,980	0	0

LONDON.

For pulling-down and rebuilding premises, 76 Great Titchfield Street, W., for Mr. Joshua Thompson. Mr. ALBERT E. PRIDMORE, architect, 2 Broad Street Buildings. Quantities by Mr. R. J. STAMP.

Watson Bros.	£1,682	0	0
A. A. Webber	1,617	0	0
S. R. Lamble	1,557	0	0
Beer & Gash	1,443	0	0
W. J. Davenport	1,349	0	0
W. Wiltshire	1,273	0	0
HERBERT KING (accepted)	1,248	0	0

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For coupling-up the boilers at the South-Western Hospital by means of a new steam-main.		
H. F. Joel & Co. and T. Potter & Sons United (Limited)	£695	0 0
W. G. Cannon & Sons	597	12 6
J. F. Clarke & Sons	440	0 0
G. Hopkins	435	4 5
C. S. Mallett & Co.	415	15 0
G. Elliott & Co.	381	16 6
J. C. Christie	378	17 9
J. & F. May	377	0 0
G. & E. BRADLEY, Chadwell Street (accepted)	301	0 0
Architect's amended estimate	360	0 0

MIDDLESBROUGH.

For new shop front, &c., to premises, 207 Linthorpe Road. Mr. WALTER G. ROBERTS, architect, 61 Albert Road, Middlesbrough.		
HUDSON BROS., Fidler Street (accepted)	£73	10 0

MOSSLEY.

For alterations and extension to National Schools. Mr. J. H. BURTON, architect, 2 Guide Lane, Hooley Hill.		
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Accepted tenders.

H. Ogden, carpenter and joiner	£302	0 0
S. Frost, excavator, waller and mason	245	0 0
J. Heywood, Manchester, sliding partitions	190	14 6
J. Oldfield, slater and plasterer	42	15 0
G. Beaumont, plumber and glazier	22	10 0
G. Beaumont, painter	3	2 0

MUIRKIRK.

For erection of two-storeyed tenement, 36 feet 9 inches long, at Muirkirk. Mr. JOHN ARMOUR, jun., architect, Irvine.		
J. Robb	£929	9 11
A. Beattie	927	2 5
Dunlop & Co.	899	11 7
J. Dalziel	890	0 0
W. Blackwood & Son	880	7 4
G. Reid & Son	872	2 10
Wood & Somerville	871	12 7
J. WOOD, Muirkirk (accepted)	858	2 4

NELSON.

For erection of Board school, for the Nelson School Board. Mr. THOS. BELL, architect, Nelson and Burnley.		
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Accepted tenders.

T. Dent & Sons, mason.
T. Booth & Sons, joiner.
C. Whitaker, slater.
Asphaltic Limestone Company, concreter.
H. Walton, ironfounder.
J. Hargreaves, plumber and glazier.
Butler, plasterer.
R. Aspinall, painter.
W. Pollard, gates and railing.
W. F. Spencer, heating.

NEWPORT (MON.).

For erection of a general hospital in Cardiff Road. Mr. RICHARD J. LOVELL, architect, 46 Queen Victoria Street, London. Quantities by Mr. JAMES KENNEDY, 25 Bedford Row, W.C.		
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H. Wilcox	£34,250	0 0
C. H. Reed	34,110	0 0
W. J. Bloxham	33,660	0 0
W. A. Linron	32,575	0 0
Gradwell	32,572	0 0
Blackburn	32,425	0 0
S. Warburton	32,314	0 0
W. Bowers & Sons	31,940	0 0
D. Parfitt	31,000	0 0
J. Linton	30,850	0 0
J. D. Davies	30,097	0 0
T. Westacott	29,991	17 0
A. S. MORGAN & Co. (accepted)	29,950	0 0

PECKHAM.

For erecting steam printing works at 187, 188 and 189 The Arches, Victoria Road. Mr. EDMON STREVS, surveyor.		
Stephens	£1,016	0 0
Eames	906	0 0
F. Webster	906	0 0
Champion	888	0 0
Dove	860	0 0
Tyreman	790	0 0
Colman	789	11 0

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J. BRADLEY, Castle Street (*accepted*) . . . £106 0 0

RADCLIFFE.

For construction of a brick sewer, &c., Church Street, Rectory Lane.

Taylor & Fleming . . . £2,116 19 0

R. E. Jones . . . 1,950 1 6

Etheridge & Clarke . . . 1,596 9 1

S. SEDDON, Bolton (*accepted*) . . . 1,535 4 6

REDCAR.

For erection of house. Mr. W. G. ROBERTS, architect, 61 Albert Road, Middlesbrough.

Accepted tenders.

W. Dobson, brick, terra-cotta, plaster, s'ating . £554 1 6

T. Burton, carpenter and joiner . . . 275 0 0

T. Bateman, plumber, glazier, gasfitter . . . 99 12 6

W. Bulmer, painter . . . 12 10 0

ROCHDALE.

For painting the outside of town hall. Mr. S. S. PLATT, borough surveyor.

W. H. BEST, Rochdale (*accepted*).

SALISBURY.

For erection of school and classrooms, and for alterations and additions to the Salisbury School. Messrs. JOHN HARDING & SON, architects, 51 Canal, Salisbury.

Jenkins & Sons . . . £2,497 6 0

Vincent & Folland . . . 2,285 0 0

E. Day . . . 2,200 0 0

T. Dawkins . . . 2,195 0 0

E. Witt . . . 2,175 0 0

E. Hale . . . 2,070 0 0

Webb & Co. . . . 2,060 0 0

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SEDBERGH.

For construction of main and outfall sewers, &c., and the laying-out of the irrigation area at Dent. Mr. R. EDGAR HORSFALL, engineer, Halifax.

R. Hopkinson . . . £1,324 10 0

T. & W. DIRKIN, Kendal (*accepted*) . . . 913 5 11

SHEERNESS.

For erection of a mission hall for Holy Trinity Church. Mr. T. W. PARRISH, architect.

Pavey & Sons . . . £1,049 0 0

E. F. Hughes . . . 874 0 0

J. R. BLIGH, Eastchurch (*accepted*) . . . 820 0 0

SOUTH CROXTON.

For erection of additional stabling. Messrs. MILES & BEASLEY, Friar Lane, Leicester, and of London. Quantities by architects.

M. HICKLING, Syston (*accepted*) . . . £200 0 0

STONF.

For completing the drainage of the workhouse.

SMALLWOOD (*accepted*) . . . £348 0 0

TEWKESBURY.

For a new door for, and to otherwise thoroughly repair the flood-gate at Deehurst, known as the Gildable. Mr. S. J. GILLET, surveyor, Deehurst.

COLLINS & GODFREY, The Cross (*accepted*) . £11 10 0

E. J. Ashley . . . 9 10 0

THETFORD.

For building new cottage hospital, Thetford, Norfolk.

Adcock & Son . . . £775 1 5

S. Holden . . . 774 0 6

J. BROUGHTON & SON, Thetford (*accepted*) . 731 14 0

SUNBURY-ON-THAMES.

For construction of an engine-house of brickwork, with concrete foundations for machinery and other work in a field adjoining Charlton Road; also, as a separate contract, for the forming of roads and paths and laying of lines of stoneware-pipe carriers near the surface, for irrigation in the same lands. Mr. JOHN ANSTIE, engineer, 17 Victoria Street, Westminster.

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M. S. Kitteringham . . . £569 0 0

T. GURNEY, Sunbury (*accepted*) . . . 568 4 6

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For construction of steel-girder bridge across the river Corrwg, at Glyncorwg. Mr. JAS. HOWELL, surveyor.

E. Jones	£190	0	0
Harris Bros.	185	0	0
W. Williams & Sons	175	10	0
Stephens & Sons	175	0	0
J. Ellis & Co.	165	0	0
E. Finch & Co.	148	0	0
J. Ellis	146	0	0
Dyne, Steel & Son	120	0	0
Bromlie & Murray	118	0	0
LEWIS & DAVID, Engineering Works, Port Talbot (accepted)	97	10	0

WALSALL.

For additions to North Bank, Highgate. Mr. FRED. W. CROSS, architect, 2 The Bridge, Walsall.

A. Lynex	£557	0	0
W. Wistance	516	0	0
M. Hughes	481	0	0
G. INSLEY, Mount Street, Walsall (accepted)	453	0	0
Architect's estimate	450	0	0

WALTHAMSTOW.

For erection of cottage residences, Chester Road. Mr. EUGENE C. BEAUMONT, architect, 78 Fleet Street, E.C.

TAYLOR & SONS, Portway, Plaistow (accepted) £3,500 0 0

For pulling-down and rebuilding Nos. 43 and 45 St. James Street, in connection with Everett's stores, for Mr. R. T. Jolly. Mr. J. WILLIAMS DUNFORD, architect and surveyor, 100c Queen Victoria Street, E.C.

G. Knight & Sons	£2,494	0	0
D. Gibb & Co.	2,160	0	0
E. Fuller & Son	2,100	0	0
W. Lawrence	2,093	0	0
Richardson Bros.	2,048	0	0
G. Burrage	1,867	0	0
F. J. COXHEAD, Leytonstone (accepted)	1,773	0	0
Architect's estimate	1,780	0	0

WALVERDEN.

For erection of Board School at Walverden, Nelson. Quantities by Mr. THOMAS BELL, architect.

T. Dent & Sons, mason	£4,349	0	0
Boothman & Sons, joiner	2,100	0	0
Asphaltic Limestone Co., concrete	626	17	0
C. Whitaker, slater	487	19	0
T. Hargreaves, plumber and glazier	450	0	0
W. F. Spencer, heating	426	0	0
Butler, plasterer	260	0	0
H. Walton, ironfounder	224	9	8
Pollard, gates and railing	119	0	0
Aspinal, painter	104	0	0

WOODFORD.

For building a cottage for Mr. John Appleby. Messrs. EDWARD BROWN & SON, architects, Commercial Street, Bishopsgate.

Tapperell & Davis	£176	15	0
J. V. Kiddle & Sons	175	0	0
H. WELLS & SONS (accepted)	149	0	0

WOOLWICH.

For pulling-down and rebuilding the Star and Garter Hotel, Powis Street, and stabling in rear. Mr. JOHN O. COOK, architect.

Balaam Bros.	£10,200	0	0
Smith & Sons	9,993	0	0
Lilly & Lilly	9,237	0	0
Kirk & Randall	9,157	0	0
Thomas & Edge	9,147	0	0
Richardson	8,929	0	0
Holloway	8,797	0	0
Sanford	8,750	0	0
Proctor	8,678	0	0

MR. ZACHARY MELLOR, the town clerk of Rochdale, died suddenly on the morning of the 13th inst. He had reached the venerable age of seventy-eight, but some years ago his health began to decline, and the Corporation appointed Mr. James Leach to act as his deputy. For the last few years he has not been required to take any active part in the work, but was occasionally consulted on important matters.

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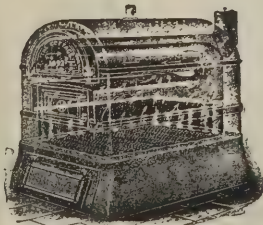
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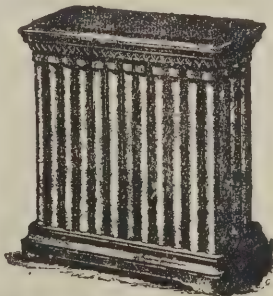


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BUILDING AND BUILDERS.

THE foundation-stone of a new cathedral in Loughrea, co. Galway, is expected to be laid on October 2; the building is estimated to cost 13,000*l*.

A SITE has been purchased in Seascale for the erection of a large hotel.

A SECOND scheme for the Cheltenham kursaal has been issued. The cost would be 26,000*l*. instead of 60,000*l*.

THE Sheerness School Board have purchased a piece of land from the War Department for 2,000*l*., on which to build a new school.

THE chapel in Nelson Street, Newcastle-on-Tyne, First Circuit, has been sold for 7,500*l*., and a new chapel and premises are to be erected in Northumberland Road, at a cost of 15,000*l*.

SEVEN tenders have been received for the restoration of Brierley Hill Church; the lowest was 6,797*l*., a sum far beyond what the committee had expected. It was anticipated that the work could be carried out for from 3,000*l*. to 3,500*l*., and Mr. John Corbett engaged to provide half of the estimated outlay.

A BREACH has been made in the North Pier, Tynemouth, and the advice of Sir J. Wolfe Barry, C.E., and Mr. C. E. Matthews is to rebuild the pier from the breach seaward, at an estimated cost of 302,000*l*. The piers had just been finished when the misfortune happened. The River Tyne commissioners have practically adopted the report of the experts.

THE plans of the new church at Handforth have been passed, and it is expected that the work of building will be entered upon in the course of the next few weeks. The new edifice is to be erected on land near the present structure.

A NEW theatre is to be erected in Hanley by Messrs. Elphinstone. The tender of Mr. T. Godwin, Hanley, has been accepted. The amount of the contract is 13,000*l*. The

site selected is at the junction of Foundry Street and Trinity Street. Mr. Matcham, of London, is the architect. The stage is to be so constructed that it can be removed at any time if necessary.

THE Clothworkers' Company have granted money for the purchase of a site in order that an extension of the Yorkshire College in Leeds can be constructed. The new buildings will comprise a main wing and corridor fronting College Road. The ground floor will be a large room for woollen-yarn making, and rooms for beaming, &c. On the first floor will be situate a room for the worsted department, research or conditioning laboratory and office.

THE contract for the construction of the Midland Railway Company's new deep-water harbour and pier at Heysham, in Morecambe Bay, has been secured by Messrs. Price & Wills, 15 Great George Street, Westminster, S.W., who have in hand the Sheffield District Railway. The railway from Morecambe to Heysham is now making good progress, the contractors being Messrs. Godfrey & Liddelow, of Morecambe. The construction of the entire works, which are naturally of a very extensive character, is likely to extend over a period of three to four years.

THE contract for excavating the foundations of the old Tombs Prison in New York City was let recently to a Mr. Cody. It was supposed that the foundations rested on piles rotted by age, and would need special machinery for their removal. He found, however, there was a platform, laid horizontally along the foundations, of huge hand-hewed logs of white pine three tiers deep, measuring 30 feet in length and 11.4 inches square. The big beams are in perfect condition. It is likely that the timber will be worth about 10,000*l*.

BUILDERS and investors in land would do well to attend the land sale at Hayling Island on the 24th inst., when in addition to the beautiful residence of Westfield, with stabling and grounds of 4½ acres, in a lot by itself, there will be offered several half-acre plots on the Sea Common at South Hayling, which may be paid for on the instalment plan, with free conveyances, so that private gentlemen, builders and speculators generally may become owners of freehold on moderate terms and reap the benefit of increased values in the immediate future. The new steam ferry at Cumberland Fort will render this charming seaside resort a suburb of Southsea. Lumleys, of St. James's House, are the London auctioneers, and King & King, of Portsea, are local agents.

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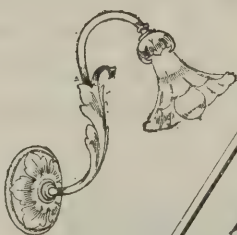
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THE foundation-stone of the new church of St. Ambrose, Pershore Road, Edgbaston, which is to replace the temporary church in which public worship has been conducted for some years, was laid on the 13th inst. The site has been given by Lord Calthorpe, and the cost of the new building will be between 6,000*l.* and 7,000*l.* It will be erected of red brick, with terracotta dressings upon the outside, and Bath stone dressings in the interior. There will be a nave 90 feet long, a chancel 36 feet long, north and south aisles, north and south transepts, a choir vestry with organ-chamber over, clergy vestry, and an apsidal projection at the west end forming a baptistery. A tower and spire 150 feet in height will be added at the north-west corner, and also a south porch, but only a portion of the tower is to be erected at present. Seating accommodation will be provided for 708 worshippers.

TRADE NOTES.

THE churches of Hampton Lovett, near Droitwich, and Kirk Ella, near Hull, have just been successfully lighted by means of the "Cathedral" lamp supplied by Messrs. Jones & Willis, of Birmingham and London. Messrs. Jones & Willis also executed the reredos for the new church of St. Luke, Maidstone, of which Mr. Seth-Smith is architect.

THE Bangor County School, Bangor, North Wales, is being warmed and ventilated by means of Shorland's patent Manchester grates and special inlet panels.

MESSRS. WYLIE & LOCHHEAD, upholsterers, were entrusted with the furnishing and decoration of the reception-room and retiring-rooms specially assigned for the use of the Duke and Duchess of York at the City Chambers, as also the reception-room in the New Art Galleries.

MESSRS. MORRISON, INGRAM & CO., LIMITED, Hygeia Works, Cornbrook, Manchester, announce that they have converted into a private limited company their business and the business of Messrs. Staley Bros., Midway Pottery, Staffordshire (with whom they are amalgamated), with the object of re-modelling and extending Midway pottery, building increased foundries, sanitary engineering workshops and sanitary pottery works upon land recently acquired, amounting to upwards of 8 acres in extent, in Trafford Park, situated near the Manchester Docks. The title of the company will be Morrison, Ingram & Co., Limited.

MESSRS. S. B. BOLAS & CO. have been awarded the bronze medal for their exhibit of photographs at the Falmouth Exhibition.

VARIETIES.

IN reply to "R. W. K." :—1. Heaton, Butler & Bayne, Garrick Street, London. 2. Lavers, Westlake & Co., Endell Street, London. 3. A. Gibbs & Co., Bloomsbury Street, London.

THE Old Deer Park, containing about 90 acres, is likely to be acquired by the Richmond Town Council.

THE Earl of Carlisle is about to dispose of a large portion of his Manor Park estate at Hampton-on-Thames.

MR. W. H. WAGSTAFF, 57 Saltergate, Chesterfield, has been instructed to report as to the best means of sewage disposal at Bolsover, near Chesterfield.

A TABLET is to be erected to the memory of the Rev. A. M. Toplady, the author of "Rock of Ages," in the Devonshire church in which he formerly ministered.

A SITE in Crown Street has now been definitely decided on for the new Aberdeen Post Office. The price at which it is to be purchased is 13,000*l.*

THE treasurers have received from "A Friend of the Dean" a donation of 500*l.* towards the restoration of the west front of Peterborough Cathedral.

THERE is but one church in the Gower peninsula, West Glamorgan, that is unrestored, and that church, Llanrhidian, is removing the reproach. It is an interesting and ancient church of the fourteenth century, and is undergoing very careful restoration.

THE Grand Duke of Hesse has placed at the disposal of the Emperor of Russia an extensive site on the so-called Matilde Höhe, on which the Emperor intends to erect at his own expense a chapel of the Orthodox Church, the construction of which will be commenced next spring.

The Prince of Wales has accepted an invitation to pay a visit to Stanmerham, Sussex, next month to lay the foundation-stone of Christ's Hospital (Blue Coat School). An application has been made to his Royal Highness to leave the train at Horsham, receive an address and drive through the town on the way to the site selected for the new school.

THE restoration of the ancient parish church of Wilmslow has now been taken in hand, and it is expected to cost nearly 2,000*l.*

IMPORTANT TO ARCHITECTS

WM. WALLACE & CO. have special facilities for carrying out Architects'

Designs in the best manner at the lowest possible cost, and invite drawings and specifications for Estimates (free of charge).

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LONDON FEVER HOSPITAL (Nurses' Home),
BANSTEAD ASYLUM (L.C.C.),
ROYAL ASCOT GOLF CLUB,
PIONEER CLUB,

TUNBRIDGE WELLS GOLF CLUB,
DULWICH COLLEGE,
HOXTON HOUSE ASYLUM,
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CRIPPLEGATE INSTITUTE,

ROYAL BENEVOLENT MEDICAL COLLEGE (EPSOM),
METROPOLITAN TOWER CONSTRUCTION CO.

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THE Dewsbury Town Council have investigated charges which had been made by Councillor Wilkinson against Mr. Whitworth, superintendent of the Corporation depôt in George Street, of having accepted bribes for placing orders with a local firm of tradesmen. The Council found there was no foundation for the charges, and called upon Mr. Wilkinson to resign his position on the general works committee.

OWING to the increase in the numbers at Mill Hill School, it has been found necessary to provide further accommodation for the boys. The additional premises are in course of alteration, and will be available for use next term. The Governors are also erecting a number of new studies for senior boys, and extensive chemical and physical laboratories with a large lecture-room. A large schoolroom, to accommodate 250 boys, and the new chapel will be ready early next year.

SEVERAL workmen were engaged in excavating under some old and dilapidated outbuildings on a farm at the village of Orton Longueville, near Peterborough, when they came across a well-made floor about 6 feet below the level, which is entirely constructed of knuckle bones, supposed to be those of sheep and cattle. It is estimated that the singular work is at least 150 years old.

THE School of Art Wood-carving, Central Technical College, Exhibition Road, South Kensington, has been reopened after the usual summer vacation. One or two of the free studentships maintained by means of funds granted to the school by the City and Guilds Institute are vacant. To bring the benefits of the school within the reach of artisans, a remission of half fees for the evening class is made to artisan students connected with the wood-carving trade. Forms of application for the free studentships and any further particulars relating to the school may be obtained from the manager.

ELECTRIC NOTES.

SEVERAL companies have notified their intention to apply for Parliamentary powers for lighting the borough of Lewes by electricity, and have asked for the consent of the Corporation. The Gas Company have also made a request for the Corporation to obtain a provisional order and transfer it to them, the company paying all costs. Owing, no doubt, to the success of the municipal electricity supply undertaking of the adjoining borough of Brighton, the Corporation have been fully discussing the matter, and consider it advisable to obtain expert

assistance. They have therefore decided to consult Mr. F. J. Warden-Stevens, of Westminster.

THE SANITARY INSTITUTE HEALTH EXHIBITION.

THE exhibition which is being held in Camp Road, Leeds, in connection with the Sanitary Congress now in progress, was opened on Tuesday evening by the Lord Mayor in the presence of a large assemblage of leading members of the Institute, sanitarians from various Yorkshire centres and members of the Leeds Corporation, the Yorkshire Ladies' Council of Education and other bodies interested in questions affecting the public health. The proceedings took place in the centre of the great edifice, where an elegantly decorated platform had been specially erected.

The exhibits, of which there are 145, exclusive of the loan collection, are widely comprehensive, embracing as they do in their respective classes (1) building materials and sanitary apparatus; (2) water-supply and sewerage; (3) heating, lighting and ventilating; and (4) personal and domestic hygiene. It is with the first three of the above-named classes that we are principally interested, and among the exhibits in these is a new form of water-closet which possesses in a marked manner many advantages over the existing ones. This new departure, invented by a well-known Liverpool architect, is on exhibition on Messrs. Doulton & Co.'s stall. The closet, which does away with the disadvantages of the present system of flushing, being self-contained, self-acting, silent, simple and absolutely impervious to injury by frost, is to all appearances nothing more than a neat-looking closed cabinet. The usual unsightly open pan, with its ugly cistern and pipes, are conspicuous by their absence, pulls, chains, levers, cranks and syphons being also entirely dispensed with. A water-retainer is placed within a casing behind the water-closet, and the flushing apparatus is worked by the mere raising and closing of the closet lid, which when put down causes the flush to take place, alike unseen and practically unheard, emptying the retainer and pipes thereto, whilst the mere raising of the lid for use again fills the retainer for the flush which follows immediately on its being closed. Frost, even of the severest, cannot damage the apparatus, which effects thereby a saving in plumbers' bills and attendant inconveniences. The closet is known by the name of the O.B. closet, and has already passed successfully the stringent tests of the Liverpool Corporation.



EWART'S COPPER "CROWN" VENTILATOR

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Messrs. Wm. Woollams & Co., of 110 High Street (near Manchester Square), W., show a handsome assortment of their wall papers, free from arsenic; examples of early Victorian and modern wall papers, highly arsenical; set of test tubes, showing arsenical mirrors obtained in testing the above-named arsenical papers; set of test tubes, showing results of testing wall-papers free from arsenic; test tubes, showing result of blank experiment, with pure reagents prior to testing the above, &c.

Messrs. Shanks & Co., Tubal Works, Barrhead, have a comprehensive show of their baths and water-closets, most of which we referred to at some length in connection with the Building Trades Exhibition.

Messrs. Claughton Bros., Bramley, Leeds, send specimens of water-closets, sanitary lead goods, junctions, lead traps, soil pipe terminals, fastenings for lead pipes, such as sockets, clips, tacks, &c., ornamental lead work, rain-water heads, gutters, &c.

Mr. George Jennings, Lambeth, is represented by his rolled edge porcelain bath, fitted with new "Duplex" supply and sanitary waste valves, arranged for public baths; special broad rolled rim iron bath, fitted with new "Duplex" supply and sanitary waste valves, arranged for asylums; rolled edge porcelain bath, fitted with new "Duplex" supply and sanitary waste valves, arranged for private use; cabinet stands fitted with new "Duplex" supply and sanitary waste valves; tip lavatory, fitted in wooden enclosure; strong porcelain lavatory, for schools, &c.; fold-up railway lavatory with patent counter-balanced porcelain tip-up basin, receiver and soap dish, polished walnut moulded casing; syphonic closet, working with waste preventing after flush, regulating supply valve, and variations; concealed urinal in mahogany casing for billiard rooms, &c.

Messrs. Adams & Co., Park Lane Works, Leeds, show examples of urinals and urinal flushing, multiple and single closets, flushing apparatus, sewage ironwork, patent sewage lift, lavatory basins, &c.

The Cordelova Co., Limited, 74 Pitt Street, Edinburgh, have an interesting display of their new material "Cordelova" for wall and ceiling decoration, consisting of dados, friezes, fillings and ceilings in relief.

Messrs. W. Summerscales & Sons, Limited, Phoenix Foundry, Keighley, Yorks, attract much attention with their washing, boiling, rinsing and disinfecting machine. The machine is made entirely of metal, the outer shell of mild steel, the inner revolving drum being of brass perforated. The inner revolving drum is fitted with a patented automatic reversing

motion and locking gear, very effective in operation. The outer shell is provided with a steam-tight door, so that all clothes treated may be boiled under steam pressure, ensuring thorough disinfection. The machine is thus particularly adapted for public-institution work and where infected linen may require to be dealt with, and their Cheltenham ironing flue for heating flat-irons and drying purposes is also shown. The special advantages this flue possesses are the small consumption of fuel, perfect control of fire, thorough cleanliness, the ashes falling into an enclosed chamber, improved method of cleaning grate bars, great durability.

The Blackman Ventilating Company, 63 Fore Street, London, E.C., show a Blackman fan, 30 inches diameter, fitted with motor direct, coupled to drive by electric current, shown in operation; and one 36 inches diameter, for driving by belt, not in operation. They also show their special screen for cleansing air for ventilating purposes, and which may also be moistened for disinfecting, deodorising or perfuming the air, which is shown in operation.

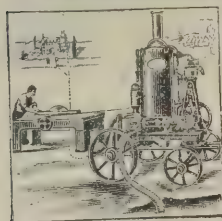
The exhibit of the Expanded Metal Company, Limited, 39 Upper Thames Street, E.C., is practically similar to that which we described at the exhibition at the Agricultural Hall, comprising as it does the now well-known specialties of the firm in expanded metal (Golding's patent); floors and suspended ceilings; solid fireproof partitions; concrete channel iron arch floor; various specimens of expanded metal fencing, tree guards, bowers and other horticultural articles; specimens of expanded brass goods, copper, aluminium, &c.; expanded metal sewage strainer; and their rotary washing machine.

Mr. William Gooding's (North Road Works, Islington, N.) patent interchangeable rubber stair treads are *en evidence*, together with his patent combined safety valve and fusible plug.

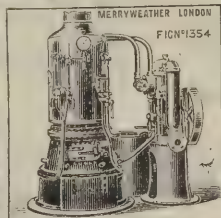
Kendall's Patent Reversible Window Sash Company, Limited, manufacturers, 69 Bath Row, Birmingham, show their patent reversible window sashes and casements, which are cleaned from the inside, and the Eagle Range Company have their usual interesting and comprehensive display of ranges and firegrates, the advantages of which are too well known now to need any particularisation.

We shall give further particulars next week of some of the principal exhibits, amongst which we may mention those of Day's Automatic Closet Co., the Leeds Art Pottery and Tile Co., the Farnley Iron Co., the Valveless Syphon Co., Oates & Green, Jas. Milne & Son, and S. Dixon & Son.

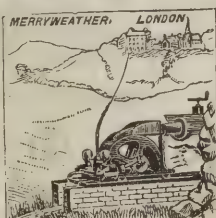
MERRYWEATHER on WATER SUPPLY TO COUNTRY MANSIONS, &



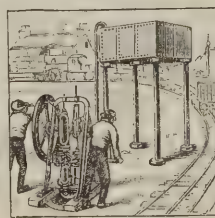
"Estate" Steam Pumping and Driving Engine.



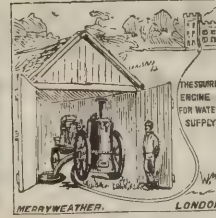
Light Pumping Engine and Boiler.



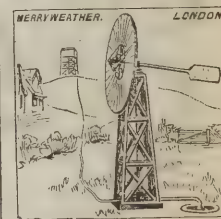
Water Wheel Pumps.



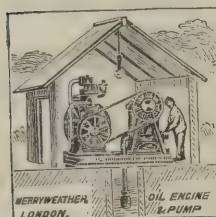
"India" Pattern Pumping Engine.



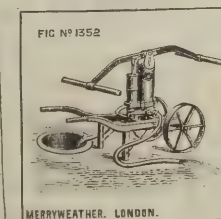
"Squire" Portable Fire Engine.



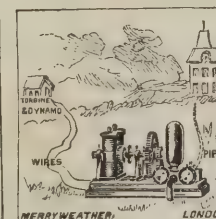
Windmill Pump.



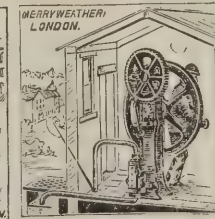
Oil Engine and Pump.



Estate Manual Force Pump.



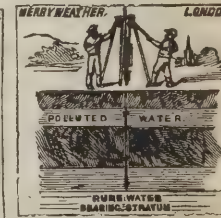
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NEW CATALOGUE.

MESSRS. J. H. SANKEY & SON, of Canning Town, are issuing a new illustrated catalogue, which is replete with information as to the firm's specialties, which comprise every variety of fire-bricks, boiler heating blocks, boiler flue covers, boiler fronts, fireballs, gannister, silica sand, crucibles, muffles, tuyers, runners, fireclays, &c. Sections and dimensions are given, and users will find the book very useful for easy reference. Messrs. Sankey & Son invite special attention to their patent deep intercepting gully, for which they claim the following advantages. Drains cannot block or sewer-gas escape where these gullies are used; effectual trapping, great depth of water always above outlet, gases from drain absolutely prevented from escaping into gully; gully does not unseal in the dry weather; specially constructed iron bucket, with long handle; water has to pass through perforations in bucket; all solid matter, such as stones, wood, grease, straw, &c., are intercepted and collected; bucket can be easily removed and emptied at any time without untrapping gully; the inspection-cap allows access to drain for clearing purposes; gullies being made of glazed vitreous stoneware are sanitary and indestructible.

NATIONAL ASSOCIATION OF MASTER BUILDERS.

THE following circular has been issued by the National Association of Master Builders of Great Britain:—

"The strike of plasterers in Liverpool, which commenced on May 1 last, still continues, and is being prolonged through the men on strike being employed by other contractors throughout the country, and I am instructed to write and ask if you will kindly request the members of your Association to refrain from employing these men during the dispute. The master plasterers are contending against the full strength of the National Association of Operative Plasterers, and it is an open secret that, if they are defeated, the operatives in the other branches of the building trade in Liverpool intend to make similar claims which include:—

- (1) Limitation in the number of apprentices.
- (2) The right of their delegates to visit all works to converse with the men.
- (3) Railway fares in and out to country jobs weekly.
- (4) That none other than plasterers do concrete flooring, floating for wood blocks and tiles and lathing.
- (5) The privilege of working overtime, when insisted upon by the men, to be paid time and a quarter, and several other similar unreasonable demands.

"If the trades union is successful in Liverpool these claims will, no doubt, be made in other towns. The officials have declined arbitration, and intimated that the operatives will not return to work until the whole of the demands are conceded.

"I am also instructed to ask you to call the attention of the members of your Association to the resolution which was unanimously passed at the recent meeting of the National Master Builders' Association, at Bristol, enforcing the necessity of all employers increasing the number of their apprentices in order to remove the present inconvenient scarcity of labour.—Yours faithfully, J. ALFRED S. HASSAL, Secretary.

P.S.—In taking on any plasterers during the present dispute my Association would suggest that full inquiries be made as to where they were last employed.

PATENT VICTORIA STONE.

THIS material has been far too long familiar to architects, builders, contractors and those engaged in public works to render any dilatation on its merits in the least degree necessary. A material which has stood the test of some thirty years' use, and that under the most exacting conditions, can require no further or other recommendation. Having been used for the paving of the northern approach to London Bridge for the last ten years and of the southern approach to Blackfriars Bridge for nearly thrice as long a period, Victoria stone is quite outside the pale of criticism and altogether *hors de concours*.

Within the last year or so, however, the Patent Victoria Stone Company have enlarged their field of operations by showing that the stone is as adaptable to, or rather as suitable for, ornamental as it has long been shown to be for utilitarian purposes. In other words, that the stone may be moulded or carved—or both—in any design and to suit any purpose, and can be produced in any colour, making it possible therefore to match any natural stone. Thus the same material which is the paving of a nobleman's stable may be employed for a delicately carved pedestal in his library or the more boldly sculptured pillars of his park gates.

Proof of this adaptability is clearly shown at the exhibit of the company at the Victorian Era exhibition at Earl's Court. Here—in that part of the building which is known as the Ducal Hall—the stone is presented in several ornamental forms, chief among them being a large window frame, which has been designed by Messrs. Leeming & Leeming, and carved

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by Mr. C. H. Mabey, of which we publish an illustration. The design, which has been most admirably executed, is in the Renaissance style, and is specially noteworthy for its restraint,



for while replete with artistic charm it has the further merit of not being overloaded with detail.

There is also at the stand a handsome panel which has

been designed to commemorate the Diamond Jubilee. This also is the work of Mr. Mabey. The centre bears a medallion portrait of the Queen, supported by winged and unwreathed cherubs, and, although the head is perhaps a trifle too large, the whole has a very good effect.

The same sculptor is responsible for two finely cast vases. They are in coloured stone, and being artistically cast have a very handsome appearance.

At the stand there are two carved panels, mention of which must not be omitted. One is in coloured stone, and bears as the design a central shield supported by cornucopie and florid ornamentation; the other is of plain stone, and in that which we believe is called the Neo-Grec style. The design is of a somewhat florid character, but this is tempered by a central *patra* or boss, and other severe details. These panels are very good, especially as showing two different but equally effective styles.

Very clever, both in idea and execution, is that which may be called the company's panel. At each end is a cherub, the one blowing a trumpet and the other with hand outstretched, both thus presumably, though perhaps unnecessarily, directing attention to the words "Victoria Stone," which are chiselled on a tablet in the centre of the panel.

The company also exhibit samples of their Patent Opalite Tiling, which would lend themselves very admirably to purposes of ornamentation. The enamel is very brilliant, as are the colours, the purity of the white and a particularly fine blue being specially noticeable. There are also bricks which have been similarly prepared.

Finally, and as showing that the stone is adaptable to useful as well as to ornamental purposes, the company exhibit a sink with rebated hole for the trap, stair treads, two fluted pedestals, a very handsome balustrade for a garden terrace and other things, the whole forming a display which not only comprises objects of great artistic merit, but is as a whole most imposing and attractive, and sets forth in a very clear and striking manner the admirable adaptability of the patent Victoria Stone to purposes of ornament as well as usefulness.

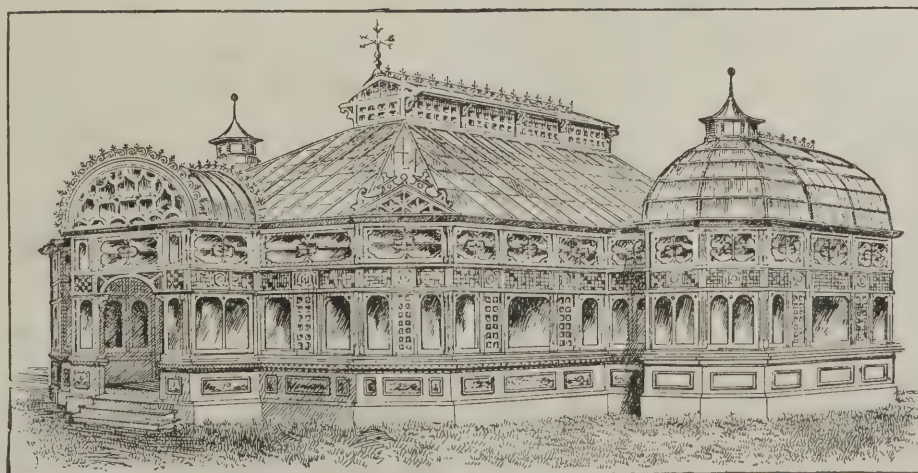
The stone used for ornamental purposes by the Victoria Stone Co. is prepared and manufactured by the same process as that used so successfully by the firm for the variety of heavy work for which this stone has been supplied during the past 30 years, the only difference being that the work now exhibited is of a much finer grain, and therefore more easily lends itself to the carver's artistic treatment.

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TEMPORARY ACCOMMODATION FOR WORKMEN.

THE great influx of workmen, chiefly navvies, into Epsom, owing to the erection of the new asylum for the London County Council on the Horton Manor estate, is causing some concern to the local authorities. There being insufficient lodging accommodation in the town many of the men sought shelter at the workhouse, but not being destitute, they could not be treated as paupers or casuals. Some tents have been erected in contravention of the by-laws, and a great number of men are reported to be sleeping in the open air and finding shelter wherever they can. The men have, however, given the police little or no trouble. Two meetings have been held by the Epsom Urban Council to consider the question with a view to taking action under the Housing of the Working Classes Act, and the Council have drawn up a scheme which, if carried out, would involve the borrowing of 7,500*l.* for the erection of fifty cottages (estimated to accommodate 500 men) on their own land. It is calculated that the rents derived from these cottages would yield an annual profit of 100*l.*, after allowing for the repayment of instalments of borrowed money with interest. The carrying out of this scheme depends upon any action which the London County Council may take to meet the difficulty, and the Epsom Council are in correspondence with that body on the subject. They have received an intimation that the asylums sub-committee have instructed the architect to communicate with the contractors. The need of accommodation will be felt still more after Christmas, when, it is stated, 1,600 men will be engaged on the work, chiefly carpenters and bricklayers.

WIRELESS TELEGRAPHY.

THE honour of being the earliest discoverer of wireless telegraphy is claimed by the *Dundee Advertiser* for Mr. James Bowman Lindsay, a teacher of science, who died in Dundee in 1862. According to our contemporary Mr. Lindsay conceived the idea of telegraphing without wires as early as 1831, and actually carried it into practice successfully in 1857. In the latter year he made experiments in the presence of several local scientific men at Earl Grey Dock, Dundee, and succeeded in sending messages from one side of the dock to the other. He dispensed with wires, using the water as his communicating medium. Mr. Lindsay afterwards extended the plan of his

experiments. He placed his plates and batteries on each side of the Tay, at Dundee and Woodhaven, where the river is nearly two miles wide, and here also he succeeded in sending messages from one side to the other without wires. In 1859 he read a paper on the subject of his theory before the British Association at Aberdeen, and at the same time conducted a further series of experiments at the Aberdeen Docks to demonstrate its correctness. Mr. Lindsay entertained great hopes of his system being used for telegraphing over much longer distances, for he made calculations to show that, by selecting two stations in Britain—one in Cornwall and the other in Scotland—and two corresponding stations well chosen in America, it would be possible to transmit messages across the Atlantic without employing cables. Although Mr. Lindsay's experiments aroused a good deal of discussion forty years ago, nothing was done to apply his theories to practice, and he himself died only a few years later in circumstances bordering on penury.

MR. F. S. PERCIVAL, of Portmadoc, South Carnarvonshire, has undertaken the erection of a choir and clergy vestry for St. John's Church in that town. The church will then only require a tower to be complete.

HORSES first, but not horses alone, were the attraction at the very successful Dublin Horse Show this year, and lady visitors to the familiar grounds at Ball's Bridge were much interested in the exhibits in the galleries. Many of these were very admirable, one of the most important and attractive being the display of artistic and inexpensive furniture made by the firm of Oetzmänn & Co., of Hampstead Road, London, whose Irish branch is at 61 Grafton Street, Dublin. Amongst other items Messrs. Oetzmänn exhibited a delightful cosy corner of white enamelled wood richly upholstered in pink silk, and yet quite inexpensive; a Sheraton writing-table of inlaid mahogany; a very handsome 7 feet high china cabinet of mahogany delicately inlaid; a newly-designed easy chair, upholstered in rich vieux rose silk; and one of their stained green wood bedroom suites, fashionable and liked for their extremely moderate price and quaint prettiness of design. Messrs. Oetzmänn's exhibit will doubtless tempt the Dublin ladies who saw it to extend their acquaintance with the firm's inexpensive productions, by paying a visit to their showrooms at 61 Grafton Street.

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RAILWAY BRIDGES AND ABNORMAL LOADS.

A RATHER extraordinary state of things has arisen at Round Oak, Staffordshire, owing to the refusal of the Great Western Railway Company to allow the passage over one of their bridges of a casting about 43 tons in weight, borne on a carriage which increases the load by about 5 tons. The casting comes from the dismantled works of the New British Iron Company, and was on its way by a somewhat circuitous route to the Old Level Iron Works. When the former works were sold under the hammer the original purchaser of the casting sacrificed his purchase owing to the great difficulty of transporting such an enormous weight, and it was subsequently bought by the present owner for the purpose of being used at the Level Works. All went well with the transport of the casting till about a month ago, when it neared the railway bridge in question. The railway officials peremptorily declined to let it pass owing to the risk to the bridge that might be incurred, and they contended that it could not be said to come under the definition of the ordinary traffic of the district for which alone they have to provide bridges of sufficient strength. The contractors for the removal, however, hold that in an iron-making district it is the duty of the railway company to provide for the passage of weights as heavy as that referred to, though they may only rarely pass along the highway. The propping of the bridge while the casting passes would, it is understood, lead to some interruption of traffic. There was an idea among the railway officials that one night an attempt would be made to risk the passage of the bridge, and to the surprise of the public, a trench was found cut across the road, but this was subsequently levelled again. Meanwhile the casting has to be specially guarded in order to avoid accidents. While the railway company refuse to let the casting pass over the bridge, the local authorities threaten proceedings for obstruction of the road. The deadlock has now existed for a month, and the subject is arousing much interest in the neighbourhood.

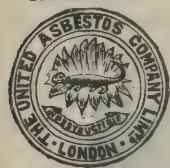
THE PATENT LAW.

A CORRESPONDENT of the *Times* writes:—Our English patent law differs from that of our commercial rivals in the careless liberality with which it treats foreigners. They obtain full protection in this country by complying with the most ordinary formalities; they occupy the time of our courts often to an inordinate extent, as in some recent cases; they can enforce

the extreme technical rights of a patentee, even to the grave prejudice of native industry and of the common weal; yet they are under no obligations to the State, nor do they make any return for the advantages they enjoy. The native inventor obtains the benefit of a limited monopoly on the ground that he is thereby encouraged to spend time, labour and money in developing industries which furnish employment, circulate capital, and aid this country to maintain and extend its foreign trade. The foreign inventor enjoys precisely the same benefits at the hands of the State, but is not bound to render any of these services in return. On the contrary, he is assisted and encouraged to employ labour in other countries, to circulate foreign capital and to promote the commercial advancement of our rivals in the markets of the world. He can and does make every ounce of his commodity abroad, dumps it upon our market and defends his monopoly against some native product, probably just as good, often upon the strength of a quibble which it takes a judge and an army of experts ten days to determine. This is probably supposed by some to be free trade. As a matter of fact it is diametrically opposed to free-trade principles. Free trade forbids all monopolies, limited or not, on the ground that they are *prima facie* opposed to the public interest. Only when this presumption can be rebutted by evidence that the public interest is better served by granting than by withholding a monopoly can the bestowal of protection be defended on public grounds. Now this country has no interest in protecting the inventions of foreigners. The foreign inventor will go on inventing upon the encouragement given to him by his own Government, and if he seeks protection at home he cannot avoid disclosing his process to the world. The interest of this country lies in following the free-trade presumption and refusing protection, because in that way it encourages the production by native labour and capital of what would otherwise have to be imported to the gain of the foreign monopolist. No State is bound to create a monopoly for the benefit of individuals, least of all for the benefit of persons who are not its own subjects, but rather their active competitors. Before they obtain protection they ought to show, much more clearly than the native inventor, in what way the State is to obtain advantages for itself and its own subjects.

Other countries are careful to insist upon this indispensable condition of protection. Admitting as they do that the civilised world has a collective interest in the encouragement of invention, they yet refuse utterly to contribute to that encouragement without remuneration. In France, for example, a patent is not

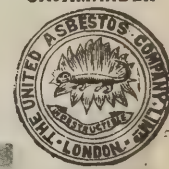
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valid unless it is actually worked in the country within two years after it is granted. In other words, the patentee is allowed two years to show that he is going to give an equivalent by employing French capital and labour, and if he fails to do this his monopoly lapses. By the German law an inventor is bound within three years to put his invention to practical use within the realm, and to grant licenses on reasonable terms to other persons who may desire to work it. Failure to comply with these conditions makes the patent void. The law in both these countries is simple, reasonable and equitable. The State gives two or three years' protection upon credit. Thus the inventor has time to discover for himself and to show to others what the invention is worth in practice, and also to find out whether it is better to keep the working in his own hands or to license other parties. If it is not worth his while to do one thing or the other within the realm, then he is not allowed to flood the market with his commodities made abroad. There is no analogous provision in the English patent law except a clause dealing with compulsory licenses, which is a miracle of futility. It runs thus:—"If on the petition of any person interested it is proved to the Board of Trade that by reason of the default of a patentee to grant licenses on reasonable terms—(a) the patent is not being worked in the United Kingdom; or (b) the reasonable requirements of the public with respect to the invention cannot be supplied; or (c) any person is prevented from working or using to the best advantage an invention of which he is possessed—the Board may order the patentee to grant licenses on such terms as to the amount of royalties, security for payment, or otherwise as the Board, having regard to the nature of the invention and the circumstances of the case, may deem just, and any such order may be enforced by mandamus." Here, instead of the simple and automatically working provisions of the French and German law, we have the matter referred to the discretion of the Board of Trade, which can act only after an expensive inquiry in which the whole *onus probandi* is thrown upon the wrong shoulders. It is for the person who gets the monopoly to show cause why he should retain it, not for ordinary citizens to prove, first, that they have a *locus standi* which is not specifically conferred, and, second, that the patent is contrary to the public interest. It is not perhaps very wonderful that this remarkable clause has never been enforced. At present, however, there are several petitions before the Board of Trade invoking its power under the Act to compel certain foreign patentees to grant licenses to English manufacturers. As in some cases

very important and lucrative manufactures are in question, the action of the Department will be watched with much interest.

But what is the Board of Trade to do? This absurd clause has evidently been framed without a thought of the foreign patentee. It is directed exclusively against the British patentee who may refuse proper facilities to the British public. The Board of Trade, after inquiry, is to make an order, and such order may, if necessary, be enforced by mandamus. But what does the foreign manufacturer care for the mandamus of a British court? He is not within its jurisdiction, and it is more than doubtful whether any court could be found to make itself ridiculous by issuing an order which it has no power to enforce. There is no power to cancel the patent or to stop the importation of the commodity, although these are the only means at command of bringing the foreign patentee to terms. It would seem, therefore, that in order to secure for the State in this country the advantages insisted upon by other countries in return for conferring a valuable monopoly, it is necessary to make a change in the law. Instead of the ineffectual 22nd clause just quoted, there ought to be a provision something to this effect:—"If within three years of its issue, or, in the case of an existing patent, within eighteen months from the passing of this amendment, a patent is not worked within the realm to an extent adequate to meet the home demand, either by the patentee himself or by licensees, the patent shall become void." In this way all patentees, whether British or foreign, would be placed upon the same footing, and the remedy for existing evils would work automatically. Any patentee in advance of his age would retain protection, because there would be no public demand for him to neglect. The settlement of royalties would not be left to the judgment of the Board of Trade, but would be effected by agreement between the parties interested. Finally, the State would reap the advantages from foreign patents which it now derives only from English ones and which all our commercial rivals insist upon securing in return for protection.

ELECTRIC SUPPLY, LIVERPOOL.

A RESOLUTION of the Liverpool lighting committee on August 6, 1897, decided "that the city electrical engineer be instructed to report fully on the extensions of generating stations and plant that will be necessary to meet the demand for electrical energy in 1898." He has accordingly submitted a report which states that the equivalent number of 16 candle-power lamps

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ANY FURTHER PARTICULARS AND PRICES ON APPLICATION

connected to the supply mains at various dates has been as follows:—July 1, 1894, 27,580; July 1, 1895, 33,732; July 1, 1896, 41,515; July 1, 1897, 57,336. In arriving at the above figures, each arc lamp is considered to be equal to nine incandescent lamps, and the electrical energy supplied for motors is expressed in the number of incandescent lamps that it would be capable of supplying. The increase in the number of lamps during the first year the supply has been in the hands of the Corporation has been nearly 16,000 lamps as against an increase of 8,000 lamps for the previous year. The equivalent number of lamps, for the supply of which applications have been received up to August 1, exceeds 63,000. Of this number about 7,500 lamps represent the supply of electrical energy to the Corporation for public buildings and street lighting. In addition to the demand for electrical energy for lighting, the favourable rates offered for power purposes are developing a demand for hoists and for motors for use in printing and other trades, and experience in other places indicates that a very material increase may be anticipated in this branch of the business.

In dealing with the extensions necessary to meet the demand for the coming year it is desirable to consider what the demands for electrical energy may ultimately amount to, so that any arrangements now adopted may form part of the larger undertaking that may be necessary to meet developments in the more distant future. The area of supply comprised in the Liverpool electric-lighting order of 1896 includes the whole of the extended city, a district about $7\frac{1}{2}$ miles long and 5 miles wide. It is not unreasonable to assume that this area may ultimately require the equivalent of 250,000 to 300,000 16 candle-power incandescent lamps, or, say, 25,000 horse-power for lighting and, say, 5,000 horse-power for motors and other purposes. In addition to this the tramways may ultimately require at least 10,000 horse-power. Although the plant required for lighting will always largely exceed that required for tramways, the advantages of a plan that provides for a supply of electrical energy for all purposes from the same stations are so obvious that the electrical engineer feels that the committee will desire to consider the subject in its broadest aspect and to invite the co-operation of the tramways committee, and he submits a complete scheme for their consideration. For this purpose he assumes that the power required at a not very distant period for the generation of electrical energy may be estimated as follows:—For lighting 25,000 horse-power, for motors 5,000 horse-power, for tramways 10,000 horse-power—total 40,000 horse-power.

The main points that require to be decided are:—The number, size and location of the generating stations, the system of generation and distribution, the type and size of plant to be adopted as the unit. When a generating station reaches a certain size, little if any economy in working can be attained by increasing its size. For example, two stations of 10,000 horse-power each can be worked with practically the same economy as one station of 20,000 horse-power, and by subdivision the risks of stoppage by fire, explosion and any other accident are minimised. Whatever system of distribution is adopted, a station is most advantageously situated when placed in the centre of the area to be supplied. In stations supplying energy for lighting only the average working hours at heavy load do not exceed two hours per day, and consequently the charges for interest and depreciation on the capital value of the plant form a much larger proportion of the cost of production than the coal bill. For this reason such stations should have plant of the simplest description and be located, as nearly as circumstances admit, in the centre of the area to be supplied. On the other hand, a station supplying energy for tramways will carry a large load throughout a working day of sixteen to eighteen hours, and in this case interest and depreciation are of less relative importance than the cost of fuel. Power stations therefore should be located so as to secure the cheaper delivery of fuel by railway or canal, and the additional cost of condensing plant may be wisely incurred.

It is often assumed that the cost of electrical energy depends mainly on the size of the generating station. This is not the case beyond a certain limit, but the main factor is the number of hours the plant can be run daily at a reasonably good load. The Paradise Street and Oldham Place stations are very favourably located for the supply of energy for lighting in the most important portion of the city, and when completed will be capable of supplying about 10,000 horse-power for this purpose, with due regard to economy of working.

Electrical energy can be generated and distributed either in the form of direct current or of alternating current, and either at high voltage or at low voltage, the latter not exceeding 500 volts. As regards the cost of production in the generating station, there is no difference between the two systems, except that the greater ease with which machinery can be worked in parallel on the direct current system somewhat lessens the cost of attendance. The alternating current is not suitable for directly supplying tramways or motors or for arc lamps or for charging accumulators, but has great advan-

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tages when energy has to be distributed over very long distances at pressures of more than 3,000 volts. In every system of electrical distribution it is necessary to have a low pressure network of distributing mains to which the consumers' service lines are connected, and to convey the electrical energy from the generating station to this network by feeding mains. When a district is sparsely populated, or in cases where it is impracticable to find a suitable site for the station within the area of supply, the cost of low-pressure feeding mains may become commercially prohibitory, and it is then necessary to use a high-pressure system of distribution with transforming stations, in which the high-pressure current can be transformed into the lower pressure necessary for the distributing network. Any transformation of energy from one pressure to another entails a loss in the process and a certain amount of complication, and is consequently to be avoided as far as possible. For the work to be dealt with in Liverpool the alternating current system is for the most part unsuitable, and high-pressure and transforming apparatus unnecessary.

The pressure required for tramways is about 500 volts, and as the bulk of the Liverpool tramways are situated within a circle of only two miles radius, the direct supply of energy to them at the above pressure presents no difficulty. As regards lighting and motors, the supply is now given in all but the centre portion of the city at a pressure of 220 volts, and as the supply mains are arranged on the three-wire system, the pressure at the distributing points will ultimately be 440 volts.

The economical limit for distribution for lighting purposes at this pressure does not exceed two miles from the generating station, and, consequently, for some of the most distant portions of the area of supply the energy will have to be transmitted at higher pressure (say, 1,000 to 3,000 volts), and reduced at transforming stations to the pressure of supply. The areas to be dealt with in this exceptional manner will, however, be but a very small portion of the total area. Plant of similar design can be used both for lighting and for the tramways, which would reduce the amount of spare plant which would be required.

The electrical engineer submits for the consideration of the committee that the future demand for electrical energy should be provided for in the following way:—That sites should be secured, preferably at Pumpfields and Edgehill, for two generating stations, each with sufficient space to contain plant of 15,000 horse-power; that the stations should be designed for construction in sections as the demand for electrical energy

increases; that the system of generation and distribution should be direct current not exceeding 550 volts pressure, except for the outlying districts, and that the engines should be compound or triple expansion, with condensing apparatus, each capable of developing 1,000 horse-power at most economical load.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

17922A. John Shettle, for "Improvements in ruling or measuring devices."

19900. Emanuel Grinnall, for "'Simplex' window-sashes and casements."

19907. Stephen Charles Armstrong, for "Sash rattle preventer."

19962. Frank Garrett, for "An improved method of unlatching doors by the foot."

19971. Moses James Adams, for "Improvements in water-closets."

19972. Moses James Adams, for "Improvements in flushing valves."

20007. Adam McKee, for "Improvements in fittings for hose and like pipes."

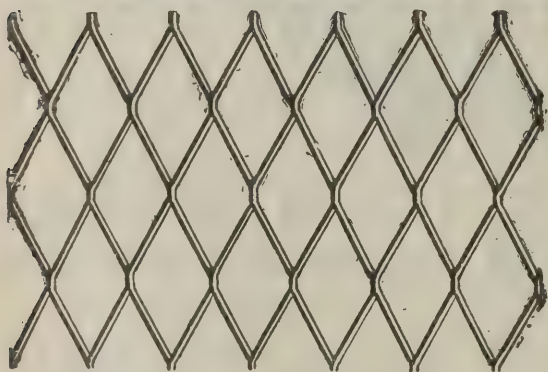
20047. George Henry Rayner, for "Improvements in the construction of taps."

20073. Stephen Kempner, for "Improvements in lamp chimneys."

20111. Wray Cockroft, for "Improvements in door-locks or latches, and keys therefor."

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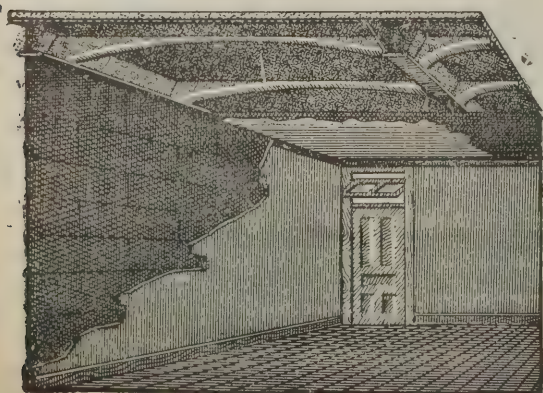
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Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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For Advertisement Scale, see page xv.

COMPETITIONS OPEN.

BEXHILL-ON-SEA.—Designs invited for promenade pier and pavilion. Secretary, Bexhill Pier, Park and Land Company, Limited, 7 Sackville Road, Bexhill-on-Sea.

BLACKBURN.—The committee of the St. Mary's Catholic new infant school, &c., Dean Street, Blackburn, offer two prizes for the best plans for the school.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500l., 300l. and 200l. respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

COLNE.—Oct. 20.—Premiums of 50l. and 35l. for plans for technical schools, public library and public hall. Mr. T. H. Hartley, borough engineer, Colne.

DORKING.—Oct. 13.—Plans and estimates are invited for the erection of an infirmary. Mr. George Scales, clerk to the Guardians, High Street, Dorking.

LEEDS.—Oct. 8.—The Corporation offer premiums of 100l., 50l. and 25l. for the three best designs for a wholesale dead-meat market and abattoir. City engineer, Municipal Buildings, Leeds.

LICHFIELD.—Premiums of 10l. and 5l. offered for designs for nursing home and invalids' kitchen. Mr. R. R. Redmayne, 22 Dane Street, Lichfield.

LOWER BEBINGTON.—Oct. 1.—The Lower Bebington Urban District Council offer premiums of 50l., 35l. and 20l. for

the three best designs for a scheme of sewerage for that portion of their district now being drained into the Bromborough Pool. Mr. Thomas Sproat, 5 Castle Street, Liverpool.

LUDLOW.—Oct. 1.—The Corporation offer a premium of 20l. for the best and most economical scheme of electric lighting for the borough. Mr. John Herbert Williams, town clerk, Ludlow.

MERTHYR TYDFIL.—Sept. 30.—The School Board offer a prize of 10l. for the best plan of erecting a second floor to the infants' school. Mr. E. Stephens, School Board offices, Merthyr Tydfil.

MORECAMBE.—Oct. 1.—The Urban District Council offer a premium of 100l. for the best scheme of an improved and extended sewerage system. Mr. Jno. Bond, surveyor, Morecambe.

SKIPTON.—Sept. 30.—The Skipton and District Cottage Hospital committee offer premiums of 15l. and 5l. for the best designs for a cottage hospital, at a cost of 2,500l. Mr. W. H. Dawson, hon. sec., Skipton.

SOUTHEND-ON-SEA.—Nov. 20.—Plans invited for new church. Rev. E. E. Kimber, St. Albans, Avenue Terrace, Southend-on-Sea.

UXBRIDGE.—Oct. 30.—The Uxbridge Rural District Council invite plans for a scheme of sewerage and sewage disposal. Mr. Charles Woodbridge, 38 High Street, Uxbridge.

CONTRACTS OPEN.

ASHTON-UNDER-LYNE.—For erection of cottages. Messrs. John Eaton, Sons & Cantrell, architects, Stamford Street, Ashton-under-Lyne.

BELFAST.—For erection of villa residence at Whitehead. Mr. Thomas Pentland, architect, 35 High Street, Belfast.

BELFAST.—Oct. 7.—For erection of a central police station and other works in Chichester Street and Town Hall Street. Sir Samuel Black, town clerk.

BETHNAL GREEN.—Oct. 5.—For construction of a hand-stand and other works upon sites on the Boundary Street area. Architect's Department, 17 Pall Mall East, S.W.

BIRMINGHAM.—Sept. 29.—For erection of epileptic accommodation at the workhouse infirmary. Mr. W. H. Ward, architect, Paradise Street, Birmingham.

BLAENAVON.—Oct. 9.—For erection of an additional classroom at the Garn Schools. Messrs. Lansdowne & Griggs, architects, Newport, Mon.

BOOTLE.—Sept. 30.—For building school. Messrs. Cox & Marmon, architects, 11 Dale Street, Liverpool.

BRADFORD.—Sept. 28.—For building seven houses and house and shop. Mr. Samuel Robinson, architect, 15 Cheapside, Bradford.

BRENTWOOD.—Oct. 2.—For erection of a boiler-house and extension of the clerk's offices at the asylum. The Medical Superintendent, Asylum, Brentwood.

BRIDLINGTON.—Sept. 28.—For erection of ten houses and premises, Fairfield Road, Hilderthorpe. Mr. J. Earnshaw, architect, Bridlington Quay.

BRIDLINGTON.—Sept. 30.—For alteration and repairs to Hardwick & Sons' shop and premises. Hardwick & Sons, Quay Road.

BURNLEY.—Sept. 29.—For erection of a memorial fountain, Queen's Park. Borough surveyor, Town Hall, Burnley.

CARDIFF.—Sept. 30.—For alterations and additions to the Barry Intermediate School. Mr. T. Mansel Franken, clerk, Glamorgan County Offices, Westgate Street, Cardiff.

CHADWELL HEATH.—Sept. 28.—For building foundations, lodges, &c., in connection with lunatic asylum. Mr. Lewis Angell, Town Hall, Stratford.



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CROYDON.—Oct. 4.—For internal repairs, cleaning, distempering, painting, &c., at infirmary, Mayday Road, Thornton Heath, and for certain repairs to and relaying portions of the tar paving at Workhouse, Queen's Road, Croydon. Mr. Harry List, clerk, Union Offices, Mayday Road, Thornton Heath.

DEVONSHIRE.—Oct. 6.—For taking down old and erecting new farmhouse and buildings at Lafter Hole, Princetown. Mr. Richard C. Merson, architect, Hollybank, Yelverton.

DORSET.—For erection of a footbridge in the parish of Moreton. Mr. W. W. Fookes, surveyor, Wareham.

DOUGLAS.—Oct. 2.—For constructing brick and stoneware pipe sewers. Messrs. Stevenson & Burstal, 38 Parliament Street, Westminster.

DURHAM.—Sept. 30.—For erection of a continuous brick kiln for a chimney 110 feet high. Mr. John Curry, manager, Chilton Moor, Fence Houses.

ENFIELD.—Oct. 13.—For erection of an isolation hospital on land adjoining the Northern Hospital, Winchmore Hill. Messrs. Young & Brown, 7 Southampton Street, Bloomsbury Square.

ERDINGTON.—Sept. 29.—For making roads. Mr. H. H. Humphries, Public Hall, Erdington, near Birmingham.

ESSEX.—Oct. 4.—For erection of a classroom to Highwood School, Writtle. Mr. A. P. Lindsell, clerk, Writtle.

FEATHERSTONE.—Sept. 28.—For erection of nineteen houses. Messrs. Garside & Keyworth, architects, Pontefract.

FORRES.—Sept. 27.—For additions to hydropathic establishment. Mr. John Forrest, architect, 129 High Street, Forres, N.B.

HALIFAX.—Sept. 29.—For building dwelling-house. Messrs. C. F. L. Horsfall & Son, architects, Lord Street Chambers, Halifax.

HALIFAX.—Oct. 4.—For erection of a drapery warehouse and offices in Rawson and Powell Streets. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HALIFAX.—Sept. 29.—For erection of a dwelling-house on the Blackwood House Estate, Pellon. Messrs. Chas. F. L. Horsfall & Son, architects, Lord Street Chambers, Halifax.

HALIFAX.—Oct. 6.—For erection of a school to accommodate a mixed department in connection with the Triangle infant school. Mr. W. Clement Williams, architect, 29 Southgate, Halifax.

HALTON.—For erection of four houses at Graveleythorpe. Mr. C. W. Lambert, 39 Whingate, Armley.

HARPENDEN.—Sept. 29.—For erection of police station. Mr. Urban A. Smith, county surveyor, 41 Parliament Street, S.W.

HAVERSTOCK HILL.—Oct. 13.—For erection of a gate porter's lodge at the North-Western Hospital. Messrs. Pennington & Son, architects, Hastings House, Norfolk Street, Strand, W.C.

HAWARDEN.—Oct. 2.—For erection of the county school. Messrs. Grayson & Ould, architects, 31 James Street, Liverpool.

HEMSWORTH.—Sept. 29.—For additions to the King's Head Hotel. Messrs. R. & W. Dixon, auctioneers, 5 Eastgate, Barnsley.

HILLSBOROUGH.—For erection of two houses. Mr. T. Peckett, 19 Wood Road, Hillsborough.

HOMERTON.—Sept. 29.—For building boundary walls and laying-out exercise-ground at the Hackney Union Infirmary. Mr. Frank R. Coles, clerk, Homerton, N.E.

HUDDERSFIELD.—Sept. 29.—For erection of offices and extensions to mill. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.

IPSWICH.—Sept. 30.—For erection of business premises. Messrs. Eade & Johns, architects, Cornhill Chambers, Ipswich.

IRELAND.—Oct. 1.—For erection of a medical officer's residence and dispensary in the town of Arklow. Mr. B. Manning, clerk, Workhouse, Rathdrum.

IRELAND.—Oct. 2.—For alterations and additions to the Magheragall parish church. Mr. Blount, architect, Atlantic Buildings, Waring Street, Belfast.

IRELAND.—Oct. 9.—For building a chronic block and farm offices at the Mullingar District Lunatic Asylum. The Secretary, Board of Control, Custom House, Dublin.

IRELAND.—Oct. 4.—For erection of a stationmaster's office at the passenger station, Banbridge, and for alterations to the station; also construction and erection of platform roofs at Banbridge and at Clones, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

KEIGHLEY.—Sept. 27.—For erection of a fence wall at Marley. Mr. W. H. Hopkinson, borough engineer.

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PRICE LIST AND ESTIMATES ON APPLICATION.

KEIGHLEY.—Sept. 28.—For erection of residence and stabling, Hollins Lane. Mr. J. Ledingham, District Bank Chambers, Bradford.

KIRKBY LONSDALE.—For alterations and additions to the Royal Hotel. Mr. John Kassell, architect, Kirkby Lonsdale.

LANCHESTER.—Oct. 6.—For erection of laundry at work-house. Mr. G. T. Wilson, architect, 121 Durham Road, Black Hill.

LEEDS.—For erection of a caretaker's house at Whingate Road School. Mr. W. S. Braithwaite, architect, School Board Offices, Leeds.

LEEDS.—For erection of two houses, Whingate, Armley. Messrs. Ambler & Bowman, architects, 9 Park Place, Leeds.

LEEDS.—For erection of a small detached house, Roundhay, and of a pair of semi-detached houses, Lidgett Park Estate, Roundhay. Messrs. Ambler & Bowman, architects, 9 Park Place, Leeds.

LEICESTER.—Sept. 28.—For excavating and foundation for additions to the borough asylum. Mr. George T. Hine, 35 Parliament Street, Westminster, S.W.

LEWISHAM.—Sept. 27.—For erection of lunatic wards at the infirmary, High Street. Mr. Robert Williams, architect, 17 Effingham Road, Lee, S.E.

LIVERPOOL.—Sept. 27.—For additions, alterations, sanitary and other improvements to the Lodge Lane Baths. Mr. W. R. Court, engineer, 15 Great George Square.

LONDON.—Sept. 28.—For alterations at underground convenience. Engineer to the Commission of Sewers, Guildhall, E.C.

MASBOROUGH.—Sept. 27.—For erection of six dwelling-houses, Sarah Street. Messrs. Edward Hutchinson & Son, surveyors, 18 Howard Street, Rotherham.

MIDDLESBROUGH.—Sept. 30.—For erection of a detached dwelling-house, near the Nunthorpe Station. Mr. Robt. Moore, architect, 7 Albert Road, Middlesbrough.

NEWBURY.—For new offices and alterations at the Atlas Brewery, Bartholomew Street. Mr. James H. Money, architect, The Broadway, Newbury.

NEW TREDEGAR.—Oct. 4.—For building six houses on Tir Phil Road. Mr. Geo. Kenshole, architect and surveyor, 26 Duffryn Terrace, New Tredegar.

NORTH WOOLWICH.—Oct. 12.—For erection of a building for stores and offices at the main drainage works near Beckton, for the London County Council. The Engineer, County Hall, Spring Gardens, S.W.

ORMSKIRK.—Sept. 28.—For erection of board-room and offices on land adjoining the workhouse. Messrs. Willink & Thicknesse, architects, 14 Castle Street, Liverpool.

PERSHORE.—Sept. 28.—For alterations to the casual wards at the workhouse. Mr. Joseph Martin, clerk, Union Offices, Pershore.

PERTHSHIRE.—Sept. 28.—For additions and alterations to Aldchapple Hotel, Kirkmichael. Mr. John Leonard, architect, Pitlochry.

PETWORTH.—Oct. 5.—For alterations to workhouse. Mr. Arthur F. Mant, clerk, Petworth.

PONTARDAWE.—Sept. 29.—For building infant school. Mr. W. W. Williams, architect, 63 Wind Street, Swansea.

PRESTON.—For erection of sixteen houses. Mr. G. F. Aveline, Estate Office, Central Station, L. & N.-W. and L. & Y. Railway.

PUDSEY.—Sept. 27.—For erection of a cabinetmaker's workshop in Occupation Lane. Mr. William Davey, 27 Brunswick Road, Pudsey.

RADSTOCK.—Oct. 7.—For construction of steel roof over market and other works, and for the erection of offices, malt-room and other premises. Mr. T. Martin, surveyor, Radstock.

ROTHERHITHE.—Sept. 29.—For building a shelter at South Wharf. Mr. T. W. Aldwinckle, architect, 1 Victoria Street, Westminster, S.W.

ROTHERHITHE.—Oct. 4.—For erection of a chimney shaft, 150 feet high, in connection with a new refuse destructor at the wharf premises, Bull Head Dock, 173 Rotherhithe Street. Mr. Norman Scorgie, surveyor, Town Hall.

SCOTLAND.—Sept. 28.—For erection of public hall for Lumphnan. Clerk to the Parish Council, Lumphnan.

SCOTLAND.—For erection of Rothes Town Hall. Mr. R. B. Pratt, architect, County Bank House, Elgin.

SEAFORD.—Sept. 30.—For alterations at sewage pumping station, and fixing additional machinery, for the Seaford Urban District Council. Mr. B. A. Miller, 3 Clinton Place, Seaford.

SKEGNESS.—For erection of pair of villas in Alghitha Road. Mr. Hy. Harper, architect, Tavistock Chambers, Market Place, Nottingham.

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SOUTHAMPTON.—Oct. 1.—For erection of boiler-house and chimney-shaft at the South Stoneham Union Workhouse, Westend. Messrs. W. H. Mitchell, Son & Gutteridge, architects, 9 Portland Street, Southampton.

SOUTHWARK.—Sept. 29.—For erection of proposed public library in Borough Road. Messrs. C. J. Phipps & A. Blomfield Jackson, architects, 26 Mecklenburgh Square, W.C.

STALYBRIDGE.—For erection of a Conservative club in Mottram Road. Messrs. John Eaton, Sons & Cantrell, architects, Stamford Street, Ashton-under-Lyne.

ST. ALBANS.—Sept. 27.—For heating and ventilating Camp-field Works. Mr. G. P. Smedley, architect, 110 St. Martin's Lane, London, W.C.

SWANSEA.—For alterations and additions to the Waterloo Hotel, Oxford Street. Messrs. Margrave & Peacock, architects, Metal Exchange, Swansea.

TADCASTER.—Sept. 28.—For erection of four villas. Messrs. Bromet & Thorman, architects, Tadcaster.

TUNBRIDGE WELLS.—Sept. 27.—For enlargement of boiler-house at Pembury, four miles from Tonbridge and Tunbridge Wells Stations. Mr. T. E. W. Mellor, Town Hall, Tunbridge Wells.

WALES.—Sept. 27.—For erecting a chapel at Pencoed. Rev. Stephen Jones, Coychurch, Bridgend.

WALES.—Oct. 1.—For erection of police station buildings, with cells and petty sessions court, at Redditch. Mr. Henry Rowe, county surveyor, Worcester.

WALES.—Oct. 11.—For alterations and improvements to the Cymmer Board Schools, Porth. Mr. Jacob Rees, Hillside Cottage, Pentre.

WALES.—Sept. 29.—For erection of fifty cottages at Trealaw, Rhondda Valley. Mr. T. R. Phillips, architect, Old Bank Chambers, Pontypridd.

WALES.—Sept. 30.—For alterations to Groesfaen farmhouse, Bargoed. Mr. W. E. R. Allen, Glamorgan County Offices, Westgate Street, Cardiff.

WALES.—Oct. 4.—For erection of a cottage at Frongoch. Mr. Geo. Boxall, secretary, Great Western Railway Offices, Paddington Station, London.

WEYBRIDGE.—Oct. 6.—For erection of stables in Elm Grove Road. Mr. John S. Crawshaw, surveyor, Weybridge.

WINLATON.—Sept. 27.—For building a dwelling-house, blacksmith's shop and out-offices; and for building dwelling-house and offices. Mr. Wm. Allen, architect, 16 Ryton Village East, Ryton-on-Tyne.

YORK.—Sept. 29.—For widening and laying-down railway. Mr. C. N. Wilkinson, North-Eastern Railway Company, York.

TENDERS.

BARNET.

For additions to the Victoria Cottage Hospital. Mr. C. P. AYRES, architect, 14A High Street, Watford.

W. James	£1,984	0	0
J. W. Pavey	1,859	0	0
C. H. Hunt	1,663	0	0
H. M. Dove	1,650	0	0
Turner, Limited	1,597	0	0
M. Pearson	1,593	17	0
J. Daniels	1,518	0	0
W. WADE, St. Neots (accepted)	1,368	0	0
G. & J. Waterman	1,227	0	0
W. B. Neal	1,150	0	0

BARNESLEY.

For alterations to business premises, Sheffield Road. Mr. HERBERT CRAWSHAW, architect, 13 Regent Street, Barnesley.

Accepted tenders.

F. Taylor, mason.

J. Watling, joiner.

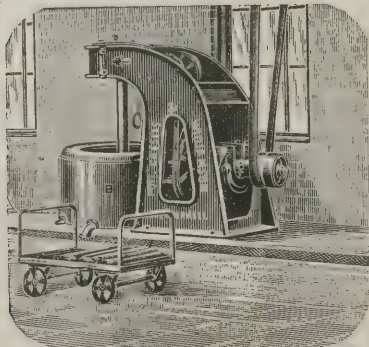
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BATH.

For erecting schools, Twerton. Messrs. SILCOCK & REAY, architects, Octagon Chambers, Bath.

Cowlin & Son	£8,190	0	0
Hayward & Wooster	7,899	0	0
J. LONG & SONS, Bath (accepted)	7,655	0	0

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F. R. Milson	996	0	0
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W. Sugg & Co.	984	15	0
J. W. Brock & Co.	964	10	0
A. Dugdale & Co.	948	7	6
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G. Fathers	3,511	12	11
J. Watler	3,355	0	0
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G. TOMBS & SONS, Buckingham (accepted)	2,799	0	0

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For laying a 2-foot brick and iron pipe sewer in Calder Street and Blackburn Street.

E. Cheetham	£680	0	0
J. Wadge	628	0	0
E. Heap	574	14	0
H. Fotherby & Son	541	13	0
J. & J. Lee	495	10	11
G. READ & SON, Burnley (accepted)	437	10	0

CHAPEL-EN-LE-FRITH.

For taking down the existing bridge over the River Noe, at Townhead, in the township of Hope, and erection of a new bridge. Messrs. STERLING & SWANN, engineers, Town Hall, Chapel-en-le-Frith.

J. Fidler	£697	0	0
C. Braddock	497	6	1
A. Hill & Bro.	437	16	6
T. A. MATTHEWS, Buxton (accepted)	395	15	6

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For laying of about 500 feet of 24-inch glazed stoneware pipes in a watercourse, &c., within district known as the Cranpit. Mr. WILLIAM HARSTON, surveyor, High Street, Dartford.

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J. Mowlem & Co.	445	0	0
A. T. Catley.	360	0	0
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R. BENNETT, South King Street, Manchester (accepted).

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Scaife Bros.	88	10	0
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E. Parry & Co., Fulham	5,357	0	0

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For drainage works at Headcorn, laying of about 300 yards 9-inch sewer, and the construction of five manholes and a small intercepting tank. Mr. ALFRED J. BURROWS, surveyor, Ashford.

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C. Munn	103	0	0
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Barnes, Chaplin & Co., Cardiff	266	19	4
Batchelor & Hall, Pontycymmer	262	17	1
D. J. Davies, Blaengarw	262	17	1

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J. Maddocks	518	18	8
Batchelor & Hall	515	7	8
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D. J. Davies	425	19	4
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Contract A.

For completion of a shop and dwelling-house.

C. Hill	£356	5	0
Lewis & James	328	17	6
Gaite & Son	219	18	9
Tucker & Tovey	191	16	3
W. A. SHIPP (accepted)	140	0	0

Contract B.

For completion of east block of six houses.

C. Hill	£434	3	0
James & Lewis]	395	3	6
Gaite & Son	317	13	6
Tucker & Tovey	303	6	9
W. A. SHIPP (accepted)	270	0	0
W. & C. Edgell	249	0	0

Contract C.

For completion of middle block of six houses.

C. Hill	£527	4	9
James & Lewis	483	16	6
GAITE & SON (accepted)	369	5	10
Tucker & Tovey	360	3	3

Contract D.

For completion of west block of six houses.

C. Hill	£737	6	0
James & Lewis	674	6	0
Coles Bros.	530	0	0
Gaite & Son	501	3	4
TUCKER & TOVEY (accepted)	479	0	0

A HANDBOOK to the "Workmen's Compensation Act, 1897," has been prepared by Mr. M. Roberts-Jones, and is published in a convenient form and at a low price at the offices of the *Western Mail*, Cardiff and London. The editor has had long acquaintance with the labour question, and has introduced as much information about the meaning of the sections as is likely to be required, until the judges have put the Act to the tests of the courts.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: NORMAN STAIR IN PRECINCTS.

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TRADE NOTES.

WE have been requested to announce that Messrs. Edward Humphries & Co., Limited, of Atlas Works, Pershore, have been awarded the gold medal for the exhibit of their improved oil engines at the International Agricultural Exhibition now being held at The Hague.

WAKEFIELD CATHEDRAL is being ventilated by means of Shorland's patent exhaust roof ventilators and special inlet tubes.

MR. P. ROLAND FULLER, of St. Ann's Road, South Tottenham, sends us his price-list and some specimens of work executed with his stencil plates. From the former we see that his charges are strictly moderate, while the quality of the work for sharpness and accuracy leaves nothing to desire. Mr. Fuller makes a specialty of his guinea builder's and decorator's assorted parcel, which includes a set each of 1 and 2-inch zinc stencil alphabets and figures, two stencil brushes, name in 2-inch zinc letters, a dozen specially prepared parchment stencils (assorted), and three zinc borders.

BUILDING AND BUILDERS.

THE foundation-stone of a new Primitive Methodist church at Dunstan-on-Tyne has been laid.

THE memorial-stone of the new halls in connection with the Cambuslang, N.B., parish church, has been laid. The new halls, which are well advanced, are being erected on the site of the old industrial school adjoining the church, and the estimated cost is 1,730*l*.

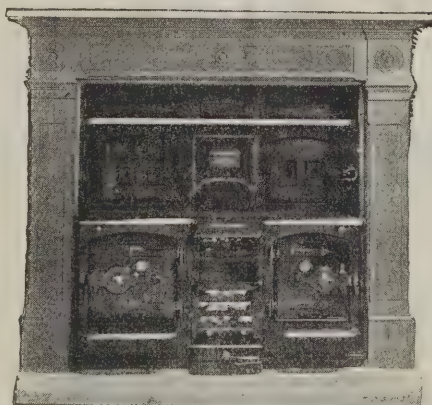
SANITARY CONGRESS, LEEDS, SEPTEMBER, 1897.

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THE foundation-stone of the new Llangollen County School was laid on the 21st inst. The school is being erected in one of the loveliest spots in the valley, and is estimated to cost 4,790*l*.

IT is proposed to build at West Kirby a convalescent home of considerable magnitude. The plans of the building have been prepared, and have been for consideration before the Hoylake and West Kirby District Council. The council are desirous of assisting in the promotion of the undertaking as far as they can. West Kirby has been selected for the convalescent home on account of its excellent position and the salubrity of its climate. The proposed institution is to be in connection with the Hospital for Consumption, Mount Pleasant.

THE foundation-stone of a new Congregational church at Otley, to replace the one which has been in existence for upwards of sixty years, has been laid. The new building will contain sitting accommodation for 542 worshippers, but 700 may be comfortably accommodated when necessary. Contracts already accepted in connection with the building amount to 6,000*l*., but the cost of the church when completed will probably be 6,500*l*., exclusive of boundary walls.

ELECTRIC NOTES.

THE British Electric Traction Company, Limited, have removed to Donington House, Norfolk Street, Strand, W.C.

THE electricity department of the Bradford Town Council have had a total income of 8,726*l*., an increase of 1,789*l*. The total expenditure, including interest on loans, has been 7,061*l*., as against 5,929*l*. for 1896. The profit has been 1,665*l*., as against 1,007*l*. for 1896. The consumers number 591, as against 391, an increase of 33½ per cent. The total units of power supplied has been 443,288, as against 336,281, an increase of 31¼ per cent., whilst the total profits since the opening of the works in 1889 has been 13,833*l*.

A MEETING in connection with the electric-lighting committee of the Corporation was held on the 21st inst. in the Dublin Municipal Buildings, to consider the state of the existing electric light supply. Recently it appears the cables conveying the current had become somewhat worn, and the meeting was summoned to consider the advisability of raising a sum of about 20,000*l*. for the improvement of the cables. It was resolved to recommend a scheme for adoption by the

committee at a future meeting, and it is stated that the feeling of the meeting appeared to be in favour of obtaining a loan of 100,000*l*., and the construction of a new power station at the Pigeon House Fort; and that meanwhile it is intended to obtain estimates for the relaying of the present system with improved cables.

THE electric current, which can be harnessed to supply most of the wants of man, has now been employed for the extinction of fire by a valuable and ingenious arrangement worked out by Messrs. Merryweather, the well-known water and electrical engineers, at Lord Rothschild's house in Piccadilly. The mansion is lighted by electricity, and a patented form of pump, driven by an electric motor, is placed in the basement, and in the event of a fire this machine may be immediately started and water forced through hose at a great pressure to attack an outbreak in any part of the house, or on the roof. The arrangement commends itself for many of our theatres, in which the water company's pressure in the flies and on the roof is utterly inadequate for dealing successfully with an outbreak of fire. We understand a similar arrangement is fitted in Mr. Harry McCalmont's house at Newmarket, and in Lord Salisbury's house at Hatfield.

VARIETIES.

IT has been decided to restore the picturesque old church of Mundesley, on the Norfolk coast.

IT is proposed to construct a new dock at Avonmouth by the Bristol City Council at a cost of 1,500,000*l*.

THE Birmingham new meat market is to be ready for formal opening on the 27th proximo.

THE members of the Architectural Association will pay a visit to the Grove Hospital of the Metropolitan Asylums Board to-morrow, 25th inst.

DRY-ROT has broken out in the ladies'-room of the new infant department at Low Blantyre School, the cause being said to be due to damp and imperfect ventilation.

A WORKMAN named Thomas McCormick, engaged on the extension works at Ramsey Pier, was struck by the handle of a crane and sustained serious injuries to the head and both arms.

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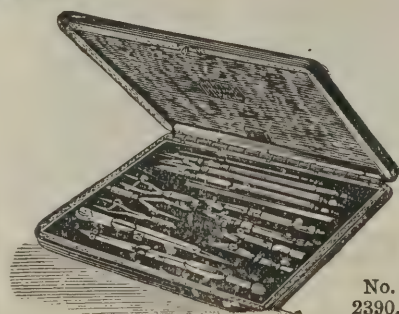


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A GREAT fire occurred in the bazaar of Cabul on the 6th and 7th inst., when 150 shops were burned out and four persons were burned to death.

THE North-Eastern Railway Company are said to have opened negotiations with a view to the purchase of Earle's ship-building yard at Hull for the purpose of constructing a new deep-water dock.

THE new font, pulpit and bells which have been added to the church of St. Paul's, and which Sir Charles Seely had built for the new parish of Daybrook, have been dedicated by the Bishop of Derby.

AN agreement has been concluded between the Great Western Railway, the London County Council and the Paddington Vestry as to the arrangements for reconstructing and widening, at a cost of 17,000*l.*, the railway bridge and the approaches at Westbourne Park. The thoroughfare is to be 50 feet wide between the pavements.

A DISASTROUS fire occurred on Southport Pier on the 18th inst., and caused damage to the extent of about 5,000*l.* The fire broke out about three o'clock in the morning in the pavilion, and the flames quickly spread to the adjoining refreshment bars. The roof of the pavilion soon fell in, and the walls were burned through. A considerable length of the decking of the pier itself also succumbed to the flames.

THE Dukinfield new town hall committee have decided to invite competitive designs and offer a considerable sum in prizes for the best designs. The cost of the new building is to be 7,000*l.* or 8,000*l.* It is to be erected on the market ground in the centre of the town, with a frontage to the principal thoroughfare. This scheme, in conjunction with the new recreation ground recently determined upon, represents the town's commemoration of the record reign.

THE remains of Mr. Thomas Gough, architect and surveyor, Knighton, were interred at Knighton on the 13th inst. The deceased gentleman, whose death took place on the previous Thursday, was fifty-nine years of age, and had held the appointment of surveyor to the Knighton Highway Board, which was superseded by the Knighton Rural Council under the Local Government Act of 1894, for nearly twenty-five years. He carried on an extensive business also as an architect.

THE famous Wesley Chapel in Church Street, Spitalfields, one of the largest and oldest places belonging to the Methodist body in London, has been sold for conversion to the uses of a

synagogue. Less than twenty years ago the most famous preachers of Methodism drew crowded congregations there, and Wesley preached often in the early days. Only a few months ago Artillery Lane Chapel was turned into a synagogue, and an effort is being made to secure another large chapel in Whitechapel.

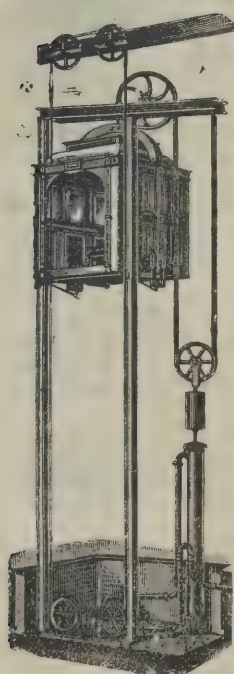
THE Treasury Commissioners have issued a circular to School Boards giving notice that the rates of interest chargeable on public loans under the Public Works Loans Acts will hereafter be, for loans repayable in not exceeding thirty years, 2½ per cent. per annum; not exceeding forty years, 3 per cent. per annum; and not exceeding fifty years, 3¼ per cent. per annum. Two-and-three-quarters per cent. is the lowest rate of interest allowed by the Act.

AN interesting discovery of skeletons has been made just outside the city in the course of excavations made for laying drainage pipes. Some of the skeletons, which are supposed to date back to the time of the Romans, were perfect, but collapsed upon attempt being made to remove them. Others, however, were dug out in a fairly perfect condition and have been removed. There are skeletons of horses, and the site on which they were found was probably at one time the scene of a pitched battle and may possibly be an old burying ground.

IT is proposed to construct a lock on the Thames below Putney Bridge at a cost of 250,000*l.* Mr. E. Pritchard, C.E., who has been commissioned by the combined committee representing the districts of Hammersmith, Fulham, Chiswick, Brentford and Isleworth on the Middlesex side of the river, and of Putney, Barnes and Mortlake on the Surrey side, to report on the best position for such a lock, is of opinion that the proposed sluices should be situated at a point of the river on the Middlesex shore from the Broomhouse, Dock Lane, to land directly opposite on the Wandsworth side. It is estimated that the work would take four years to complete.

IN the course of the excavations which are being carried out at Furness Abbey a bulla, or leaden seal, has been discovered, which dates from the thirteenth century. The seal has been attached to one of the five bulls sent to this Cistercian establishment in the time of Pope Innocent IV. and whilst William de Middleton was abbot of Furness. The first of these bulls dealt with the cultivation of vines and the fisheries of Lancastria. The bulla, which was found at the south-western corner of the ruins, is about the size of a crown piece, but rather thicker and

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almost round. It is in excellent preservation. One side bears representations of the heads of St. Paul and St. Peter, with a crozier down the centre, and over the heads the letters "SPA.SPE." On the reverse side is the inscription, "Inno-centivs PP.: III."

THE South Hackney Synagogue, in Devonshire Road, Mare Street, Hackney, was opened on the 18th inst. by the Hon. Walter Rothschild. The buildings, which are situated nearly two miles away from any other Jewish synagogue, and have cost 8,000*l.*, are from the designs of Mr. Delissa Joseph, and are similar in structure to the Hampstead and Hammersmith Synagogues, which were designed by the same architect, the almehmar, or reading-desk, being placed immediately in front of the Ark, and not in the centre of the building, as was formerly the general custom. The curtain of the Ark is placed inside and not outside, while the background of the building is of a pure white.

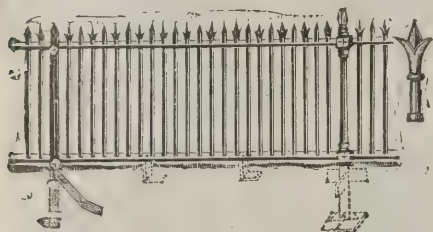
THE Clubbiedean Reservoir in the Pentland Hills is at present empty. It is in the hands of Messrs. Young, contractors, undergoing repairs. There has been a leak through the embankment for several years, and though not of an alarming nature it was recently decided to find out the cause of it and make the embankment watertight before the good weather ended. In digging down where the water appeared at the tail of the embankment it was found that the ground was of a very loose, rocky nature, with numerous fissures in the rock, and it was through these cracks that the water was making its way below the puddle wall. What will now be done will be to cut deeper than the old foundation of the puddle trench, and fill up the fissures with concrete and clay—a good supply of the latter material being found near the reservoir.

THE Smethwick District Council have decided to establish refuse-destructor works at once, and a committee, consisting of members of the Council, has been appointed to visit various towns where destructors are in operation. Negotiations have also taken place for the acquisition of a suitable site for the works. These negotiations have been completed by the purchase of the Crown Forge estate, situated in Rolfe Street, Smethwick, which was formerly carried on by Messrs. Wickham. The price paid for the estate was 4,000*l.*, payment of the money to be made by instalments spread over a period of twenty years, at an interest to be charged at the rate of 2½ per cent. On the site of the proposed works there is a tall

stack which will be utilised, and there is also an extensive canal frontage. Steps are to be taken at once to provide the necessary works. The cost of the scheme is estimated at several thousands of pounds, but it is anticipated that it will in the end prove a great saving to the ratepayers.

THE Stafford sewage works, which have been established in the town at a cost of about 52,000*l.*, were formally opened on Wednesday. The mayor (Mr. F. Greatrex), members of the Council and invited guests, met at the Borough Hall, where they marched in procession to the sanitary dépôt. There a silver key was presented by Mr. Blackshaw, the borough engineer, to Alderman C. H. Wright, the chairman of the sewerage committee. With a duplicate key Mr. Wright opened the door of the engine-room, and, the company having entered, he delivered a short address, giving the history of the works. At the close he presented keys to the Mayor and Mr. W. G. Bagnall, formerly chairman of the sewerage committee. The Mayor opened the valve on the pumping main, and one of the engines was started by Mr. Bagnall, after which the Mayor declared the works open. The sanitary dépôt was inspected by the company, attention being devoted to the new refuse destructor. The company afterwards proceeded to the outfall works on the Lammascote Farm, and an explanation of the process of filtration was given by Mr. C. H. Wright.

THE Countess of Derby opened on the 16th inst. the new Victoria Jubilee Technical School at Preston, which has been erected as a permanent memorial of her Majesty's Jubilee. The school has been erected at a cost of 15,000*l.*, and stands on a site given by the Corporation, containing some 5,800 square yards and situate in Corporation Street. The foundation-stone of the new school was laid on July 6, 1895, by Mr. W. Ascroft, president of the Harris Institute. The building, which presents a noble and imposing appearance, is Gothic in style, consists of three storeys, and has a frontage of 150 feet to Corporation Street. It is constructed of Accrington red brick, with rich ornamental stone dressings. On the sub-floor are located various classrooms, including a splendid weaving school, 84 feet by 64 feet, and a spinning school 64 feet by 40 feet. All the woodwork is finished with beautifully grained pitch pine. The rooms are all 15 feet high, and are exceedingly well lighted. At the top of the grand staircase is the lecture theatre measuring 50 feet by 40 feet, and surrounded by a spacious gallery. The school is fitted throughout with electric light and hot-water heating apparatus.



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THE NEW NORTH BRIDGE, EDINBURGH.

THE new North Bridge, which was formally opened on the 15th inst., replaces, says the *Scotsman*, the old North Bridge which, begun in 1763, was opened in 1772, having taken nine years to build. Under the present contract the old bridge has been renewed and the new bridge erected in about two and a half years. The contract for the new bridge was signed on March 11, 1895, by Sir William Arrol and on March 19 by the Town Council, and it was stipulated that the work should be completed by May 1, 1897. The contractors got possession of the bridge on April 12, 1895; and after that there were points to be adjusted connected with the carrying of the southern abutments further south than was originally intended, in order to improve the gradients, so that on a work of this magnitude the few months additional required for its completion cannot be regarded as excessive. Messrs. Beattie, Fountainbridge, were sub-contractors for the important masonry contract; and to harmonious working between the parties is due the successful carrying out of the undertaking within so short a period. The work was one of no ordinary kind, and it was not wholly free from danger, due to the fact that the old bridge had to be taken down and the new bridge built without interfering with the railway traffic being carried on underneath, or the tramway and other street traffic above. Scaffolding of a peculiar construction had to be employed, and methods of working more or less of a novelty had to be introduced as the work went on; but all has now happily ended in the most successful manner. As an example of smart workmanship, it may be recalled that the first half of the new bridge, having been completed, was opened about October 12, 1896, and that the remaining half of the old bridge was taken down and the last half of the new bridge built between that time and this—a period of eleven months. It is only a pity that the graceful arches of the bridge will be somewhat hidden by the roofs of the station sheds. Possibly the best view of the structure will always be secured from Jeffrey Street. But in any case it will be an immense improvement overhead to the street traffic, while underneath the railway company will get, in greatly enhanced facilities for the carrying on of their traffic, the full value of their contribution towards the cost of the bridge. The new bridge is built under an Act of Parliament obtained in 1894, which also authorised the widening of North Bridge Street—an improvement now also in progress. Constructed of iron

girders resting on stone piers and abutments, the new bridge consists of three spans of 175 feet each. The width between the parapets of the new bridge is 75 feet, as compared with 54 feet of the old bridge as altered more than twenty years ago. Each span is formed of six steel arched ribs, each 175 feet from pier to pier, with a 20 feet rise at the centre of the arch. They are set into the masonry of the abutments in cast-iron "springers," each weighing 12 tons. The holding-down bolts are 3 inches in diameter. Each rib or "boom" is 4 feet in depth by 1 foot 9 inches in breadth, and it weighs about 40 tons. They were built at the Glasgow works of Sir William Arrol (Limited), were milled to suit the radius and were delivered in 9 ton "lifts" or segments. On the top of these "booms" are fixed vertical posts which carry longitudinal girders, and on these again are fixed cross girders which carry the brick arching forming the roadway. The whole is braced diagonally and horizontally by lattice girders, &c. In the bridge there is about 2,000 tons of chilled steel and about 500 tons of cast-iron work, which is chiefly of an ornamental nature. The spandrels of the great spans, for example, are filled in with an arcading graduated in height, surmounted by a frieze broken up by carved corbels, and carrying a pretty moulded festoon of flowers and fruit. At each end of the large spans is an expansion joint, which has a play of an inch and a half so as to make due allowance for expansion and contraction caused by the summer and winter temperature.

In taking down the old bridge nothing of great interest was found. The only curious objects embedded in the masonry were an old pewter jug, now in the Antiquarian Museum, and several old moulded headstones and carved stones, as if from an ancient church. Search was made for the foundation-stone which was laid on October 21, 1763, by Lord Provost Drummond and the "Merrie Masons" of his day, but it was not discovered, and in all likelihood now never will be. The abutments at the south and north ends of the bridge rest on solid rock. The two large piers are built on concrete foundations, laid, the south pier 40 feet below the rail level and the north pier 35 feet below ground. Each of these piers is 100 feet long, measuring from east to west, and 22 feet in thickness. They are "hearted" with brick laid on cement, and faced with grey sandstone ashlar. In the construction of the bridge there has been used by the Messrs. Beattie 100,000 cubic feet of ashlar, equal to 8,333 tons; nearly 3,000,000 bricks, and 10,000 cubic yards, or about 800 tons, of concrete. In addition to this there was half a million

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AWARDS OBTAINED: LONDON, 1862, 1874; PARIS, 1867, 1878; CHICAGO, 1893.**BEDFORD LEMERE & CO.,**
ARCHITECTURAL PHOTOGRAPHERSTo Her Majesty the Queen and Royal Family; H.M. Office of Works; H.M. Office of Woods and Forests; the London County Council, &c.
Photographs taken and proofs delivered same day. 50,000 Architectural and Decorative Views. Price List and Catalogues Free.**147 STRAND, LONDON. W.C.**

of blue bricks required for the arching already alluded to which carries the roadway. From the spring of the arches the piers are carried up above the iron parapet of the bridge with ornamental panelled and moulded faces, and below the top moulding is a carved ornament. The flat tops of the piers would form suitable pedestals for groups of statuary, but unless these are presented the city fathers, with all their heavy responsibilities, are not likely to go in for them at present. In regard to the roadway it may be explained that on the top of the arched brick asphalt has been spread, and on that are placed the granite blocks of the roadway. The cable rails have, of course, been laid, and on each side of the roadway of the bridge a subway for pipes has been constructed, about 12 feet by 2 feet in depth, with manhole entrances at each pier. The engineers of the bridge were Messrs. Cunningham, Blyth & Westland, C.E., Edinburgh; the city superintendent, Mr. Robert Morham, designed the elevations; the contractors were Sir William Arrol & Co., Limited, Glasgow, with Messrs. William Beattie & Sons, Edinburgh, sub-contractors for the masonwork. The cost is 90,000*l.*, of which the North British Railway Company contribute 30,000*l.*

ST. JOHN'S CHURCH, WORKINGTON.

THREE schemes are proposed by the restoration committee for the restoration of St. John's Church, Workington. The most important alterations are those which provide for the erection of a chancel extending into the church about 30 feet; to remove the choir into seats provided in the chancel; to rebuild and enlarge the organ in its present condition; to effect a connection between organist and choir by electricity; to reseal the ground floor; to put in a new heating apparatus and to adopt a proper system of ventilation. The cost of these alterations is estimated at 3,300*l.*; while to carry a frieze all round the church inside, supported by pilasters at each side of the windows, and to panel the ceiling and to erect a reredos, would cost 2,000*l.*; and to erect new galleries, alter the gallery stairs and to make minor structural alterations, would cost 1,800*l.* It is feared that the full effect of the proposed restoration would not be realised unless it is carried out in its entirety, but if sufficient funds are not forthcoming for the purpose it is recommended that the first part only of the scheme shall be undertaken.

THE MERCHANDISE MARKS ACT.

THE report from the select committee on Merchandise Marks, together with the proceedings of the committee and minutes of evidence has been published as a Blue-book. The committee commence their report by a reference to the untimely death of Mr. Mundella, who was specially qualified to express an opinion as to the working of the Act. The committee premise their general report by remarking that they "are satisfied that the operation of the Merchandise Marks Act of 1887 has been on the whole beneficial." There is, the committee add, abundant evidence that the Act has to a great extent stopped the fraudulent practices against which it was directed, while the effect of those portions of the Act referring to the imitation of proprietary trade marks and false trade descriptions has been especially beneficial. The establishment and observance of higher standards of honesty has tended to inspire confidence in the accuracy of the marks placed on British goods, and to enlarge to that extent and give stability to the trade of British merchants and manufacturers. Notwithstanding, therefore, that the competition of improperly marked foreign goods is still in some cases injurious, and that merchandise marks legislation has made little progress outside the United Kingdom, India and the British Colonies, the balance of the evidence is in favour of retaining the greater portion of the Act. The committee consider that the Act is now so well understood both at home and abroad that they would strongly deprecate any change in its chief provisions relating to the importation of goods for use in the United Kingdom. As to the complaint received from the transit trade, who allege hindrance through the opening of packages, the committee are of opinion that this particular trade has not kept pace with the expansion of the export trade of this country, and they think it would be misleading to attribute the result complained of to the operation of the Act, especially when the committee have evidence of the increase of bounties and subsidies granted by foreign governments to their national lines of shipping, expressly designed to foster foreign trade in national bottoms, and officially declared to have done so. Moreover, the report points out some foreign State railways have adopted a system of reduced fares to seaports which are prejudicial to British interests. The evidence on the point of the decline of the transit trade is, therefore, not conclusive, although the Board of Customs and other witnesses believe that the examination of goods in transit operates in that direction. The committee are

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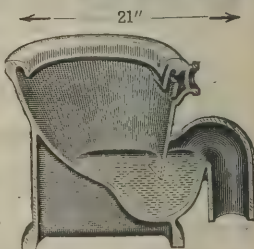


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of opinion that this examination is ineffectual to prevent the fraudulent use of British trade marks on goods passing from foreign ports to other countries or British colonies, and on consideration of the whole case the committee recommend that goods in transit be exempted from the operation of the Act. The committee believe that the orders of 1896 as to the detention of goods which bore marks raising a direct claim to British origin had given great relief, but the committee are of opinion that it is unnecessary and uncalled for by the Act to detain goods, and insist upon a qualification because they are marked with English words of description, unless such words are calculated to deceive the purchaser in regard to the country of origin. Moreover, they think that the Customs should move in the direction of requiring the excision of offending marks rather than in that of requiring a qualifying mark, which has been proved to the satisfaction of the committee to be in many cases a gratuitous and altogether unnecessary and undesirable advertisement of our foreign competitors. Unless therefore the Customs relax their regulations as the committee suggest should be done forthwith, they recommend that a provision to the foregoing effect shall be placed in any Bill introduced to amend the Act of 1887. As to the marking of imported goods, the committee think that it should not be unlawful for traders to stamp goods with their own names and business addresses, provided that some such words as "sold by" be added.

SANITARY INSTITUTE HEALTH EXHIBITION.

The Ferrybridge Foundry Company.

THIS firm exhibit the "Fryston" kitchener, which created a great amount of interest, and was the object of much attention, both to the members of the Sanitary Institute and visitors. The principle of the "Fryston" kitchener is novel and the construction scientific. The "Fryston" Duplex are made on the open and close fire principle, but differ from all other kitcheners in having two fires in one fire-basket, the upper fire being lighted upon an adjustable grate near to and level with the upper part of the ovens and under side of the hot plate, the lower fire being placed almost on a level with the bottom of the ovens, leaving an air space between the two fires through which air is supplied to both—upwards to the upper fire, and downwards to the lower fire. This air, being sandwiched between the two fires, is thoroughly heated before coming in contact with either of them, hence producing great heat. The great advantage of this plan is that all the heat is supplied to the ovens and hot plate through horizontal and ascending flues, without any descending flue whatever, insuring a still fire without any "roaring," thus effecting a considerable



saving in fuel. Each fire has its own damper, so that more top heat for ovens and hot plate is secured by drawing out the upper fire damper further than the lower, and *vice versa*. The kitchener is filled throughout with self-contained flues, which simplifies the fixing. During the exhibition we had many opportunities of observing the results obtained, and found during a period of nine hours the temperature of the ovens registered (with only a variation of two or three degrees) 450 deg. The amount of fuel consumed during this period was extremely small, as was also the quantity of ash resulting, while the quantity of smoke escaping from the chimney was practically nil. The flues will thus require only very occasional clearing out.

After a series of severe tests the judges gave this kitchener the highest award—a silver medal.

The "Fryston" is also made with a lifting or rising or falling fire, which has advantages over any of this class we have seen. The fuel, by a special arrangement in the section of the rising and falling grate, is always kept exactly central to the flues that it has to supply with heat instead of falling forward to

the bars of the grate when down and backward to the face of the pressure boiler when raised. The bars are designed to prevent the rising or falling grate slipping from its position when any extra weight is added, such as a kettle of water, saucepan, &c., and indeed it is quite impossible for this to happen. This stove was awarded the bronze medal of the Society.

The Ferrybridge Foundry Company, whose address is Ferrybridge, Yorkshire, received the only medals awarded at the exhibition.

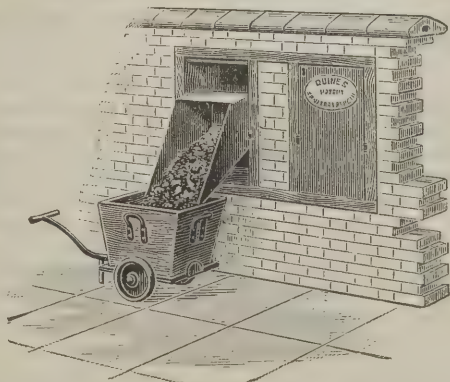
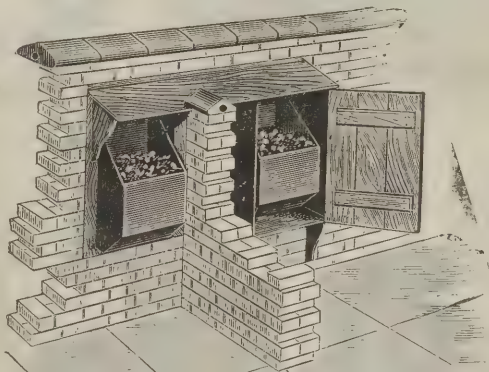
The Leeds Art Pottery and Tile Company.

We are particularly struck with the exhibit of the Leeds Art Pottery and Tile Company, of Hunslet, Leeds. They show a large selection of dados in faience, which for finish and harmony of colour are unsurpassed by anything we have seen. It is evident this firm make the arrangement of colours their special study, and in this they have been most successful. A new departure is a panel treatment of dull or egg-shell glazed embossed tiles, in a cream tint with glazed grey-blue moulding. The ornament under the dull glaze has lost none of its sharpness, and the effect of the combination is very good. The Leeds Art Pottery and Tile Company are also showing a sample tile dado, fixed at the new General Hospital, Birmingham, and a number of special tiles used for this job. To judge from the great number of various shapes, especially of the many internal and external rounded angles made to the architect's design and instructions, one can form some idea of the magnitude and importance of this work. We purpose giving an illustration of one of the Tower staircase lobbies in one of our early issues. This firm was awarded the Sanitary Institute's medal for the excellence of their work.

Pendleton's Sanitary Engineering Company.

This firm are exhibiting Dr. Quine's patent sanitary dustbin, of which they are the proprietors, and to show its proper working and fixing they have built in brick the backyard walls. It is constructed of steel plate galvanised, and is hung on pivots in the frame of an opening in the wall of a backyard. It holds over 4 cubic feet—sufficient for one or two weeks' refuse. We illustrate views of inside the yard and outside. The dustbin is fitted with a dead-weight lock, without any spring, and is self-locking.

The advantages of this system are many: The scavenger no longer requires access to the premises. He is supplied with



a key that fits every dustbin, and, after unlocking it, the bin is tilted forward and the whole of the contents is discharged into a light box on a trolley, which is wheeled from house to house until filled and then easily emptied into the cart. The bin is then lifted into position, and is at once self-locked.

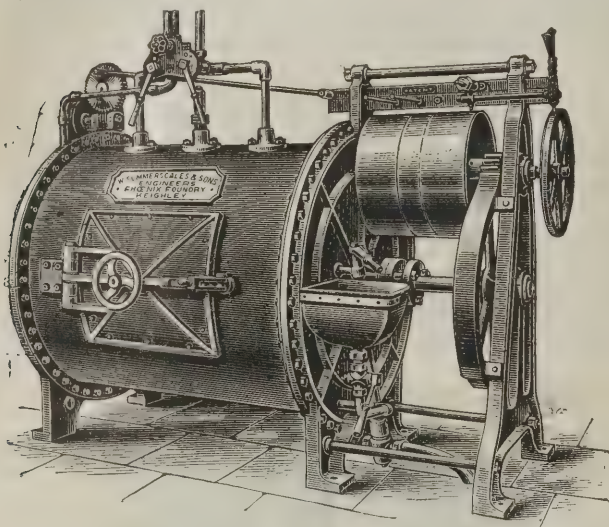
If necessary, the scavenger can throw disinfectant into it before locking up, ensuring absence of decomposition and the attendant ills.

Where the walls abut on the road a wooden door is provided which, when closed, hides the dustbin from sight. Owing to the simplicity of its construction, the wear and tear is reduced to a minimum, and it cannot get out of order. It takes up no yard room, as it projects only a few inches from the wall.

Their claim that it marks a revolution in backyard sanitation seems justified. It has already been adopted by the Manchester Corporation among others, and is giving every satisfaction. The address of the company, who were awarded the bronze medal of the Society, is 1 Leaf Square, Pendleton, Manchester.

Messrs. W. Summerscales.

Messrs. W. Summerscales, of Phoenix Foundries, Keighley, are well represented by their washing machines and laundry appliances, conspicuous among which is the patent "Triumph" washing machine, which is made in three sizes and consists of two heavy cast-iron ends, having their centres truly bored. The ends are stayed apart to the required distance by strong stays, with turned and faced collared ends abutting on to machined facings on the end castings, thus securing correct, mechanical and permanent adjustment entirely independent of the body of the machine, which, being an unknown quantity owing to expansion and contraction, gives much trouble in other makers' machines. The revolving drum is constructed of two strong cast-iron discs, lined with brass, and staved apart with turned and collared stays, the body being formed of pitch-pine, perforated, the hinges and fastenings of strong cast brass. This drum is fitted with patent automatic reversing



motion and locking gear, the former causing the machine to change its direction of rotation every few revolutions, thereby preventing the twisting and roping of the linen so disastrous in other machines, the latter locking the starting gear when standing, and at once removing what has always been a source of danger to the attendants of washing machines, viz. the possibility of the machine starting during the operation of loading or unloading. The gearing is carried by a strong box section bracket, which, together with the seatings on the end, is machine-faced and strongly bolted. This machine is fitted with steam inlet valve, hot and cold water supply cocks, gauge glass for registering height of water, and emptying cock of large dimensions; is self-contained and requires no special foundation; is easily fixed and set to work, and readily operated by unskilled labour.

Messrs. Garner & Co.

At stand No. 16 Messrs. Garner & Co., Lightwoods Road, Smethwick, show Webb's patent reversible window sashes, in which a new departure has been made, as the sashes are pivoted and placed in the frame one immediately over the other in a direct line and not as with other windows one behind the other. This arrangement brings the insides of the stiles of both sashes flush with themselves and with the frame, which enables the employment of hinged and locking flies at the sides of frame by which the sashes can be made perfectly firm, draught, dust and burglar proof. The sashes being loosely hung can be easily taken out of frame for the removal of furniture, &c., while by the use of special friction pivots or locking bolts, each sash can be regulated and securely fastened at any required angle for air inlet or for cleaning, glazing or painting inside room. A special locking arrangement is provided for asylums, infirmaries, &c. Ordinary window sashes can be altered to this system at a moderate cost.

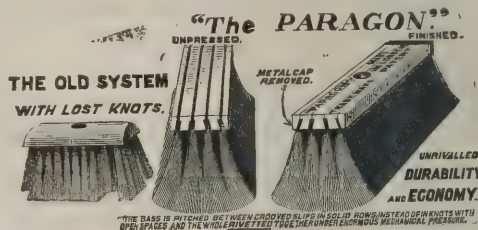
Mr. Richard Mason.

Mr. Richard Mason, of Hemsworth, Yorks, also shows a reversible window, some of the advantages claimed for which

are simplicity of design, arrangement and operation, full weight, always bearing direct on the pivots and cases, and never dependent on the screws; ventilation on the most approved principle; in every case the air is directed upward, the full width of the window, thus driving vitiated air out of room; window can be opened for ventilation day or night, and the sashes be held secure; safety in cleaning, as the outside of the sashes can be turned into the room, thus all danger avoided; the price is such that they are being used in all classes of work, from the cottage to the mansion.

A New Scavenging Broom.

A new and very effective form of scavenger's bass broom is now being manufactured by the New Patent Broom Company, of Paragon Works, Stoke Newington, N., and we have pleasure in commending it to the notice of surveyors, contractors and others. The new broom, which possesses greater cleansing power, is quite unique in the manner of its construction, the stock or head being made up of a series of grooved slips of beechwood, instead of the usual solid block with holes for the reception of the bass. In the ordinary pattern, as is well known, much trouble is caused by tufts or knots of material falling out, especially in the summer-time, and so spoiling the broom; in the "Paragon" this is practically impossible, as the material is held so very solidly in the stock. The bass for each groove having been accurately weighed and pitched and laid in position, the whole series of slips are forced firmly together by means of powerful machinery, and a number of strong rivets driven right through the sides of the stock whilst still under pressure. The finished article convincingly illustrates the old



axiom about unity and strength. We are not surprised to learn that the new broom is finding favour wherever introduced. It is already used in many large provincial towns for street cleaning purposes, and has been found to clean quicker and better, to wear longer and more evenly, than the ordinary pattern, for each fibre, being closely pressed to the other one, there is on the whole length of the broom a solid row of bass, making it impossible for dirt and water to escape, as through the open spaces between the bundles of the old style. Therefore less exertion is necessary to clean a certain area with the Paragon broom than with an ordinary one, whereby the bass of the broom lasts longer. The conditions of manufacture preclude the production of any other than a flat back stock, but the shape of a broom is a very small matter as compared with its practical utility, and the æsthetic street-sweeper will learn to value a flat-back if it sweeps up the mud with one drive instead of two. The "Paragon" is made in three qualities and the usual sizes up to 18 inches, and we have no doubt the manufacturers will be pleased to furnish samples and further particulars that may be required.

Messrs. Adams & Co., engineers and sanitary specialists, Leeds, write to us to point out the fact that neither their sanitary work nor their patent sewage lift were submitted to the judges for competition. They departed from their custom on this occasion and exhibited their specialties, but they feel that the best and highest award is the good opinion of those who have the appliances in actual use.

NEW CATALOGUE.

Messrs. HARTLEY & SUGDEN, LIMITED, Atlas Boiler Works, Halifax, who have received 45 awards during the past 25 years, including the Gold Medal given at the Birmingham Horticultural Show after actual working test on 1,000 feet of 4-inch pipe with which they were in competition with twelve other makers, are sending out their new supplementary catalogue of boilers, the various kinds of which are illustrated by means of clear well-cut blocks. The prices, dimensions, heating powers and all other necessary information are explicitly given. We would specially draw attention to their new patent independent "Eiffel" boiler, which is a powerful and economical boiler, and has proved most satisfactory in work; the larger sizes are made with bent tubes welded into the fire-box, which add valuable heating surface and give rapid circulation of the water; and their "Lion" hot-water independent base-burning boiler, arranged with shallow fire-box of good diameter. The tubes are placed so as to give the best results from the fuel used. The list price of the "Lion" varies from 31*l.* to 93*l.*

PALACE THEATRE.

THIS beautiful theatre having, under the energetic and judicious régime of that *doyen* of managers Mr. Charles Morton, emerged from the gloom of oblivion and neglect into the full midsummer radiance of the sunshine of popularity, now shows a bill which caters for every taste, and satisfies the most fastidious. The programme contains no less than seventeen "turns," all of which are, of their kind, alike excellent. The *pièce de résistance* is undoubtedly the American biograph, which is quite the best series of moving photographs yet seen in London, and alone would well repay a tedious journey. The different pictures, most of which are new, are so clear and steady that it is difficult to imagine that any further improvement can be introduced, while the figures are life-size and the portraits admirable. Among the artistes who contribute to the making of an admirable evening's entertainment Will Crackles continues to cause amusement by his impersonation of a burglar whose strenuous and somewhat noisy efforts to force a safe supposed to contain untold gold are interrupted by the entrance of a housemaid who opens the safe by a mere touch and fills a scuttle from the coals which are its sole contents. This is not perhaps very high art, but it serves to amuse. J. Radcliffe (flautist) plays a fine instrument with great brilliancy and refinement, and Mlle. Deyo delights everyone with her charming appearance and graceful dancing. The dexterity and whimsicality displayed by Mr. W. E. Ritchie (tramp bicyclist) elicits unstinted laughter and approval. Other excellent items are supplied by Edith Yorke, Will Hebden, Mary Gray, Lily Morris, the De Forrests, Wilson and Waring and others, and last, but by no means least, the excellent orchestra under the able conductorship of Mr. Alfred Plumptre, besides affording the necessary valuable assistance to the artistes, plays a selection of *morceaux* in a manner which disarms criticism. Mr. Morton, not satisfied with a crowded house every evening, has again started his season of Saturday *matinées* for the winter, and there is no doubt that they will "catch on" as heretofore.

SEPARATION OF BUILDINGS.

UNDER section 74 (2) of the London Building Act it is necessary that in every building exceeding 10 squares in area used in part for purposes of trade or manufacture and in part as a dwelling-house, the part used for the purposes of trade or manufacture shall be separated from the part used as a dwell-

ing-house by walls and floors constructed of fire-resisting materials, and all passages, staircases and other means of approach to the part used as a dwelling-house shall be constructed throughout of fire-resisting materials. On the 16th inst. Messrs. Simpson & Cove, builders, were summoned by Mr. A. Payne, district surveyor, for non-compliance with the conditions required by the section. Defendants had made alterations and additions to a public-house, Devon Arms, 38 Morning Lane, Hackney, exceeding 10 squares in area, and had formed an approach from the back leading to the bar and the staircase for the use of the dwelling-house without fitting the opening between the said approach and the bar with fire-resisting doors. The defendant replied that he was carrying out the instructions of the architect, who said the doors were not necessary. The defendant was fined 10s. and 12s. costs, with an intimation that he would be liable to a further penalty if the doors were not placed there.

This agrees with recent decisions on the point.

LANDLORDS AND SANITARY INSPECTORS.

IN the City of London Court, on the 16th inst., before Mr. Commissioner Kerr, a case of some importance was disposed of. Mr. Robert E. Clarke, builder, Finsbury Pavement, E.C., sought to recover the sum of 10l. 2s. against the defendant, Mr. Frederick London, of Edmund Street, Birmingham, for work done at 85 Finsbury Pavement, of which the defendant was the landlord. Mr. Harry Dade, for the plaintiff, explained that the defendant's London property was managed by Tillett and Yeoman, a firm of estate agents. The house in question had been empty, and they succeeded in letting it. The tenant wanted certain repairs done which the plaintiff estimated would cost 85l. The order was given him; and, indeed, the 85l. had been paid by the defendant as the landlord. But while the work was in progress the City of London sanitary inspector visited the house. That official ordered the plaintiff to do extra work for which he now asked the defendant to pay. Mr. Aldous, for the defendant, urged that no liability could attach to the defendant for the extra work, which he had never ordered to be done. What business had a builder to do work which the landlord had not instructed him to do? Mr. Commissioner Kerr replied that if a sanitary inspector required work done a builder was bound to do it. Under the Sanitary Acts a landlord was liable for such work, although he did not

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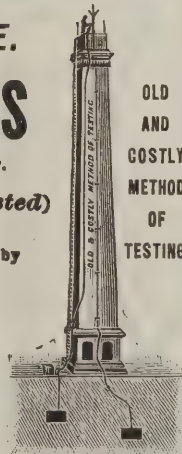
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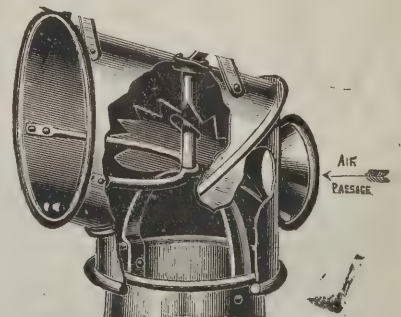
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give any order. Mr. Aldous argued that the defendant, as the landlord of the property, should have been communicated with. Mr. Commissioner Kerr said that if that had been done and the defendant had not given the instruction the sanitary inspector would have taken him before a magistrate, who would have made an order. It was no use opposing sanitary inspectors when they wanted necessary work done. It was for the public benefit. Mr. Gathercole, the sanitary inspector, said the work was done on his verbal order. He had not to serve the landlord with written notice. Mr. Aldous contended that without a written notice the statute had not been complied with. Mr. Commissioner Kerr said he could not hold that. The defendant could not get out of it. There must be judgment for the plaintiff for the amount claimed, with costs.

THE SANITATION OF HOUSES ON THE RIVIERA.

A "Winter Resident on the Riviera," in a letter to the *Times*, says:—As people are now preparing to go to the Riviera for the winter it may be opportune to call attention to the sanitary condition of most of the houses they will find there. Last year, before going out, I let my house in London. The tenant, before taking it, had an exhaustive examination by an expert, and it was necessary to show by a very stringent test that there was no possibility of the escape of sewage or sewer-gas into the house or the adjoining soil. This represents the sanitary standard in England. On arrival at my destination on the Riviera I found a house of an expensive character being built in a very good situation. In the middle of it, in the basement, was a great pit. Inquiring the object of this I was told it was the "fosse" or cesspool for the whole house. The pipes that led into it from the closets were very large and of rough earthenware, with very imperfect joints, and they were all inside the house. I was told that this was quite a common construction. A friend of mine, who had an examination made of a house he proposed to take, was told it was in the best sanitary condition, so much so indeed that "not a drop of sewage could escape outside the house." Examining a house myself later on with a view to hiring it for the year, I found the cesspool partly outside and partly under the house, the soil-pipes coming down inside the house of the very roughest construction, and no pretence of a syphon trap; an inch or so of water in the pan was supposed to

provide all necessary security against the admission of sewer gas. The owner was indignant at being told this was all wrong; the English, he said, were mad about microbes; he had always let the house, and he would do nothing. The English doctor informed me that 99 houses out of 100 were no better. The same people who insist on excessively stringent tests before taking a house in London go gaily into such a house as I have described on the Riviera. Perhaps they would not do so if they knew the facts which I have set forth above.

PATENTS.

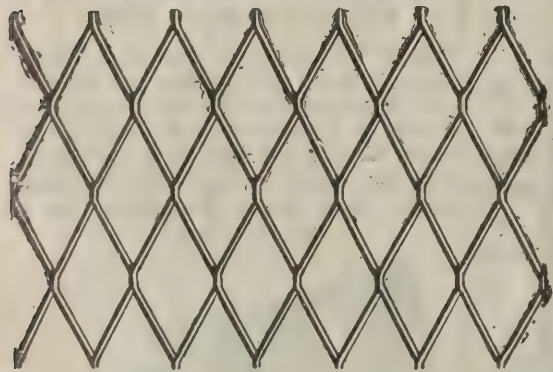
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

- 20407. Thomas Garforth Rhodes and Raymond Gaunt for "Improvements in apparatus for silencing the noise in flushing cisterns."
- 20414. William Thomson, for "Improved glass tiles."
- 20417. John Taylor, for "Improved joint for sewerage and other pipes."
- 20423. Samuel Bott, Charles Turner and David Holmes, for "Improvements in latches for doors and like purposes."
- 20426. Henry David, jun., for "Cupboard turn or turn-buckle, or door knob and spindle."
- 20432. James George Hall, for "Improvements in *portière* or door curtain rods."
- 20447. Samuel Ticklemore, for "An improved door-step whitener."
- 20454. Dolvan Barnabus Akard, for "Door opener and closer."
- 20491. Robert Simpson, for "Improvements relating to the building of arches upon metal girders or wooden beams."
- 20518. Henry Igel and Frederick Henry Young, for "Improvements in valve taps."

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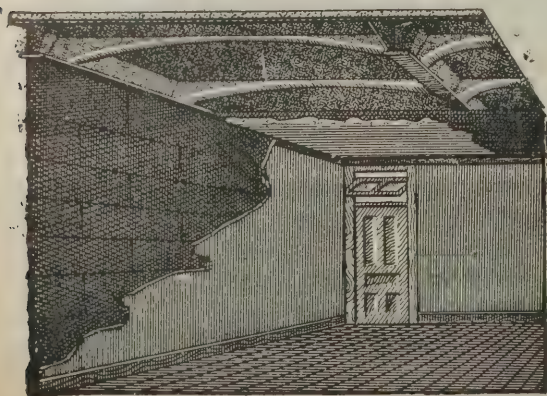
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Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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For Advertisement Scale, see page xv.

COMPETITIONS OPEN.

BEXHILL-ON-SEA.—Designs invited for promenade pier and pavilion. Secretary, Bexhill Pier, Park and Land Company, Limited, 7 Sackville Road, Bexhill-on-Sea.

BLACKBURN.—The committee of the St. Mary's Catholic new infant school, &c., Dean Street, Blackburn, offer two prizes for the best plans for the school.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500*l.*, 300*l.* and 200*l.* respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

COLNE.—Oct. 20.—Premiums of 50*l.* and 35*l.* for plans for technical schools, public library and public hall. Mr. T. H. Hartley, borough engineer, Colne.

DORKING.—Oct. 13.—Plans and estimates are invited for the erection of an infirmary. Mr. George Scales, clerk to the Guardians, High Street, Dorking.

LEEDS.—Oct. 8.—The Corporation offer premiums of 100*l.*, 50*l.* and 25*l.* for the three best designs for a wholesale dead-meat market and abattoir. City engineer, Municipal Buildings, Leeds.

SOUTHEND-ON-SEA.—Nov. 20.—Plans invited for new church. Rev. E. E. Kimber, St. Albans, Avenue Terrace, Southend-on-Sea.

UXBRIDGE.—Oct. 30.—The Uxbridge Rural District Council invite plans for a scheme of sewerage and sewage disposal. Mr. Charles Woodbridge, 38 High Street, Uxbridge.

CONTRACTS OPEN.

ABERDEEN.—Oct. 6.—For erection of houses and shop at Hatton, Cruden. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

AYLESBURY.—For erection of three shops and residences in Cambridge Street. Mr. W. F. Taylor, architect, Aylesbury.

BACUP.—Oct. 4.—For erection of a sand-washing building at Sheephouse Reservoir. Mr. James Diggie, Heywood.

BELFAST.—Oct. 7.—For erection of a central police station and other works in Chichester Street and Town Hall Street. Sir Samuel Black, town clerk.

BELFAST.—Oct. 7.—For erection of two semi-detached villas at Whitehead. Messrs. Young & Mackenzie, Donegall Square East, Belfast.

BELFAST.—Oct. 21.—For erection of new city hall. Messrs. E. Thomas & Son, architects, 7 Queen Anne's Gate, Westminster.

BETHNAL GREEN.—Oct. 5.—For construction of a bandstand and other works upon sites on the Boundary Street area. Architect's Department, 17 Pall Mall East, S.W.

BLAENAVON.—Oct. 9.—For erection of an additional classroom at the Garn Schools. Messrs. Lansdowne & Griggs, architects, Newport, Mon.

BLETCHINGLEY.—Oct. 15.—For enlargement and alteration of the workhouse. Mr. Frederick Elliff, Caterham, Surrey.

BRIDGWATER.—Oct. 5.—For execution of sundry works at Mariners' Chapel, St. John Street. Mr. F. Davies, Eastover.

BRIDLINGTON QUAY.—Oct. 7.—For erection of two pairs of villas, Marshall Street. Mr. J. Earnshaw, architect, Wellington Road.

BRIGHTON.—Oct. 4.—For alteration and enlargement of the Queen's Park School. Messrs. Thomas Simpson & Son, surveyors, 16 Ship Street, Brighton.

BUCKFASTLEIGH.—Oct. 16.—For alterations and additions to farm buildings at Torr Dean, and for alterations and additions to the stables at Bigadon House. Mr. J. Fleming, 9 Billiter Square, London, E.C.

CARLISLE.—For building cottage villas at Haydon Bridge. Mr. George Tyzack, Tyne View, Haydon Bridge.

CHATHAM.—Oct. 7.—For erection of two shelters at the Victoria Gardens. Mr. Charles Day, borough surveyor, Corporation Offices, Military Road, Chatham.

COWBRIDGE.—Oct. 6.—For alterations and additions to Maindy Board school. Mr. E. Jenkin Williams, architect and surveyor, 14 High Street, Cardiff.

CROYDON.—Oct. 4.—For internal repairs, cleaning, distemper, painting, &c., at infirmary, Mayday Road, Thornton Heath, and for certain repairs to and relaying portions of the tar paving at Workhouse, Queen's Road, Croydon. Mr. Harry List, clerk, Union Offices, Mayday Road, Thornton Heath.

DEVONSHIRE.—Oct. 6.—For taking down old and erecting new farmhouse and buildings at Lafter Hole, Princetown. Mr. Richard C. Merson, architect, Hollybank, Yelverton.

DEVONSHIRE.—Oct. 6.—For taking-down old and erecting a new farmhouse and buildings at Lafter Hole. Mr. Richard C. Merson, architect, Hollybank, Yelverton.

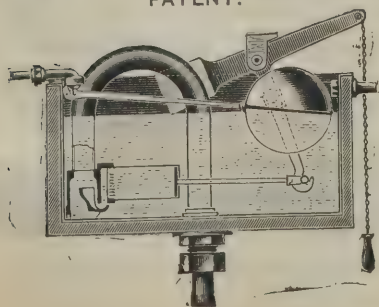
DEWSBURY.—Oct. 6.—For taking-down and re-erecting a boundary-wall and iron railing, &c., in Boothroyd Lane. Mr. H. Dearden, borough surveyor, Town Hall, Dewsbury.

DONCASTER.—Oct. 5.—For erection of brewery, Cleve Street. Messrs. Athron & Beck, architects and surveyors, Dolphin Chambers, Doncaster.

DORCHESTER.—Oct. 6.—For erection of four terrace houses in Alexandra Road, Victoria Park Estate. Mr. J. Feacey, architect, Dorchester.

ARCHITECTS PLEASE NOTE.

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ELGIN.—Oct. 9.—For erection of three blocks of semi-detached cottages at Maisondieu. Mr. G. Sutherland, architect, 51 High Street.

ENFIELD.—Oct. 13.—For erection of an isolation hospital on land adjoining the Northern Hospital, Winchmore Hill. Messrs. Young & Brown, 7 Southampton Street, Bloomsbury Square.

ESSEX.—Oct. 4.—For erection of a classroom to Highwood School, Writtle. Mr. A. P. Lindsell, clerk, Writtle.

GLASGOW.—Oct. 11.—For erection of two ranges of two-storey goods sheds, 1,476 feet and 1,444 feet respectively in length by 75 feet in width, on the South Pier, Prince's Dock. Mr. James Deas, engineer, 16 Robertson Street, Glasgow.

HALIFAX.—Oct. 4.—For erection of a drapery warehouse and offices in Rawson and Powell Streets. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HALIFAX.—Oct. 6.—For erection of a school to accommodate a mixed department in connection with the Triangle infant school. Mr. W. Clement Williams, architect, 29 Southgate, Halifax.

HALIFAX.—Oct. 12.—For erection of a drapery warehouse and offices in Rawson and Powell Streets. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HALIFAX.—Oct. 12.—For erection of new goods offices at North Bridge Station. Mr. A. Guille, secretary to the joint committee, King's Cross Station, G.N.R., London.

HAVERSTOCK HILL.—Oct. 13.—For erection of a gate porter's lodge at the North-Western Hospital. Messrs. Pennington & Son, architects, Hastings House, Norfolk Street, Strand, W.C.

HILLSBOROUGH.—For erection of two houses. Mr. T. Peckett, 19 Wood Road, Hillsborough, Sheffield.

HUDDERSFIELD.—Oct. 6.—For erection of a dwelling-house in William Street, Crosland Moor. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.

HULL.—Oct. 8.—For rebuilding Waterloo Mills, Cleveland Street. Messrs. Wellsted & Easton, architects, Prince's Dock Chambers, Hull.

HULL.—Oct. 7.—For erection of a sawmill, Hedon Road. Messrs. Botterill, Son & Bilson, architects, 23 Parliament Street, Hull.

ILKLEY.—For erection of a pair of semi-detached houses. Messrs. Isitt, Adkin & Hill, architects, Prudential Buildings, Bradford.

IRELAND.—Oct. 5.—For alterations and additions to the Town Hall. Mr. John Donnelly, town clerk, Town Hall, Kingstown.

IRELAND.—Oct. 9.—For building a chronic block and farm offices at the Mullingar District Lunatic Asylum. The Secretary, Board of Control, Custom House, Dublin.

IRELAND.—Oct. 4.—For erection of a stationmaster's office at the passenger station, Banbridge, and for alterations to the station; also construction and erection of platform roofs at Banbridge and at Clones, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

IRELAND.—Oct. 13.—For erection of water-closets, &c., in the workhouse. Mr. Thomas P. Orford, Board Room, Workhouse, Athy.

IRELAND.—Nov. 1.—For repairs to Manorhamilton Court-house. Mr. E. O'N. Clarke, county surveyor, Carrick-on-Shannon.

ISLINGTON.—Oct. 4.—For erection of stables and the fixing of water-softening plant, at the Vestry's Disinfecting Station, Seven Sisters Road, N. Mr. J. Patten Barber, Vestry Hall, Upper Street, N.

LANCHESTER.—Oct. 6.—For erection of laundry at workhouse. Mr. G. T. Wilson, architect, 121 Durham Road, Black Hill.

LONDON.—For alterations and additions to 5 Whitehall Chambers. Mr. R. Curwen, 149 Bishopsgate Street Without, E.C.

MARYPORT.—For plastering three cottages near Station. Mr. J. W. Fitzsimmons, Ellenborough, near Maryport.

MIDDLESBROUGH.—Oct. 5.—For building new cells, coach-house, stables, &c., to Cannon Street police station. Mr. Frank Baker, borough engineer, Municipal Buildings, Middlesbrough.

MIDDLESBROUGH.—Oct. 4.—For erection of baths at Grangetown. Mr. J. Mitchell Bottomley, architect, 20 Albert Road, Middlesbrough.

NEWBURY.—Oct. 7.—For erection of offices and alterations at Atlas Brewery, Bartholomew Street. Mr. James H. Money, architect, The Broadway, Newbury.

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NEW SHILDON.—Oct. 6.—For alterations and additions to the Greyhound Inn. Mr. W. A. Mason, architect and surveyor.

NEW TREDEGAR.—Oct. 4.—For building six houses on Tir Phil Road. Mr. Geo. Kenshole, architect and surveyor, 26 Duffryn Terrace, New Tredegar.

NORTH WOOLWICH.—Oct. 12.—For erection of a building for stores and offices at the main drainage works near Beckton, for the London County Council. The Engineer, County Hall, Spring Gardens, S.W.

PETWORTH.—Oct. 5.—For alterations to workhouse. Mr. Arthur F. Mant, clerk, Petworth.

PORTLAND.—Oct. 8.—For erection of dwellings on the St. Martin's Estate. Messrs. Webster & Co., architects, Fortune's Well, Portland, and High West Street, Dorchester.

RADSTOCK.—Oct. 7.—For construction of steel roof over market and other works, and for the erection of offices, malt-room and other premises. Mr. T. Martin, surveyor, Radstock.

ROTHERHITHE.—Oct. 4.—For erection of a chimney shaft, 150 feet high, in connection with a new refuse destructor at the wharf premises, Bull Head Dock, 173 Rotherhithe Street. Mr. Norman Scorgie, surveyor, Town Hall.

ROTHERHAM.—Oct. 6.—For erection of assembly hall and other alterations at the Sportsman Inn, Broad Street. Mr. J. Platts, architect, Old Bank Buildings, Rotherham.

ROTHERHAM.—Oct. 4.—For erection of a swimming-bath. Mr. H. H. Hickmott, town clerk, Council Hall, Rotherham.

SCOTLAND.—For erection of stables and office houses at Invercauld Arms Hotel, Braemar. Mr. R. G. Foggo, Invercauld Office.

SCOTLAND.—Oct. 12.—For erection of the proposed Fleming Cottage Hospital at Aberlour. Messrs. Stewart & M'Isaac, solicitors, Elgin.

SHEFFIELD.—Oct. 9.—For erection of stores, stabling, &c., at the corner Abbeydale Road and Arnside Road. Messrs. Hall & Fenton, architects, 10 Paradise Square.

SLIGO.—Oct. 7.—For new flagging and door of pump-house. Mr. W. T. Vernon, registrar, Board Room, County Infirmary, Sligo.

STOCKWELL.—Oct. 13.—For erection of a pavilion and the reconstruction of the system of drainage at the South-Western

Hospital, Landor Road. Mr. T. W. Aldwinckle, architect, 1 Victoria Street, Westminster, S.W.

THIRSK.—Oct. 9.—For rebuilding the Sike county bridge. Mr. Walker Stead, Northallerton.

WAKEFIELD.—Oct. 12.—For supplying and laying about 97 yards of earthenware pipe sewer, 9 inches in diameter, with manhole and lamphole, and the draining and preparing of half an acre of land for irrigation. Mr. T. H. Richardson, surveyor, Hemsworth.

WALES.—Oct. 7.—For additions and alterations to the Blaenlyfni Hotel, Blaencraau. Messrs. Griffiths & Jones, architects and surveyors, Tonypandy.

WALES.—Oct. 6.—For alterations and additions to 31 Llewellyn Street, and rebuilding 36 Llewellyn Street, Pentre, Rhondda. Mr. E. Jones, architect and surveyor, Porth.

WALES.—Oct. 7.—For re-erection, additions, alteration and reparations of shop and house, &c., at Tonyrefail. Mr. J. J. Evans, architect, &c., Penarth.

WALES.—Oct. 11.—For alterations and improvements to the Cymmer Board Schools, Porth. Mr. Jacob Rees, Hillside Cottage, Pentre.

WALES.—Oct. 4.—For erection of a cottage at Frongoch. Mr. Geo. Boxall, secretary, Great Western Railway Offices, Paddington Station, London.

WANDSWORTH.—Oct. 6.—For erection of a laundry at the infirmary, St. John's Hill. Mr. T. W. Aldwinckle, architect, 1 Victoria Street, Westminster.

WESTON-SUPER-MARE.—Oct. 8.—For erection of cottages in Uphill Drive Road. Mr. S. J. Wilde, architect, Boulevard Chambers, Weston-super-Mare.

WEYBRIDGE.—Oct. 6.—For erection of stables in Elm Grove Road. Mr. John S. Crawshaw, surveyor, Weybridge.

WIBSEY.—Oct. 14.—For erection of a store and six houses. Messrs. Rycroft & Firth, architects, Bank Buildings, Manchester Road, Bradford.

WINCHFIELD.—Oct. 22.—For erection of a cottage home at the Union House. Mr. F. S. Chandler, Odiham, Hants.

WINDSOR.—Oct. 26.—For erection of a new passenger station and other works at Windsor. Mr. G. K. Mills, secretary, Great Western Railway Company, Paddington Station, London.

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GENERAL HOSPITAL, BIRMINGHAM.

WE have received from Mr. Alfred Whitehead, 35 and 36 Prudential Buildings, Leeds, illustrations showing portions of the new General Hospital, Birmingham, the ceramic decorations in which he has carried out in eburite and majolica faience. They include the large waiting-hall, which is treated with a dull or eggshell-glazed material, and is an important work carried out in a thoroughly satisfactory manner, and the doctors' and patients' entrances, some of the bath-rooms, lavatories and dispensary. In addition to the above, Mr. Whitehead is also carrying out extensive decorations in eburite faience ware at the new theatre, Winter Gardens, Morecambe, the Oldham Joint Stock Bank, Shaw, near Oldham, the large hall, library, &c., at the Brunswick Rooms, Whitby, and many other places. Amongst the many important works he has carried out, we may mention the exterior faience works at the new Grand Arcade, Leeds; exterior faience treatment of ground-floor, Queen's Hotel, Leeds; also at General Infirmary, Leeds; new hotel, Goole; new court-house, Pateley Bridge; new premises, Upper Priory, Birmingham, &c. We have received a sample of Mr. Whitehead's ceramic decoration, which has a very artistic and pleasing effect.

TENDERS.**ACTON.**

For erection of additions, &c., to accommodate about 600 children, and for new caretaker's house at the Beaumont Park Board schools, for the Acton School Board. Mr. EDWARD MONSON, architect to the Board, Acton Vale, W.

Lott & Son, Brompton	£10,045	0	0
Leeder & Co., Chiswick	9,343	0	0
Pattinson & Co., Whitehall	9,195	0	0
J. & M. Patrick, Wandsworth	9,138	0	0
J. W. Brooking, Richmond	8,947	0	0
Godson & Sons, Kilburn Lane	8,317	0	0
G. Hooper, Acton	8,225	12	0
C. F. Kearley, Uxbridge	7,994	0	0
Nye, Exors. of, Ealing Green	7,965	0	0
Soole & Son, Richmond	7,800	0	0
W. Blackburn, Chiswick*	7,750	0	0

* Accepted subject to the approval of the Education Department.

AYLESBURY.

For construction of retaining walls to terraces in Buckingham Road and Walton Road. Mr. J. H. BRADFORD, surveyor.

Whole Tender.

H. T. Grimsdale	£435	0	0
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Walton Road.

Senior & Clarke	296	16	6
W. Y. Green & Co.*	220	0	0

Buckingham Road.

Senior & Clarke	252	8	0
W. Y. Green & Co., Aylesbury*	185	0	0

* Recommended for acceptance.

BASFORD.

For construction and maintenance of about 3,300 lineal yards of stoneware pipe sewers, from 6 inches to 9 inches diameter, with requisite manholes, ventilation and inspection shafts, flushing chambers and other works; also precipitation tanks, effluent channels, crossing under canal, surface carriers, fencing, &c. Mr. HERBERT WALKER, engineer Newcastle Chambers, Nottingham.

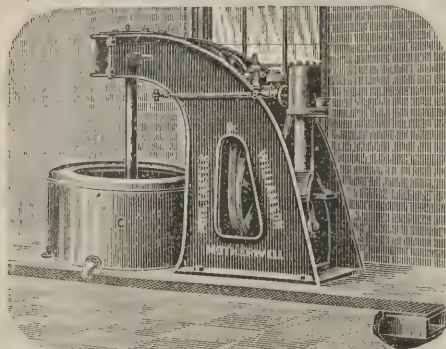
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Cope & Raynor, Gregory Street, Lenton, Nottingham	2,096	13	0

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For additions to county school. Mr. JAS. OWEN, architect, Menai Bridge.

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Jones & Williams	920	0	0
E. Parry	800	0	0
R. Owen, Menai Bridge*	785	0	0

* Recommended for acceptance.

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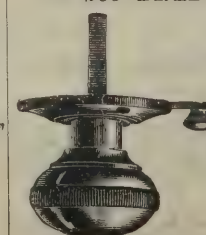
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Rootham & Jeakings	1,172	6	9
G. T. JARVIS (<i>accepted</i>)	1,157	19	0

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For erection of a pair of villas. Mr. J. HUCKERBY, surveyor, 8 The City, Beeston, Notts.

G. Burnham	£581	17	0
W. Gell & Son	560	0	0
J. H. WILLIAM & CO., Nottingham (<i>accepted</i>)	525	0	0

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W. H. Dyche	18	0	0
H. G. ATKINSON, Bentley (<i>accepted</i>)	16	10	0

BRADFORD.

For erection of two houses and house and shop in Lilycroft and Westfield Roads, Manningham. Messrs. FAIRBANK & WALL, architects, Craven Bank Chambers, Bradford.

Accepted tenders.

Davies & Jones, Heaton Road, mason	£773	11	6
T. W. Ackroyd, Allerton, joiner	320	0	0
T. & K. Pratt, Daisy Hill, plumber	116	0	0
J. F. Raunsley, Whetley Lane, plasterer	87	0	0
T. Nelson, Manningham Lane, slater	48	0	0
H. Nutter, Allerton, painter	14	10	0

BRIDLINGTON QUAY.

For alterations and additions to 2 and 3 Spring Terrace. Mr. S. DYER, architect, Bridlington Quay.

C. Limon	£358	0	0
A. Gardam	336	6	8
J. Wood	316	0	0
W. BARNES, Travis Street, Bridlington Quay (<i>accepted</i>)	288	0	0

BRIGHTON.

For erection of kitchen and sanitary improvements at Dann's Creamery, 200 Western Road. Mr. WILLIAM C. F. GILLAM, architect, 162-163 North Street, Brighton.

J. Barnes	£701	10	0
E. Watts	658	0	0
W. Brown & Son	595	0	0

For erection of lithographing and printing works, Meeting House Lane. Mr. WILLIAM C. F. GILLAM, architect, 162-163 North Street, Brighton.

W. Botting & Son	£1,560	0	0
W. Brown & Son	1,459	0	0
J. Barnes	1,431	0	0
Manwaring & Son	1,428	0	0
G. Lockyer	1,416	0	0
Holloway Bros.	1,393	0	0
Lynn & Son	1,344	0	0
T. & W. GARRETT (<i>accepted provisionally</i>)	1,315	0	0

BRISTOL.

For erecting school at Pensford. Mr. J. ACE BEYNON, architect, Coleford, near Bath.

Hughes & Weeks	£1,410	0	0
S. R. Gorvett	1,376	0	0
S. Hinton	1,125	0	0
M. Durnford	1,000	0	0
W. A. SHIPP, Bristol (<i>accepted</i>)	1,062	0	0
Adams & Jeffries	1,045	0	0

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For draining cricket field. Mr. H. SMITH, surveyor, 135 Leyland Road, Burnley.

W. J. NICHOLSON, 15 Brunshaw Road (*accepted*) £50 16 6

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For street works, Shepley Street and Malkin Street. Mr. H. E. FEATHERSTONE, borough surveyor, Chesterfield.

Shepley Street.

Clarke Bros.	£525	0	0
G. Hall	482	14	9
R. Peck	445	0	0
R. HOLMES & CO., Chesterfield (<i>accepted</i>)	399	0	0

Malkin Street.

Clarke Bros.	235	0	0
R. Peck	230	0	0
R. HOLMES & CO. (<i>accepted</i>)	196	0	0
G. Hall	184	2	0

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Williams & Son	977	0	0
Clarke & Mannooch	927	0	0
Lawrence & Sons	908	0	0
G. L. KIRBY (accepted)	837	0	0

CUMBERLAND.

For erection of a stone bridge over the Camp Beck at Walton Mill Ford. Mr. G. J. BELL, surveyor, The Courts, Carlisle.

T. TELFER, Langholm, N.B. (accepted)	£786	13	4
Surveyor's estimate	800	0	0

DONCASTER.

For erection of workhouse.

H. ARNOLD & SON, Doncaster (accepted)	£60,249	17	6
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EALING.

For erecting four houses on the Castle Hill House Estate.
Messrs. HOWGATE, LEEDS & KEITH, architects, 70 Gower Street. Quantities by Mr. L. J. WILLIAMS.

Higgs & Hill	£12,494	0	0
W. Whiteley	12,485	0	0
E. Lawrance & Sons	12,335	0	0
G. W. Pearce	11,708	0	0
Adamson & Sons	11,578	0	0
W. Nash	11,345	0	0
J. NYE (accepted)	10,976	10	0

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For alterations and repairs at the Goldsmiths' Arms. Mr. J. HUME, architect and surveyor, Chiswick.

Poore & Son	£265	0	0
Wenborn	200	0	0
L. Leeder	198	17	0
<i>Drainage.</i>			
L. Leeder	102	0	0

ELGIN.

For erection of two blocks of artisans' dwellings, Maisondieu.
Mr. GEO. SUTHERLAND, architect, Elgin.

Accepted tenders.

A. McKerron, mason.
Sellar & Leitch, carpenter.
A. McIvor, plasterer.
Lyon & Son, plumber.
G. Ogilvie, slater.
J. James, painter.
Total, £2,060.

FOLKESTONE.

For erection of a house. Mr. REGINALD POPE, architect, Radnor Chambers, Folkestone.

Franklin	£1,899	0	0
Wallis & Son	1,600	0	0
Newman	1,569	0	0
Webster	1,550	0	0
Paramor	1,539	0	0
Salter	1,423	0	0
PETTS & SON (accepted)	1,417	0	0

For erection of fifty artisans' dwellings at East Cliff, Folkestone.

Mr. JOHN WHITE, borough engineer.

W. J. Adcock	£16,970	0	0
Multon & Wallis	16,490	0	0
T. Barden	15,498	0	0
T. L. Denne	15,470	0	0
S. Vant	13,297	0	0
G. CASTLE & SON, Folkestone (accepted)	12,922	6	10

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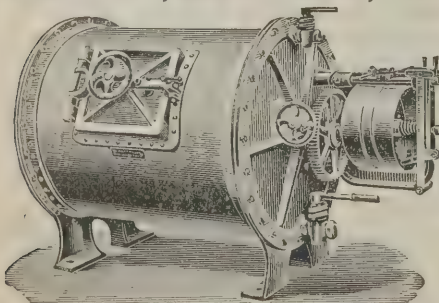
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Hardington & Elliott	3,755	16	3
J. WRIGHT, South Wigston (accepted)	3,740	0	0
J. E. Johnson & Son	3,711	0	0

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T. Bendon	106	10	0
D. Bailey	103	0	0
Heywood	100	0	0

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Currall, Lewis & Martin	1,085	6	4
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For alterations and repairs to the King's Arms. Mr. J. HUME, architect, Chiswick.

HISCOCK (accepted)	£281	0	0
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IRELAND.

For reroofing and reeiling of the Presbyterian church, Ballygowan. Mr. A. H. DE WIND, architect, Comber, Belfast.

A. McRoberts, Belfast	£521	0	0
E. McCune, Ravara	518	0	0
J. Gordon, Newtownards	350	0	0
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Bardell Bros., Lynn	1,159	3	7
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C. S. Mallett & Co.	329	0	0
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H. J. Botterill	272	10	6
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For constructing a sewer in North Runcton.

R. Clarke	£165	0	0
S. Thurston	125	0	0
R. W. FAYERS, King's Lynn (accepted)	95	2	0

For construction of an outfall sewer 5 feet in diameter. Mr. E. J. SILCOCK, borough engineer.

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H. B. & W. F. James	4,940	15	9
R. M. Parkinson	4,687	0	0
Read & Wildbur	4,441	0	0
Pedrette & Co.	3,980	0	0
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T. & H. Herbert 2,937 0 0
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DESIGN "O"

DESIGN "P"

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DESIGN "W"

DESIGN "X"

DESIGN "Y"

DESIGN "Z"

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NARBOROUGH.

For erection of four small villas. Messrs. SIMPSON & HARVEY, architects, Alliance Chambers, Leicester.

W. Moss	£1,335	0	0
W. Coulson	1,240	0	0
J. WRIGHT, South Wigston *	1,232	0	0

* Accepted for three houses at £870.

NORTH EVINGTON.

For construction of Rosebery Street, Lancaster Street and Leicester Street. Messrs. SIMPSON & HARVEY and ROLLESTON & CO., surveyors, Leicester.

Hutchinson & Sons	£2,475	5	0
Stimpson & Rolleston	2,153	14	0
T. PHILBRICK, Leicester (accepted)	2,062	3	0

PENSFORD.

For building new schools, offices, &c., at Pensford, for the Stanton Drew School Board. Mr. J. A. BENYON, M.S.A., architect, Sunnyside, Coleford, near Bath.

Hughes & Weeks, Bristol	£1,410	0	0
S. R. Corvett, Bristol	1,376	0	0
Stephen Hinton, Doynton	1,125	0	0
M. Durnford, Totterdown	1,100	0	0
W. A. SHIPP, Bristol (accepted)	1,062	0	0
Adams & Jefferies, Bristol	1,045	0	0

PONDERS END.

For additions and reinstatement after fire at the works of the Corticine Floor Covering Company, Limited, Ponders End. Mr. HOWARD CHATFIELD CLARKE, architect, 63 Bishopsgate Street Within, E.C.

Colls & Sons	£7,189	0	0
Brown, Son & Blomfield	6,980	0	0
Clarke & Bracey	6,812	0	0
Ashby & Horner	6,697	0	0
LAWRANCE & SONS (accepted)	6,470	0	0

PONTLOTTYN.

For erection of 65 or more houses. Mr. WM. DAVIES, architect.

Accepted tender.

GRIFFITHS BROS., Treaw, £139 10s. per house.

PONTYPRIDD.

For alterations and enlarging the Cilfyndd school for about 300 additional children. Mr. A. O. EVANS, architect, Post Office Chambers, Pontypridd.

E. Jenkins & Son	£5,650	0	0
Cox & Bardo	5,496	0	0
W. Williams	5,099	0	0
W. Thomas & Co.	5,053	18	0
W. Davies	5,000	0	0
Williams & James	4,997	15	0
M. JULIAN, Pontypridd (accepted)	4,437	0	0

PORTSMOUTH.

For alterations and additions to the Omega Street Board school. Mr. A. H. BONE, architect, Cambridge Junction, Portsmouth.

Lear	£4,918	0	0
T. P. Hall	4,904	0	0
Matthews	4,900	0	0
E. A. Sprigings	4,850	0	0
J. W. Perkins	4,805	0	0
J. Crockerell	4,800	0	0
W. Learmouth	4,725	0	0
H. Jones, Southsea *	4,680	0	0

* Recommended for acceptance.

PERTH.

For the construction of the Craigie extension line and the supply of the necessary materials therefor. Mr. GEORGE P. K. YOUNG, engineer, 42 Tay Street, Perth.

A. BRUNTON & SONS, 45 York Place, Edinburgh (accepted).

RADNORSHIRE.

For erection of a new north aisle and new roof to nave, &c., to Rhayader Church. Mr. S. W. WILLIAMS, architect, Rhayader. Quantities by architect.

T. Lant	£1,552	0	0
Smith	1,511	0	0
Morgan	1,477	0	0
Meredith	1,443	0	0
Davies & Son	1,368	0	0
LLOYD, Rhayader (accepted)	1,180	0	0

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RICHMOND.

For rebuilding the Angel and Crown. Mr. J. HULME, architect, Chiswick.	
S. Hunt	£2,025 0 0
T. H. Adamson & Son	1,974 0 0
J. Dorey & Co.	1,840 0 0
Soole & Son	1,780 0 0
Speechly & Smith	1,775 0 0

Note.—Exclusive of fittings.

SETTLE.

For construction of about 823 lineal yards of 9-inch and 6-inch earthenware and cast-iron pipe sewers, with manholes, lampholes, flushing chambers and other works at Newby, Mr. T. A. FOXCROFT, surveyor.	
W. Atkinson	£238 11 2
Brassington Bros. & Corney.	218 7 11
H. SLINGER, Lancaster (accepted)	164 14 0

SOUTHAMPTON.

For constructing stoneware pipe storm-water drains and soil sewers, with manholes. Mr. W. B. G. BENNETT, borough engineer.	
W. H. Saunders & Co.	£13,333 0 0
G. Bell	12,959 0 0
Dyer & Sons	12,957 0 0
C. Daysh.	12,946 0 0
Playfair & Toole	12,712 0 0
F. OSMAN, Southampton (accepted)	12,683 0 0

STANTON-IN-CLEVELAND.

For pulling-down and rebuilding the Blacksmiths' Arms Inn. Mr. W. H. LINTON, architect, Exchange, Stockton-on-Tees. Quantities by architect.	
W. A. King	£1,450 19 4
S. Coates	1,442 11 4
J. Coates	1,429 12 6
A. Atkinson & Co.	1,418 18 3
J. Davison	1,400 0 0
A. J. Cooke	1,287 0 0
H. F. LINTON & SON, Woodland Street, Stockton (accepted)	1,238 12 3

ST. GEORGE'S-IN-THE-EAST.

For repair of the parish church clock.	
MOORE & SONS (accepted)	£107 10 0

SOUTHEND-ON-SEA.

For erection of Primitive Methodist chapel and schoolrooms, Pleasant Road.	
G. Susans	£2,280 0 0
J. Shelbourne & Co.	2,050 0 0
Atkins & Green	2,035 0 0
ARDLEY & ELVEY, Southend (accepted)	1,982 0 0

WALES.

For erection of sixty-nine houses at Pontllytyn.	
E. Rowlands	£156 0 0
J. Bowen	153 0 0
R. Francis	152 0 0
J. James & Sons	149 18 0
W. Williams & Sons	149 10 0
Davies Bros.	147 0 0
M. R. Rowlands	146 0 0
J. C. Davies	143 10 0
J. Monks & Co.	143 0 0
J. Morgan	140 0 0
GRIFFITHS BROS., Trealar (accepted)	139 10 0

WALKERN.

For erection of a detached house, Walkern, Herts. Mr. J. RANDALL VINING, architect and surveyor, 89 Chancery Lane, W.C.	
W. French	£1,199 0 0
J. Redhouse	1,198 0 0
F. Newton	1,090 0 0
F. J. Bailey	1,060 0 0
J. H. ALDRIDGE (accepted)	947 0 0

WEST HUMBERSTONE.

For construction of St. Barnabas Road. Messrs. SIMPSON & HARVEY, surveyors, Alliance Chambers, Leicester.	
Stimpson & Rolleston	£1,283 12 4
T. Philbrick	1,265 14 7

WELLINGTON.

For laying new water-mains in Park Street.	
Davies & Wilcox	£55 17 6
Evans	53 2 0
Yorke	51 16 0
W. H. HOWGATE, Wellington (accepted)	50 0 0

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WHITFORD.

For building a bridge at Whitford.

HARRIS, Clithydon (*accepted*) . . . £3,632 0 0**WHITEHAVEN.**

For alterations to 61 Lowther Street. Messrs. MOFFAT & BENTLEY, architects, 53 Church Street, Whitehaven.

Accepted tenders.

S. Burlington, mason, slating and plastering.

J. W. McClay, carpenter and joiner.

D. Burns, plumbing, glazing and gasfitting.

R. Woodworth, painting.

For rebuilding 30 Lowther Street. Messrs. MOFFAT & BENTLEY, architects, Whitehaven.

Accepted tenders.

J. Young, mason, slating and plastering.

R. D. Metcalf, carpenter and joiner.

H. Burns, plumbing, glazing and gasfitting.

J. Brown, painting.

Note.—Steel girders, wrought and cast-iron work and electric lighting not tendered for yet.

For alterations to 22 and 23 Kings Street. Messrs. MOFFAT & BENTLEY, architects, Whitehaven.

CHAPPLE & SON (*accepted*).

Ramsay Bros., steel girders, wrought and cast-iron work.

WILTON.

For erection of a laundry and other works at workhouse. Messrs. HARDING & SON, architects, 51 Canal, Salisbury.

E. Witt £591 9 6

Webb & Co. 545 0 0

Vincent & Folland 499 0 0

E. Hale 498 0 0

J. Whatley 497 10 0

T. Elliott 470 0 0

P. Tryhorn 448 10 0

T. DAWKINS, Barford St. Martin (*accepted*) . . . 412 0 0**WINWICK.**

For erection of county asylum on the Winwick Hall Estate, Winwick, near Warrington.

R. NEILL & SONS, Strangeways, Manchester (*accepted*).**WISBECH.**

For erection of five Diamond Jubilee almshouses in Lynn Road.

J. GROOM, Wisbech (*accepted*).**YORKS.**

For erection of a new bacon factory at Selby.

Accepted tenders.

Jackson Bros., excavation, brickwork, &c.

W. Douglas & Son, ironwork.

For erection of St. Matthew's Church, Chapel Allerton, near Leeds. Mr. G. F. BODLEY, architect, 7 Gray's Inn Square, W.C. Messrs. NORTHCROFT, SON & NEIGHBOUR, surveyors, 8 St. Martin's Place, Charing Cross, W.C.

STEPHENS, BASTOW & CO., LIMITED, Bristol

(*accepted*) £13,276 0 0**TRADE NOTES.**

THE Aspley Heath Board schools, Woburn Sands, Beds, are being warmed and ventilated by means of Shorland's patent Manchester grates, patent exhaust roof ventilators and special inlet tubes.

MR. L. NICKLIN, of the Smethwick Ventilating Company, Despatch Works, High Park Road, Smethwick, has just supplied his patent cowls for the ventilation of the Higher Grade School, Swansea. The Soho Cowl (Nicklin's patent) is being largely adopted by leading architects and contractors throughout the country, in consequence of its simplicity and the moderate rate of cost.

THAT pumps can be worked noiselessly is proved by Messrs. Merryweather in their patent triangular and compact pump recently fitted up at Hatfield House, the seat of Lord Salisbury, Lord Rothschild's house in Piccadilly, and other establishments. Hotel visitors are so numerous now to what they were a few years ago that the study of the pump and its noises becomes one of the greatest considerations as far as the comfort of the visitor is concerned. We must congratulate Messrs. Merryweather on their patent pump, and commend it to architects and engineers, whose aim should be to please their clients with a noiseless piece of machinery.

A CONTRACT for the pewing of St. Giles's Church, Newcastle, Staffs, has been made with Messrs. Jones & Willis, of Birmingham, and for the present seating accommodation of chairs, which has served that purpose since the opening of the church in 1875, there will be substituted a permanent seating

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The saving in time, labour and material by using this paint is enormous. A Builder, for instance, instead of using three or more coats of ordinary paint, coupled with a coat of varnish, and waiting a considerable time between each for it to dry, and paying labour for each, can with a much smaller quantity of "The Pittman Paint" accomplish all he needs. He can paint a house in the morning and it can be moved into in the afternoon with impunity. Moreover, the paint will not require renewal for a great length of time.

Canvas, Linen, Muslin, Calico, Paper, even Tissue Paper, will become waterproof when the paint is applied; in fact it will **Waterproof anything and everything from a Stone Wall or Iron Girder down to Tissue Paper.**

There is no unpleasant smell attached to it, and it can be scented with any perfume desired by the user.

For the Ironwork of Railway Stations, Girders, Pillars, Machinery, Safes, &c., it will be found invaluable, lasting for years, without the necessity of renewal, and preventing all rust or oxidation.

It is useful for Baths and Tin Work, Stoves and Mantel Pieces, for Metal Advertisement Plates, and in cases where enamel is now used.

It does not sink into the material.

A quick-drying and brilliant paint, too, for Bedsteads, Bicycles and Fancy Metal Articles requiring a fine polish. Carriage Builders will find a wonderful saving in using it.

It is non-corrosive and can be applied to ships and shipbuilding purposes.

ANY FURTHER PARTICULARS AND PRICES ON APPLICATION

of open benches in oak, the design being in harmony with that of the fine church, which is one of the last examples of the late Sir Gilbert Scott's work. The present contract includes the pewing of the nave, three stalls of special design being provided on the south side for the use of the Corporation on the occasion of their visits to the church. The seat for the Mayor is appropriately distinguished among these. The work is being carried out from the design of Mr. J. Lewis, architect, of Newcastle, Staffs, and the cost will be defrayed by Mr. Edward Turner, a member of the congregation, who has before made other munificent contributions to the fabric and furnishing of the church. The special object of the gift is to commemorate the Diamond Jubilee of the Queen in the mother church of the town.

ELECTRIC NOTES.

A SPECIAL committee on electric lighting at a meeting of Leith Town Council was held on Tuesday last, when Mr. W. A. Bryson, consulting engineer, 11 Bothwell Street, Glasgow, was elected resident engineer at a salary of 300*l.* per annum.

A MEETING of the electric-lighting committee of the Dublin Corporation was held on September 23 in the City Hall for the purpose of considering a scheme for the improvement and extension of the supply of electric light in Dublin. It was decided to retain the services of a London electrical engineer and to make a suggestion to the Municipal Council to borrow 100,000*l.* for the construction of a power station at the Pigeon House Fort.

THE new installation of electric light at Boston Dock was officially opened on the night of September 22. The dock and premises were illuminated by eight arc lamps and 150 incandescent lamps, and an illuminated electric device on the walls of one of the large granaries bore the Boston motto, "Per mare per terram," composed of 168 clustered lights. The lighting of the dock was much superior to that afforded by the old gas lamps. The work has been carried out at a cost of 1,682*l.* 13*s.* 11*d.*

AT a meeting of the watch committee of the Bootle Town Council, held recently, it was reported by the town clerk (Mr. J. H. Farmer) that notification of the approval of the Board of Trade to the system of supply of the electric lighting in the borough had been received. The plans bearing on the scheme will at once be proceeded with.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: DEAN'S CHAPEL; NORTH AISLE OF CRIPPT UNDER TRINITY CHAPEL.

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BUILDING AND BUILDERS.

THE last section of the scheme for the building of St. George's Church, in the Meadows district, Nottingham, was entered upon on Thursday, when a memorial-stone was laid by Sir Charles Seely.

THE foundation-stone has been laid of the mission-hall being erected in Overton Road in connection with St. Peter's Episcopal Church, Kirkcaldy.

THE Holbrook Convalescent Home, associated with the Derby Royal Infirmary, is to be rebuilt at a cost of 5,000*l.*

BRUSSELS is to have a permanent memorial of the Diamond Jubilee in the addition of a much-needed chancel to the edifice of Christ Church, of which the first stone was laid by Her Majesty's representative, Sir Savile Lumley, afterwards Lord Savile. An inscription recording the great event of the Jubilee will be placed in the new chancel as the most appropriate memento of its erection.

A NEW Presbyterian church in Gordon Road, South Byker, the first place of worship to be erected in Newcastle under the scheme of church extension inaugurated by the Synod of the Presbyterian Church of England in 1895, has just been opened.

THE foundation-stone of additions which are to be made to the church of St. Andrew, Porthill, Wolstanton, has just been laid. The extension will consist of a south aisle, transept, vestry, south entrance and porch. The new building will be of stone, to correspond with the existing structure, and the contract, which is for 780*l.*, has been let to Messrs. Yorke & Goodwin, of Tunstall. Messrs. Wood & Hutchings, architects of the present church, have drawn the plans for the extensions.

SANITARY CONGRESS, LEEDS, SEPTEMBER, 1897.

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Also made in small sizes with one oven, and with either side or back boiler, from 3 ft. 6 in. upwards, with one oven and either back boiler and hot hearth with rings and plug, or side boiler.

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VARIETIES.

THE restoration of the church at East Markham, near Retford, which was commenced last June, the cost of which is being defrayed by the Duke of Newcastle, is almost completed. In taking up the old floor the original altar stone was found.

THE foundation-stone has been laid of the new schools at Ten Acres, in connection with St. Stephen's Church, Selly Hill, Birmingham.

THE parish church of St. Mary, Long Crendon, Bucks, was recently broken into and an attempt made to set the building on fire.

THE new chancel of St. Andrew's Episcopal church, Wishaw, was dedicated by the Bishop of Glasgow and Galloway.

AT a special meeting of the Rochdale Town Council, Mr. James Leach, solicitor and deputy town clerk, was appointed town clerk to the borough at a salary of 500*l.* per annum.

IT has been decided to place a memorial of the late Bishop of Wakefield in the church of St. Mark, Noel Park, North London, which church Dr. How founded while he was Bishop of Bedford.

THE interesting old church of Stanway, near Winchcombe, on the Gloucestershire estate of the Earl of Wemyss and March, was reopened on September 25, after complete restoration, of which the cost has been about 2,000*l.*

A MOVEMENT is said to be in progress for the formation of an association of architects in Aberdeen similar to those that have been formed in southern cities. Arrangements are so far advanced that it is expected the new society will be inaugurated early next month. There are thirty-four architects in business on their own account in the city.

NO fewer than three chapels have been recently closed in the centre of Birmingham, and a few days since one was sold by public auction. The organ fetched 14*l.* and the pulpit and seats a fair sum. One of the closed chapels is being used as a boxing-saloon and another by Socialists.

WHAT was probably the last tollhouse in London has just been demolished in the Westminster Bridge Road, where the South-Western Railway Company have been making some extensive clearances for the widening of their line between Waterloo and Vauxhall. The tollhouse in question admitted into Lambeth Marsh, but, of course, had long since been put to

other uses. An inscription, however, had been placed on the front, which gave the history of the house.

THE Congregational church in Melbourne Street, Stalybridge, which had been closed for alteration and decoration, was reopened on Monday last. New choir stalls of oak have been erected, and a fine pulpit of oak with a stone and marble base—a memorial of the late Mr. John Cheetham and his wife—has been placed in the church by Mr. J. F. Cheetham and Miss Cheetham, their son and daughter. Greater space has been gained in the nave by setting back the gallery front, which has hitherto shut off much of the light, and the whole church has been decorated in quiet colours.

THE new rooms of All Saints Church, Cockermouth, were opened on September 23. They have been built on the site of an old grammar school which had stood in the churchyard since 1564, and was carried on until about fifteen years since. The building, which has cost some 1,500*l.*, is a handsome structure, built in Elizabethan style. It was designed by Mr. G. D. Oliver, the county architect, and in addition to the parish room, which accommodates nearly 300 people, has two classrooms, two retiring-rooms and a kitchen. The contract was carried out by Mr. John Bolton, building and plastering; Mr. P. Robinson, joinery and painting; Mr. Bell, plumbing; Mr. J. Walker, slating; while the heating apparatus was supplied by Messrs. Walker, of Newcastle-on-Tyne.

THE members of the North-Western and Midland Sanitary Inspectors' Association held a meeting at Manchester on September 25. The chairman, Mr. Urquhart, of Crewe, in submitting the report of the delegates to the Leeds Congress of the Sanitary Institute, congratulated the Association on the fact that Dr. Farquharson, M.P., had promised to assist the progress of the Local Authorities' (Officers) Superannuation Bill in Parliament, that a sanitary inspector had for the first time been appointed president of the sanitary inspectors' section of the Congress and that sanitary inspectors were granted an opportunity of reading papers in other sections. In the course of a discussion on the report strong complaint was made of the meeting-place assigned to the sanitary inspectors at the Congress, it being contended that the value of the conferences was much lessened through the acoustic defects of the room. Mr. Bland, of Urmston, spoke in favour of a united organisation covering the British Isles. A statement was made to the effect that next month a conference would be held in Birmingham with a view to raising the status of the inspectors there and improving the position of the Association.

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LONDON FEVER HOSPITAL (Nurses' Home),
BANSTEAD ASYLUM (L.C.C.),
ROYAL ASCOT GOLF CLUB,
PIONEER CLUB,

TUNBRIDGE WELLS GOLF CLUB,
DULWICH COLLEGE,
HOXTON HOUSE ASYLUM,
NATIONAL CLUB,
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LONDON EXHIBITIONS CO.,
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CRIPPLEGATE INSTITUTE,

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BACK-TO-BACK HOUSES.

At the Sanitary Congress a paper on "Operating the Housing of the Working Classes Act in Leeds" was read by Mr. George F. Carter, C.E., assistant engineer, which described the steps being taken by the Corporation to clear the York Street and Camp Field insanitary areas. It was proposed, he said, to deal with the York Street area as follows:—The buildings on the first section of the area would be demolished, and dwellings afterwards erected for the accommodation of 500 persons of the working class. The second section would then be cleared, and provision made for another 500. Then the third section would be dealt with, and provision made for 1,000, or in all a total provision of 2,000 persons of the working class. Afterwards the fourth section would be cleared. All dwellings, whether erected by the Corporation or by private enterprise, must be in accordance with plans approved by the Local Government Board. It was not intended that all the accommodation should be in the area itself; and as there might be some residents who, if suitable small through houses were erected on cheap land nearer the suburbs, would avail themselves of the same, the committee had determined to arrange for the erection of about 100 houses (to accommodate about 500 persons) upon a part of the Ivy House Estate, belonging to the Corporation. The type of house it was proposed to erect would contain suitable accommodation for a working-class family, comprising a good-sized kitchen or living room, a scullery with copper fitted in, two good bedrooms on the first floor, an attic, and a cellar for food and coals, or an outside pantry. Each house would have its own back yard, w.c. and ashpit. With regard to the remaining 1,500 for whom accommodation must be made, a great question opened itself out, as some effort must necessarily be made to supply suitable accommodation for the very poorest class. The area itself, from its position in the town, and especially its proximity to the public markets, was one in which many of this poorer class preferred to reside. The truth of this was proved by the present overcrowded state of the area, and also the fact that there was scarcely an empty house in it. There was great need in Leeds for some really good common lodging-houses, where for about 4d. or 5d. per day a person could have the use of a private and properly arranged cubicle to sleep in, and it had been suggested that the Corporation should erect such a lodging-house to accommodate about 500 persons. It was proposed to accommodate the remainder of the people displaced in tenement

dwellings and specially arranged through houses on the area. The ordinary tenement blocks would not exceed four storeys in height

Dr. Muntz (Belfast) said he was glad to see that the Local Government Board would not permit the Corporation to erect back-to-back houses in place of those to be demolished. The Leeds authorities had a very difficult problem to deal with in these insanitary areas. He thought they would always find it better to take a small area in hand rather than a large one, because they would so reduce the opposition they had to encounter. It was desirable to drive one long street through such an area, but it was a fatal mistake to make it too wide, because if they did so they would spoil it for shop purposes. In one case in which he was concerned they widened a street to 65 feet, but it would have been better to make it 55 feet, because, when wider, it became practically two different streets. Generally speaking, the main street should be of such a width as to take in a double line of tramway, with sufficient space for ordinary traffic on either side. The very large number of them was one of the difficulties of housing the working classes in Leeds. To accommodate them in tenements was just the thing that should not be done. It would be crowding so many individuals upon so many square yards, and that was not the way to make healthy towns. It was better to have the central portions of the city entirely used for manufacturing purposes, and for the people to live in the purer air outside. It could be easily managed, because from inquiries made that morning he found land was not so dear around Leeds as he had imagined. It could be bought for 3s. per square yard in fee. That worked out at something like 750l. per acre, in fee, or 37l. 10s. per acre per annum. Houses could be built on land obtained at that price that would pay 10 per cent. if properly managed, and it was being done in other places.

Dr. Gordon Beveridge (Aberdeen) said he disagreed with Dr. Muntz on one point. His (Dr. Beveridge's) objection to the Corporation scheme was that it was not large enough. If they could remove the displaced population to the outskirts of the city they could give them better accommodation than would be possible in the centre, and they would avoid the introduction into Leeds of the odious Scottish system of huge tenemented houses. They would also place their scheme on a more sound financial basis, because they could acquire land at a cheaper rate outside, and could easily persuade the railway companies that there was money in providing proper facilities.

Dr. Aston (Ecclehill) said he noticed from the plans that



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the drains of the houses went direct to the main sewer, and this was contrary to the model by-laws of the Local Government Board. Another criticism he had to offer was that the scullery opened out of one of the bedrooms, and he did not think that was sanitary.

Councillor Womersley said, with reference to back-to-back houses, that there was no comparison between the older specimens and those more recently erected. Fewer objections could be raised against the latter, especially when they took into consideration the enhanced value of land in Leeds. They might be able to get land on the outskirts at 3s. per yard, but the difficulty was to get the people there. Let him say, however, that the Corporation were doing their best in that direction by running early morning trams from the outskirts for the convenience of the workmen. But there was a class of people who would be practically deprived of their livelihood if they were removed from the centre of the city. Those employed casually in and about the markets, for example, who had no certainty any day of getting work, could have no chance at all of doing so unless they were on the spot very early in the morning. The committee wanted therefore to avoid if possible removing them too far from the centre of the city. In the end, he thought, they would adopt some form of tenement house. It would not be a very high one, for, remembering the prejudice there was in Leeds against such dwellings, they would not soar so high as their friends in Scotland in that respect. He would ask their critics to try and realise what it meant to have to deal with 72 acres of land in the centre of a great city like Leeds, and to house and rehouse 15,000 people. Let them think of the enormous opposition that would be engendered by the mere fact of issuing notices to quit upon 15,000 people. They had not bought sixpennyworth of property yet. Their trouble had already been enormous, and he did not like to think of what it would be by the time they had acquired the property. He confessed he felt rather depressed about this huge scheme, and he would rather their friends had encouraged them than that they had suggested that it was not bold enough.

Alderman Harrison, chairman of the health committee, Sunderland, said that his Corporation, in clearing an insanitary area, divided the work into three portions and proceeded by steps. They instructed the borough engineer to value the whole of the property involved, and then had an independent valuation made by an estate agent. The two were found to correspond very nearly, and the committee therefore placed the matter in the hands of the agent with instructions to acquire the property

at as near his own valuation as possible. He secured a considerable amount, some at less, some at the valuation, and some at a little more, and they had now bought the whole property at a fairly considerable sum less than the original valuation. They submitted plans to the Local Government Board, and this placed them in a difficulty, for while on the one hand their effort was to do away with insanitary overcrowding, the Local Government Board insisted that the whole of the people displaced should be provided for on the area cleared, and they were driven to erect these high buildings that none of them liked. Their plans only showed three storeys, as against the four required, and the Local Government Board had not yet sanctioned them because they were unable to house the whole of the people on the area. That was a strong argument in favour of the local authority having absolute discretion in such a matter.

Dr. Walter Smith spoke of a similar condition of things in St. Pancras. They had a very large scheme before them, and the Local Government Board refused to allow them to go on unless they rehoused three-fourths of those displaced, and that was absolutely impossible, because every inch of ground for miles around was covered.

Mr. Carter, in replying, mentioned that the Leeds Corporation building by-laws contained no reference to tenement dwellings. If plans for such a building were submitted, he dared say they would be thrown out.

A BUILDING PROBLEM IN EDINBURGH.

THE completion of the North Bridge in Edinburgh makes it necessary to consider what is to be done with the sites for building along the new approach, and which will form a street that will be the connecting link between the Old Town and the New. Some members of the Council propose that the land should be sold in one or more lots, while others consider the interests of the city would be served if the Council decided on undertaking the erection of the new buildings, for which a general design was obtained in competition. The city treasurer, Mr. M'Crae, has prepared an elaborate report, in which he advocates the completion of the improvement by the Council. The following are the most important parts of the document:—

There are three different methods which may be followed

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in carrying out the scheme. (1) The city may build on the scheduled area, and hold the property for behoof of the citizens; or it may, after building, sell the properties under burden of a feu-duty, which latter may either be sold for a capital sum or retained as a source of annual revenue to the city. 2. The scheduled area may be disposed of, as has been suggested, in separate lots, stipulation being made that the buildings to be erected thereon should conform to the plans approved by the city. 3. The scheduled area may be disposed of in one lot, subject also to the building plans approved by the city being adhered to. If either of the two latter methods is adopted, the first question that suggests itself is, What price can the city in equity accept as the purchase price of the ground? or, alternatively, what feu-duty would be the equivalent of the capital sum fixed upon as its reasonable value? And, further, how are we to arrive at what that sum ought to be? We have two factors which may help to solve the problem, viz. the cost of acquisition, and the value of the ground as a building site.

Cost of Acquisition.

The first point to be considered, however, is the cost of acquisition. Here we are on somewhat delicate ground, as a large part of North Bridge Street has yet to be acquired. We will, therefore, take the cost of acquisition at 300,000*l.*, although it is probable that the cost will be below that figure. If, however, this sum is taken in all the calculations, any saving which may ensue will apply equally to all three methods, and will not, therefore, affect the comparison. We will then have an estimated expenditure as follows:—

Estimated cost of acquisition	£300,000
Valuators' estimate for rebuilding	211,000
Total cost	£511,000

Financial Result considered on Basis of Rental, that is, the City Building and Letting the Properties.

We have next to consider the annual rental value of the property when erected. Here we are met with a conflict of opinion on the part of experts as to the rent which the property will produce.

The lowest estimated rental is	£19,500
The highest is	26,000

The mean between these two is 22,750*l.* One of our valuers, who has had great experience of this class of property, estimated

the rental at 22,000*l.* As this is, in round figures, the mean between the two extremes, it may be assumed as a fair rental. At least, I feel sure no business man will say that the estimate has been overstated, when he considers the trade possibilities of the widened thoroughfare, the main access between the old town and the new, with its breadth of 75 feet of roadway and pavement, its magnificent buildings situate in the very business centre of the city, and adjacent to the finest street in the world. A rental of 22,000*l.* per annum, subject to a deduction of 25 per cent. for taxes, repairs, &c., would produce a free rental to the city of 16,500*l.* per annum. The annual charge for sinking fund and interest on the annuity principle—viz. an equal annual instalment for principal and interest for the redemption of 511,000*l.*—the total cost of acquisition and rebuilding would be 18,000*l.*, calculated on a fifty years' basis, the term sanctioned by Act of Parliament for the scheme. This shows a seeming deficit of 1,500*l.* per annum. Against this, however, has to be placed the increased assessment which the city will receive from the new rental, which may be moderately stated at 1,750*l.* per annum, which gives annual surplus of 250*l.* for the fifty years during the liquidation of the debt. At the expiry of that period the city would receive a clear revenue of 16,500*l.* per annum, exclusive of the increased assessment. The architects who were successful in gaining the premium awarded by the Corporation for the best design estimate the cost of reconstruction, according to the plans prepared by them, and which have been taken by all the valuers as the basis of calculation at 172,000*l.* or 38,000*l.* less than the estimate made by the valuers.

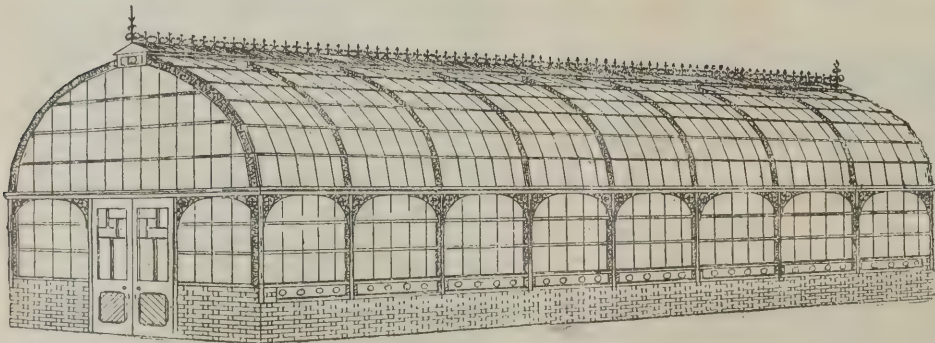
If we take the figures of the architects, who, it may be presumed, are able to correctly calculate the cost of their own design, the result would be as follows:—

Estimated cost of acquisition	£300,000
Estimated cost of rebuilding	172,000
Total cost	£472,000

Estimated rental 26,000*l.*, less 25 per cent. for taxes, repairs, &c., 6,500*l.*, leaving a net rental of 19,500*l.* The annual charge for sinking fund and interest on 472,000*l.* would amount to 16,640*l.*, showing a surplus, exclusive of the increase in the assessment, of 2,680*l.* per annum. And at the expiry of the period allowed for liquidation of the debt, a free revenue of 19,500*l.* per annum would be received by the city. To avoid complication I have omitted any calculation as to interest to be paid during construction, as the amount would not materially

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affect the above conclusions, having regard to the manner in which the rebuilding would be proceeded with. The city would receive the rents from the properties acquired until their demolition, which would take place gradually, the scheme being completed in, say, four sections. On the other hand, if the ground were feued, a period would require to elapse before the first feu-duty became payable to allow time for building.

On the Basis of the City Building and Selling the Properties.

We will now consider the probable result on the basis of the city building and selling the property after reconstruction. Taking cost of acquisition and rebuilding at the larger figure of 511,000*l.* and the rental of the property at the smaller figure of 22,000*l.*, and the feu-duty at the very moderate sum of 6,000*l.* per annum, the result would be:—

Rental	£22,000
Deduct feu-duty of, say	6,000
Leaving	£16,000

This capitalised at twenty years' purchase would produce for the property alone a sum of 320,000*l.*, to which remains to be added the feu-duty of 6,000*l.* per annum, which capitalised at thirty-three years' purchase would give 198,000*l.*, a total of 518,000*l.* Deduct cost of acquisition and rebuilding, 511,000*l.*, which shows a surplus of 7,000*l.* I know I will be supported by the best expert opinion in saying that the above estimate of 6,000*l.* per annum for feu-duty is, considering the site, certainly not overstated. But I have been anxious to ascertain, in the event of the city rebuilding the area in question, the worst possible result which could follow such a course. I am firmly convinced that, making all possible allowances for contingencies, the result of the city undertaking the work under the most unfavourable conditions would be that the return would meet the cost of acquisition and rebuilding. If, however, we take the architect's figures, we have the following startling results:—

Rental 26,000 <i>l.</i> , deduct feu-duty 6,000 <i>l.</i> , leaving 20,000 <i>l.</i> , which, capitalised at twenty years' purchase	£400,000
Feu-duty, capitalised at thirty-three years' purchase	198,000
Cost of acquisition and rebuilding	£598,000
Surplus	472,000
Cost of acquisition and rebuilding	£126,000

It will be generally admitted that twenty years' purchase for

property in the new North Bridge Street is too low, but I have been most anxious, as in the case of the feu-duty, not to over-estimate the value.

If these calculations are accurate—and they have unquestionably been taken on the safest possible basis—it follows that if the city should resolve to expose the ground for sale before building, the lowest price which the city could accept to be in the position it would be under the former estimate would be 307,000*l.*—viz. the purchase price paid by the city for the acquisition of the property and the estimated surplus of 7,000*l.* If the architect's estimate is realised—and I see no reason for thinking that the result indicated is unattainable—the value of the site to the city is 426,000*l.* If the foregoing calculations are carefully weighed, it is evident that in no case could the city incur serious loss in undertaking the completion of the scheme, while it is extremely probable that a surplus would be obtained. To the above calculation must be added the capital value of the increased assessment, which may be taken at 52,000*l.* As this will accrue to the city whichever course is followed, it has not been included in the foregoing calculations, but will go to the credit of the scheme when considering the financial results of the scheme as affecting the ratepayers. It will be at once apparent that should the Council resolve to dispose of the ground in one lot, or in several lots, the upset price must be greatly in excess of any sum hitherto mentioned. It will not suffice to proceed on mere theory as to the wisdom or unwisdom of the city building without fairly facing the consequences of the alternative.

Selling or Feuing the Site to Outside Parties.

Having arrived approximately at the value of the site, let us now consider the advantages of exposing the ground for sale, supposing a sufficient price could be obtained. One obvious advantage is that the city would be relieved of all responsibility as to the further progress of the scheme, and in these days of ever-increasing demand on the time and energy of the members of Council which the extension and development of the city entails, that is no small gain.

The objection urged against the case is a serious one, namely, that exposing the ground in one lot limits unduly the number of probable purchasers, leaving the city very much at the mercy of the speculator, who alone could undertake a risk involving such a large capital outlay for the purchase of the ground, not taking into account the additional capital necessary to rebuild the area. It is evident that only such a price as

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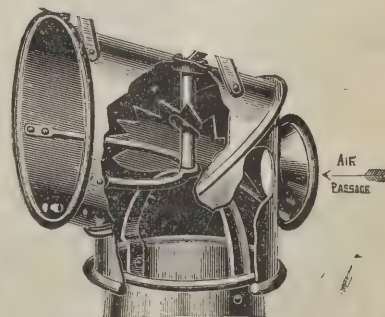
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would leave a large margin of profit to the purchaser would be obtained if the area is thus exposed. The proposal to expose the ground in lots so far meets the last-mentioned objection by enlarging the field from which purchasers may be drawn. The advantages which would follow the adoption of this course have been already referred to. There are, however, obvious objections which perhaps have been overlooked. In the first place, the contention that by exposing the ground in lots you thereby increase the number of purchasers is less real than it seems. The character of the buildings, which must be worthy of the site and in keeping with the new North Bridge, does not permit of the breaking up of the area into small lots. A careful study of the plans makes it apparent that the lots cannot be so divided as to bring them within the reach of the ordinary trader, who would hesitate to become responsible for the erection of a large pile of buildings, far in excess of his own requirements. We are met face to face with this difficulty, that although we have somewhat increased the number of competitors by exposing the area in blocks, we will still have the middleman to deal with. It will, with few exceptions, be the speculator and not the trader who will form our market. It is needless to observe that here also the price obtained by the city can only be of such amount as will leave a large profit to the purchasers, to which they are justly entitled. Then follows the problem:—If the area is to be exposed in lots, how are the unremunerative parts to be dealt with? Is the city to sell all it can and make the best possible use of the remainder, or is it going to jeopardise the sale of the choice portions by tacking on to them those less valuable? But granting that the city were able to dispose of the ground under the most favourable conditions as to price, it is not too much to say that the task of securing adherence to the general plan, if the area is disposed of to different parties, is well nigh insurmountable, however stringent the conditions imposed. The way in which back portions of the ground dovetail into the frontages, the variety of detail in the interior arrangements, provision for light, air, &c., affecting to a certain degree the elevations, comparatively easy of adjustment so long as the whole design is under one control, will lead to endless trouble and confusion and expense if the city once lose grip of the undertaking. I feel assured that the proposal to sell the ground in lots, plausible as it at first sight appears, would be less advantageous to the city than if the ground were sold to one party, who would be responsible for the execution of the work to the satisfaction of the city.

Objections to City Building Themselves.

What are the objections urged against the city completing the scheme? So far as I can gather they are as follows:—First, that the Corporation would not do the work efficiently or economically; secondly, that it is entirely foreign to the duties of the Corporation and outwith its province. The first objection arises from a total misconception of the proposals made. If the Council resolve to rebuild North Bridge Street, they will not themselves be the contractors for the work employing their own workmen. They will proceed exactly as they did in rebuilding the North Bridge—advertise for contractors to carry out the work, and in this case there would not be one, but several contracts, proceeding simultaneously if necessary. The rebuilding of the North Bridge has been most satisfactorily accomplished, although carried out by the Council. The electric lighting of the city has been an unqualified success, carried out by the Council. The conversion of the tramway system from horse haulage to cable, involving with extensions an expenditure of 400,000*l.*, is being carried out by the city's contractors in a most efficient manner. The plea that the city would not be competent to carry out the work is not only not complimentary to the business capacity of the Council, but is quite at variance with established facts. The other contention, that it is outwith the province of the Council to undertake the work is equally fallacious. The argument is entirely the other way. The Council, under statutory powers, are undertaking a great city improvement. The carrying out of the scheme to its logical conclusion involves the rebuilding of the area. The reconstruction, instead of being in the nature of a speculation, is consequent on, and part and parcel of the scheme following on the rebuilding of the bridge and the widening of the street. Nor can we leave out of account the great advantage of the city having direct control of the buildings during construction. The building scheme could be carried out strictly according to the elevations, the interior plans being adapted to meet the requirements of the tenants or purchasers, for the city would be ready to sell any part of the property on suitable terms. And here evolves the fundamental difference between the two methods of procedure. It is only after the area has been utilised that its real productiveness can be gauged. It is only after it has been covered by buildings that its capacity can be exhausted. No real equivalent can or will be received for it merely as a building site, even with its prospective capabilities. The selling of the area, either in one lot or in several lots, before the city had acquired the whole, however carefully the conditions of roup were framed, is

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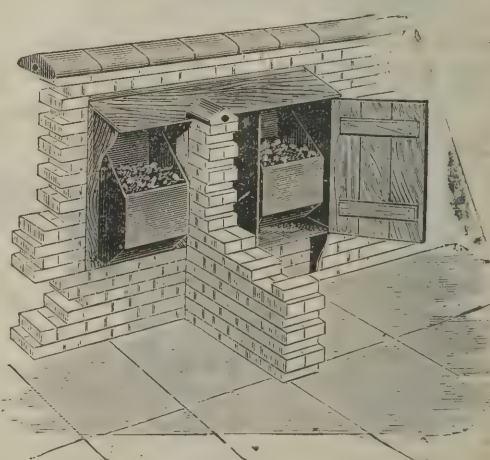
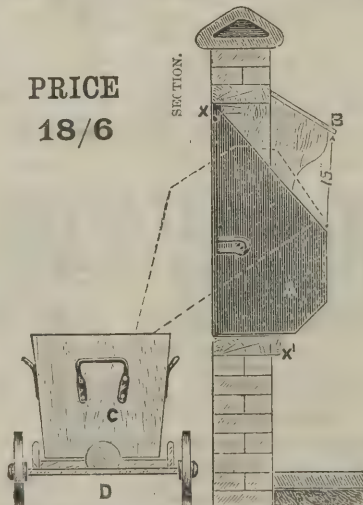
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attended with considerable difficulty. Were the city to resolve to proceed with the rebuilding, it could begin now with that portion of the area which has already been acquired.

WATER SUPPLY IN RURAL DISTRICTS.

A PAPER on "Water Supplies from Wells in Rural Districts" was read by Dr. Mitchell Wilson at the last meeting of the Sanitary Congress. The water supply in rural districts was, he said, still largely obtained from wells, many of which were of old construction and had been made with few, if any, safeguards against pollution of the water from impurities in the surrounding subsoil. The Public Health (Water) Act, 1876, by its limitation of the amount of cost which a district council could enforce in order to obtain a safer supply through the construction of wells, prevented wells being made of a better class. Such improved wells had, however, been adopted by the sanitary authorities and voluntarily by private individuals with highly satisfactory results. Specially designed well tubes consisting of glazed sanitary tubes from 30 inches to 3 feet in diameter had been largely adopted in the rural districts to the east and south of Leeds. As the socket was fixed on the inner side of the pipe, the outer surface was smooth and offered little hindrance to the tube sinking. It was believed that a well made with such tubes was more secure against impurities than when bricks were used. Another method frequently adopted was to obtain water from the deeper strata when the geological formation was favourable. The water was reached by boring in the usual way. From 60 to 200 feet was the average depth in these districts needed to reach the new red sandstone rock, which usually yielded a good supply of wholesome water. As an additional precaution, the lining tube was often carried above the level of the ground, and the suction tube of the pump was directly connected with the lining tube. Such wells could not be provided within the limits of the Public Health (Water) Act. Experience had shown that to be quite successful the work ought to be carried out by a thoroughly competent well-sinker. At present there were no by-laws or official specification for the guidance of those advising upon, or actually engaged in, sinking wells. Matters of far less importance were regulated by by-laws, and much of the unsatisfactory work in the sinking of wells was due to ignorance of the scientific principles and newer methods based upon these,

which could alone provide a supply of wholesome water from wells.

Dr. Thresh, medical officer of health, Essex, read a paper on "Water Supplies for Rural Districts and the Means of Protecting them from Contamination." Increased attention, he said, was now being given to the question of providing rural districts with abundant supplies of wholesome water. Past neglect had been due to two sets of causes. The first was the ignorance of our rural population. The second was the general apathy of rural sanitary authorities. He had found in many districts that there were springs yielding considerable quantities of wholesome water running to waste, when within a mile or two there were villages badly in need of such a supply as those springs afforded. In other instances the subsoil contained and was capable of yielding an abundance of water, which, if properly collected and protected from pollution, would supply all the wants of the inhabitants of the neighbourhood. There were, however, many localities destitute of springs and with an impervious subsoil, but even in those places it was often possible to find and obtain water below the impervious stratum and at a reasonable depth. Where such was not the case, the attention had to be turned to the possibility of impounding surface water from a suitable collecting area. Where springs were available and the water rose at a sufficient elevation to supply the districts by gravitation, they formed by far the most economical source of supply, as there was no annual outlay for pumping, and the necessary storage was but small and of the cheapest character. Where the flow was sufficiently abundant, but the elevation insufficient, a ram, turbine, water-wheel, or even a windmill, might frequently be utilised to raise the water. The subsoil as a source of water-supply had unfortunately fallen into disrepute, because the water from shallow wells (all of which was derived from the subsoil) was so generally polluted. He was convinced, however, that in most districts a perfectly wholesome water could be obtained from the subsoil, by selecting a suitable site and obtaining water by aid of a tube well or a properly constructed shallow well. Where the only available source of water was from a permeable stratum lying under an impervious one, the expense incurred would generally be considerable, especially if the upper layer was 300 or more feet in thickness. The water would probably be of a high degree of organic purity, but it might contain sufficient iron, magnesia or other objectionable matters to render it useless. There was always more or less risk involved in deep-well boring either with regard to the quality or quantity of water procurable;

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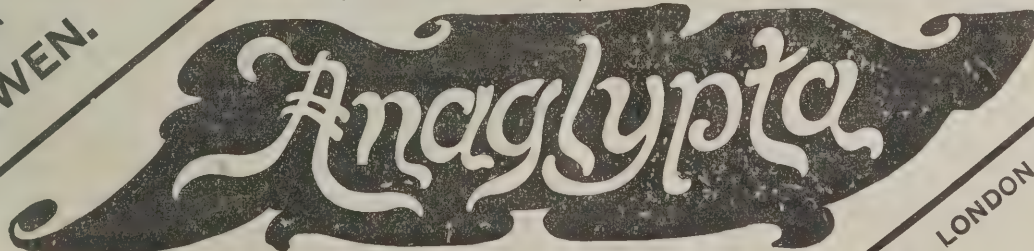
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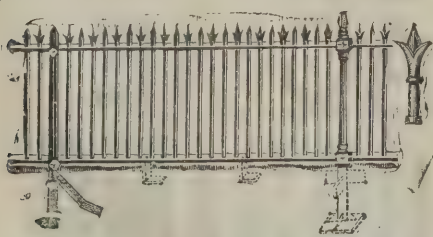
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hence a skilled hydrologist should always be consulted before deciding upon attempting to obtain water from such a source. In fact, wherever there was any uncertainty about the quality or character of the water procurable, an expert should be consulted, but by an "expert" he did not mean the advertising expert who professed to find water by the aid of a hazel-twigs or other similar means. To prevent the contamination of a water-supply the situation should be carefully selected, and the surroundings should receive constant attention. If a spring had to be purchased, rights should be acquired over a sufficient amount of the ground above the spring to enable the authority to protect the water and insure its purity. Where water was collected from a fissured stratum, it must be remembered that impurities might travel great distances in such fissures. When surface water was being collected, strict watch must be kept over the whole of the collecting area. An uncultivated, uninhabited surface was the best, and in any case some considerable area around the points of collection should not receive manure of any kind. Rain-water collected from the roofs of outbuildings and houses would always be impure unless some system was adopted of rejecting the washings of the roofs. Wherever a water-supply was affected by a heavy rainfall, so as to show any turbidity, it was evident that there was something wrong, and a careful investigation of the cause should be made. In conclusion, Dr. Thresh said if they wished to prevent the exodus from our villages, or attract the town dweller to the country, they must provide better water-supplies, and do all in their power to remove the stigma which at present caused all intelligent people to look with suspicion upon all water-supplies in rural districts.

The president (Mr. Whitaker) said both Dr. Mitchell Wilson and Dr. Thresh had laid them under a debt of gratitude. Both had had considerable experience of wells in rural districts, so that their opinions should carry weight. Dr. Wilson said there was no official guide as to sinking a well. He had been a Government official for a considerable time, and he looked with suspicion upon official guides. He was of opinion that the county councils might do something in that direction. Dr. Thresh's remarks about the divining-rod were not far from the mark. It was a comparatively easy thing to conduct a research for the construction of large waterworks, but it was generally much more difficult to obtain practical plans for supplying small villages and towns. Very often the most perfect method was impracticable on account of the cost.

Mr. Herbert Peck said it was exceptional to find a shallow

well that was any good, and few deep ones could be relied upon for decent water. He had made nearly 1,000 analyses of well water during five years, and in less than 100 cases was the water of good quality. It was not an uncommon thing to find a well a few yards from a cesspool.

Mr. P. F. Kendall, F.G.S., of the Yorkshire College, said Dr. Wilson's recommendation of wells with bore-holes was exactly in accordance with his experience. He had met many cases where wells yielding an insufficient supply of water, when a bore-hole had been put down the centre afforded a much augmented supply. Geologists always preferred deep wells, because they were able to acquire much valuable information when they were being sunk.

Dr. Brown (Bacup) said little reference had been made to the merits or demerits of a supply of water from the roofs of cottages. A case came under his notice some time ago in which the water from a roof was collected in lead tanks. The result was severe cases of lead poisoning.

Dr. Anningson said the experience of Dr. Thresh was valuable. He would like to ask him how he got over the difficulty of the Local Government Board's objection to small water schemes. The President had referred to the necessity of an extended geological survey of the drifts. In attempting to obtain surface water it was useful to have some guidance as to the nature of the drift. It would be of great value to medical officers if they knew how to obtain water from gravel patches.

Dr. Mitchell Wilson, replying to the discussion, said one of the delegates had asked if they had had any experience in dealing with rain water. He had had a few years' experience of a fen district in Cambridge, where other water was absolutely non-existent. Rain water was very uncertain, and a drought meant a water famine. When any other supply was available it was advisable to discard rain water. He agreed with Mr. Kendall that it was necessary to bring the tubes of the well above the surface.

Dr. Thresh said he had been asked if he had had any experience of lead poisoning resulting from the water obtained from the roofs of houses. The county in which he resided was a very poor one. Any one who found lead about the roofs of the houses which he had to deal with would be a clever man. There were no leaden cisterns. The water was collected in old wooden tubs. He had been asked how he succeeded in getting the Local Government Board's consent to small schemes. He had had several battles with Local Government Board inspectors, and so far had been able to get much what he wanted

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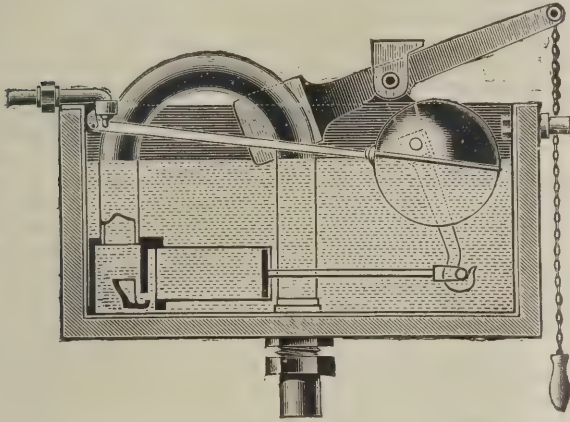
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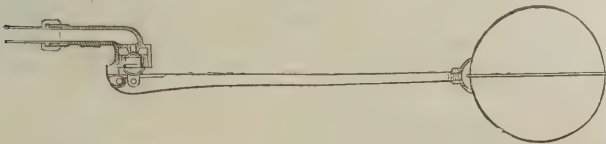
THE Valveless Syphon Company, of Kirkstall, have a most interesting display of their goods. First and foremost is an improved pattern of their well-known "Waterwitch" syphon flushing cistern.

The syphon arrangement consists of a horizontal cylinder and syphon bend; the cylinder is fitted with a displacer which is worked by means of a bell-cranked lever operated by the pull; the piston gives the first flush only, then the water is drawn direct up the syphon pipe, and is so arranged as to practically take all the water out of the cistern. The working parts being all of brass and the cylinder of brass tube, a smooth and



reliable action is insured. The syphon is practically noiseless, and the cistern will flush with only 4 inches of water if desired. With a 4-foot fall and 1½-inch fall-pipe a three gallon cistern will discharge its contents in six seconds. A small silencing valve can be attached, which is adjustable for rendering the cistern silent for given fall of flush pipe.

A new syphon cistern, the "Neptune," is also shown. It consists of a vertical cylinder and syphon bend; the piston passes a side opening at the top of the cylinder in its upward course, and then forms its own valve, and being formed with a well which enters a projecting boss on the top of the cylinder inside, and being full of water it traps the joint, thus insuring a perfect full-bore flush by reason of being kept air-tight during the discharge, which is accomplished with the least exertion.



The "Waterwitch" ball-valve is a very ingenious, though simple, piece of work. The main feature is a loose, spherical valve-seat, which rights itself square to the valve-face, thus insuring a perfectly tight valve. At the same time the seating is as easy to renew as an ordinary ball-tap, and the spherical seating arrangement dispenses with all tight-fitting parts, thus reducing friction to a minimum. This ball-valve is an effectual cure for water-hammer.

Mr. H. Jackson, 134 Westfield Road, Leeds, is exhibiting his patent "Paragon" instantaneous water-boiler, which has decided advantages over many of those which are on the market. By means of the "Paragon" a continuous stream of boiling water at the rate of a gallon per minute can be obtained when once the boiler has been warmed by the flow of hot water, but even when cold the water boils within two minutes. It is fitted with a jockey-light, which when turned in to the burners turns on the gas, and when withdrawn cuts off the supply—thus gas is only consumed when the boiler is in use. The supply of cold water is regulated by a ball-tap, and by means of an overflow pipe the hot water cannot boil over but returns into the heater. The bronze medal of the Sanitary Institute was awarded the inventor at the Congress held at Leeds last month.

YORK COUNTY HOSPITAL.

THE new wing to be erected at the York County Hospital will occupy a piece of the garden on the south side of the institution, and is to be approached from a corridor which connects the Watt ward with the main block. It is to be a one-storey building and will comprise a children's ward for eighteen beds, 70 feet long by 24 feet wide, an inspection ward for two beds, a day-room, a ward kitchen and the usual offices, together with separate and detached lavatory blocks. Open to the south will

be a sun-room, with glazed roof, into which the beds of the patients can be wheeled, enabling them to enjoy the sunlight entirely sheltered from the winds. The buildings are to be fireproof throughout, the walls lined with tiles and the floors laid with teak. The roof will form a flat, which will be laid with asphalt, and to this the patients from the upper floors of the main building may have access. The whole of the new wing has been arranged by Messrs. Demaine & Brierley, the architects, upon the very latest and approved principles of hospital planning, and for this purpose Mr. Brierley visited some half-dozen of the finest hospitals in the kingdom before finally settling the plans. The foundation-stone of the new wing was laid by the Duke of Cambridge on the 23rd ult.

BUILDING INDUSTRIES IN RUSSIA.

A SERIES of articles from a correspondent in Russia is appearing in the *Leeds Mercury*. The following description of brick-making and shingling as practised in the provinces is curious:—

Brickfields are generally worked under a contract, in which the proprietor's contribution to the joint enterprise is the brick-field itself, the plant and the fuel. The labour is supplied by an "artel" of peasants, who take the contract for the season, the proceeds of the sale of the bricks being equally divided between the proprietor and the members of the artel. While speaking of brickmaking, I must relate an anecdote illustrative of the way in which superstitions arise. I was surprised to find that the bricks made by the peasants for their own use, and destined for the construction of their stores, were marked with a rude but perfectly recognisable representation of the British Arms, with the lion and the unicorn. On inquiring the reason for such a very marked compliment to our country in a remote part of Russia, I was informed that the lion and the unicorn were the emblems of two saints who, thus honoured, would they believed protect their "izbas" against the risk of fire. I afterwards discovered the real origin of the custom. For many years the best firebricks were imported from England, and many of these were stamped with the royal arms. Of late years the importation has diminished, but they are still held in such high esteem that Russian imitations are generally stamped in the same way. The peasants here, ignorant of the real meaning of the trade mark, in stamping the bricks made for their own use in the same way, were unconsciously perpetuating a fraud from pious motives.

Another industry carried on upon this estate and which is spreading in White Russia is the manufacture of shingle for roofing. The work is done upon the same partnership system, the wood and the machine—generally worked by oxen—being supplied by the proprietor, who shares the proceeds equally with the artel that undertakes the work. Machines for this industry are imported from Germany and also, I am told, from Belgium. Should any enterprising British firm manufacture such machines for the Russian market, they would have to be small in size, easily transportable, as simple as possible in construction and to be worked by hand, or for larger sizes the motive power to be given by oxen or horses. Shingle for roofing is of course manufactured on a large scale in regular sawmills, whence it is sent in immense quantities to the urban districts; but it becomes expensive when it has to be carted for long distances into remote parts of the country. Hence the demand for small machines to manufacture it locally with wood which would not be of any saleable value on the spot. This demand will certainly greatly increase on account of the action of the fire insurance companies, which accept shingle-roofed buildings upon far more advantageous terms than those covered with thatch.

A LABOURING man named Michael Harte was engaged in excavating gravel in a field near the Glen, opposite Tower Hill, county Down, about three miles from Newry, when he came across a large hole, which at first he believed was a rabbit warren. To his surprise, however, the bank gave way, and revealed a large cave or tunnel. Harte was so much astonished that he ran and informed Mr. M'Anuff, his employer, of what he had discovered. Mr. M'Anuff then secured the assistance of Mr. Samuel Downey, and together they entered the cave and explored it. To their astonishment it turned out to be a fine building about 25 yards long, in two compartments, about 4½ or 5 feet high and 5 feet broad; well faced on both sides with stone, and covered over the top with very large stones, some of which are over 3 feet broad. The passage was quite dry, the whole altogether forming a comfortable and secure place of concealment. It is believed the cave is only opened in the centre, and that it runs to the one that was discovered in the townland of Donaghmore some time since. The district of Donaghmore, Tormore and Benagh abounds with cairns, caves and mounds.

INSTITUTION OF CIVIL ENGINEERS.

THE prize list of the Institution of Civil Engineers for the session 1896-97, now made known, contains awards as follows:—The Howard prize of 50 guineas to Mr. Hilary Bauerman, in recognition of his work on the metallurgy of iron. For original papers presented to the Institution, Telford medals, with premiums of books or instruments, to Messrs. H. A. Humphrey, for "The Mond Gas-producer Plant and its Application;" to Colonel Pennyquick, R.E., for "The Diversion of the Parivar;" to Mr. E. C. Shankland, for "Steel Skeleton Construction in Chicago;" to Mr. Dugald Drummond, for "High Pressure in Locomotives;" and to Mr. Thomas Holgate, for "The Enrichment of Coal Gas." George Stephenson medals and Telford premiums to Mr. Cruttwell, for "The Tower Bridge Super-structure," and to Professor Unwin, for "A New Indentation Test for Determining the Hardness of Metals." Watt medals and Telford premiums to Messrs. Hay and Fitzmaurice for their joint paper on "The Blackwall Tunnel." The Telford premium list contains the names of Messrs. Donaldson, Ripper, Ravenshaw, Worth, Santo Crimp, Homfray, Nichols, Ramsay, H. D. Smith and Major Leach, of the Corps of Engineers, United States Army. Awards to students attached to the Institution comprise:—The James Forrest medal to Mr. A. H. Jameson, the Joule medal to Mr. H. W. Barker, and Miller prizes to Messrs. Beer, Brand, Berridge and Kitchin for papers read in London, and to Messrs. Godfrey and Garvie, of Manchester, Mr. Carter, of Newcastle, and Mr. Hurt, of Leeds. This year marks the first award by the Institution of the medals named after James Prescott Joule, the discoverer of the mechanical equivalent of heat, and James Forrest, whose long service as secretary and the care devoted by him to fostering the student class have on his retirement been commemorated by the foundation of this medal. The presentation will be made at the opening meeting of the session on November 2.

CHEAP SCHOOLS IN EASTBOURNE.

A NOVEL scheme is being floated at Eastbourne. The Education Department requires the provision of 400 additional school places. Mr. J. G. Langham, a local solicitor, proposes the formation of a joint-stock company to raise the funds required for additional buildings and to aid in placing the schools on a sound financial footing for the future. The promoters believe that the project, if speedily taken up, will keep out a School Board and yield a moderate return of interest to the investors. The Duke of Devonshire, Lord President of the Council, has taken shares to the amount of 500*l*. Mr. Davies Gilbert, the other local landowner, the Archdeacon of Lewes, the Mayor of Eastbourne and others have also consented to take shares. The capital is 10,000*l*. in 1*l*. shares. The proposal has been before the Education Department and no objection has been made to it. The hire of premises for school purposes, provided they are properly constructed to meet the sanitary and other requirements of the Department, is, in fact, recognised and the rent of such premises is allowed in the school accounts as a legitimate part of the annual expenses of the school. The scheme has also been laid before the Bishop of Chichester who has given it his sanction. The Duke of Devonshire has offered to convey to the company the fee simple of a site in Bourne Street in consideration of a rent-charge of 12*l*. a year. The cost of a school containing 400 places is estimated at 2,500*l*., and when built it will be let to a body of managers at a rent of 125*l*., equal to 5 per cent. on the capital. Deducting 25*l*. for management expenses, there will remain 100*l*. a year, or a clear 4 per cent. for dividend for the shareholders. The directors desire to raise 10,000*l*. in order to have a strong reserve to fall back upon as further needs arise.

ARSENICAL POISONING BY WALL PAPERS.

IN a note by Mr. Thomas Bolas, F.C.S., in the *Society of Arts Journal*, we read:—It has long been recognised that arsenical wall papers do serious mischief, but the work of Gosio and of Emmerling seems to have cleared up that mystery which has surrounded the matter. Certain moulds, including the very common *muco* *nucedo*, have a remarkable property of decomposing arsenical compounds with the evolution of volatile products containing arsenic, and the highly poisonous character of volatile arsenical compounds, coming into the system by way of the respiratory organs, is well known. Arsenious acid is, even in small quantities, a highly antiseptic substance, and poisonous to moulds, so the throwing off of the arsenic in a volatile form may be an effort of nature to cast out the poison. The arsenical copper greens and other colouring matters containing arsenic are still used, and, paradoxical as it may appear, it is by no means improbable that the most dangerous wall papers are those containing a mere trace of arsenic, as when the quantity is large the moulds cannot exist. Traces of arsenic may come into wall papers from the imperfect washing of

vessels used to contain the more highly arsenical colours. Now that boric acid is very cheap, the old and perhaps forgotten suggestion of Bolley to use a precipitated borate of copper as a green pigment in place of the arsenical green deserves attention. Bolley's green is prepared by taking two parts of blue vitriol (crystallised cupric sulphate) and three parts of borax in separate quantities of cold water and mixing, after which the precipitate is washed and dried. Dyed and printed fabrics now very frequently contain traces of arsenic.

RENTAL AND LAND VALUES IN LANCASHIRE.

A RETURN recently published gives the gross estimated rental and rateable value of agricultural land and of buildings in the respective counties under the Agricultural Rates Act of 1896. The return for Lancashire shows that the gross estimated rental of agricultural land is 1,227,082*l*., and the rateable value 1,147,066*l*., while the gross estimated rentals of buildings, &c., is no less than 22,907,186*l*., the rateable value being 19,009,640*l*. The gross estimated rental is 24,134,268*l*., and the gross rateable value 20,156,706*l*., or about five millions sterling in advance of the whole of Yorkshire, the next highest in the return. An analysis of the different unions in the County Palatine shows that the gross estimated rental of buildings, &c., in the Manchester Union is 1,827,506*l*., with a rateable value of 1,527,525*l*., the figures being those of the valuation list in force at Lady Day, 1896. In Salford Union the rental of agricultural land is 3,347*l*., and the rateable value 3,178*l*., while the estimated rental of buildings is 1,006,332*l*., and the rateable value 876,395*l*. In the Chorlton Union the estimated rental of the agricultural land is 11,173*l*., and the rateable value 11,168*l*.; the rental of the buildings is 1,576,512*l*., rated at 1,309,738*l*. In the Prestwich Union the agricultural land is rated at 77,082*l*., and the buildings at 566,573*l*.

ALRESFORD PARISH CHURCH.

IN a report on Alresford Church, Sir Arthur Blomfield says that on further examination he finds that the posts supporting the nave roof are in an extremely unsound state. One was split from top to bottom, and a collapse with a part of the roof falling might have occurred at any moment. The unsoundness of the posts was not visible, as they were cased. If the posts were removed it would be necessary to disturb a large portion of the roof-timbers, and as those are shaky and twisted it would be almost impossible to replace them. Under the circumstances he recommends that "columns and arcades with clerestory windows in stone, of a similar character to those existing before the fire, should replace the existing wooden construction." The estimated cost of an entirely new roof to the nave in oak, with nave arcade and columns and clerestory windows in stone, is approximately 1,000*l*. beyond the present contract. An interesting discovery of an Early English window has been made, and also extensive remains of windows of a Perpendicular church. The foundations of the new chancel are also found to be on exactly the same lines as those of the Perpendicular church, the latter having been brought to light in the course of the restoration.

A CURIOUS discovery has just been made at Heathfield Park, near Eastbourne, the seat of Mr. Alexander, of Lombard Street. On demolishing an old wall in the cellar the workmen found behind it 300 bottles of wine. It transpires that it was placed there seventy-one years ago by a former owner, who intended making it a present to his son on the latter attaining his majority. Death prevented the design from being carried out, and the existence of the store passed out of knowledge.

THE church of St. Martin-in-the-Fields has just emerged from the hands of the decorator, and was reopened on Sunday morning, September 26, radiant with fresh paint, varnish and distemper. The exterior in certain parts has for the last five years or so been hidden by scaffoldings for the necessary repairs, which necessitated the outlay of some 4,500*l*. The interior greatly needed renovating, but no funds being available, the idea was dismissed. The Jubilee, however, introduced it again, when Harrod's people paid 4,000*l*. for permission to erect stands round the church. Upwards of 2,000*l*. has been spent on the interior, the whole scheme of decoration in pale green, terra-cotta and gold, as well as the repairs, being placed under the supervision of Sir Arthur Blomfield. Without discarding the old pews, they have been made more comfortable by slight slope given to the back and by the addition of a shelf in front for the safety of the high hat. Unfortunately, street noises cannot be excluded, but sound has been deadened by covering the entire floor with linoleum. As St. Martin's was almost, if not actually, the first church in London to make use of the electric light, no improvement could be effected in this particular. A choir vestry has been fitted up in a corner crypt, which for a long time has been used as a gymnasium and recreation-room.

BUILDING REGULATIONS IN EASTBOURNE.

ON Monday, September 27, Mr. James Vine was summoned, at the instance of the building committee of the Town Council, for having contravened the building regulations in the erection of four houses in Cliff Road, Eastbourne.

Mr. H. West Fovargue, the town clerk, in opening the case, said that it would be well for the magistrates to view the premises. The complaint against the defendant was simply that he had erected the front main wall of the building, which was the subject of these proceedings, beyond the front main wall of the Convalescent Hospital. The defendant's building projected to the extent of 8 feet 3 inches beyond the front main wall of the hospital. The institution being built with bays, that might be made the subject of difference, but, allowing for any difference of this kind, it was still his contention that the defendant's building projected 4 feet 7 inches beyond the front main wall of the hospital. It was also contended by the Corporation that the assent of the urban authority was necessary to the erection of the building beyond the line of the adjoining building and that assent had never been given.

Mr. W. C. Field, building surveyor to the Corporation, stated that the plans deposited in April 1896 by Mr. Coster, on behalf of the defendant, for four houses in Cliff Road, were objected to, the notice of objection specifying that the drainage was incomplete and the building line infringed. In June 1896 new plans were deposited, showing the building line of the new building in a line with the front main wall of the hospital, and these plans were recommended for approval, subject to the removal of an old sewer at the rear. This latter matter had never been arranged, and actually no plans had been approved of by the Council, though had the plans of June, which were re-submitted in June 1897, been carried out, no objection would have been taken on account of the building line. Witness, finding that the building was being proceeded with, first gave notice to the builder, J. Holland, to discontinue the work, and on August 23, when first the measurements were taken, the defendant was present and heard the objections then raised by witness on the spot. Despite these notices the buildings had been proceeded with to the height of the second storey, and this prosecution was accordingly instituted.

In cross-examination, witness said the prosecution was authorised by the buildings committee, whose proceedings had not yet been approved of by the Town Council. This building was on the Duke of Devonshire's estate, but witness did not

know that the building line was fixed at 20 feet from the roadway.

Mr. Fovargue testified that this question, as to the examination and approval of plans and any prosecutions that might be necessary relative thereto, was entirely within the province of the buildings committee. In his opinion, while the Council could approve or disapprove of the proceedings of the committee, the resolution of the committee was sufficient for the present purpose, under section 6 of the Eastbourne Improvement Act 1895.

Mr. R. M. Gloyne, the borough engineer, stated that in his opinion the front main wall of the hospital was the wall erected at a depth of 28 feet 6 inches from a line indicating a fence or road boundary.

For the defence Mr. Hillman submitted an agreement specifying that the building line should be 20 feet from the roadway, and that a new building line ought not to be fixed by the previous erection of a building like the hospital, which was full of bays and excrescences. He also contended that the notice of objection given to the defendant's building was not sufficient notice to the defendant.

At this stage an adjournment was taken, during which the magistrates viewed the building.

For the defence Mr. James Coster, architect, manager to Mr. Holland, builder, stated that he prepared the plan, and it was understood that it was approved so far as the building line was concerned.

In reply to Mr. Fovargue witness admitted that he had no consent in writing from the building committee to proceed with the work according to the plan.

The Bench suggested whether a compromise could not be effected by taking away the two bay windows, and Mr. Hillman and the town clerk expressed their willingness to discuss the question. The case was accordingly adjourned for a fortnight.

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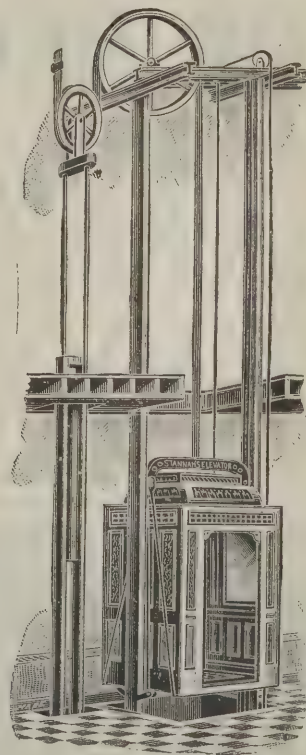


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electrical engineering or applied chemistry. It opened in September 1896 with only eight pupils, but before its first session was ended over seventy individual students had availed themselves of the excellent education offered by it. For those who are unable to attend in the daytime similar classes in the evening are available. Electrical engineering and applied physics seem to be subjects largely sought after in both day and evening classes. During the last session the physics and electrical engineering evening classes were attended by nearly 170 students engaged in one or more of the following subjects:—Applied physics, electrical technology, electric wiring and fitting and instrument making. None of the technical courses are run on examination lines, the object being simply to give the pupil that instruction which will best fit him for the occupation he has selected, but several of the students have highly distinguished themselves in the examinations of the City and Guilds Institute, whilst others have carried off evening exhibitions offered by the Technical Education Board. As regards equipment there is little to be desired. Thanks mainly to the London Technical Education Board something like 10,000*l.* has been spent on the plant requisite for electrical and mechanical engineering and for the apparatus required in the chemical and physical laboratories. The whole of the Institute is lighted by electricity, which can be generated by its own electric plant, or by the Chelsea Electric Supply Company. For the present session, which commenced on September 28, there are already a considerable number of entries in both day and evening engineering classes.

RESTORATION OF BRADFORD CHURCH.

A FACULTY has been granted by Dr. Tristram, Chancellor of the Diocese of Ripon, for the restoration of the Bradford parish church. About 3,500*l.* has been already raised towards the object, and the scheme of restoration was fully discussed at a Consistory Court held on September 22, the Chancellor presiding. It was stated that the scheme had long been in contemplation by the late vicar, Archdeacon Bardsley, and that twelve months was the proposed time for carrying it out, but this will probably be extended. The removal of graves and the reinterment of bodies, as also the diminution of the seating accommodation are the chief points which were involved in the inquiry, but the Chancellor said he had viewed the church and

had come to the conclusion that the alterations proposed were most desirable. The decision of the Chancellor has given general satisfaction, for it has long been felt that the old church needed restoration.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

21093. Alfred Ernest Barnett, for "Improvements in the method of, and means for repairing gas, water and other pipes and mains."

21020. David Muir Nesbitt and Walter Clowes, for "A combined water-heater and steam-condenser for water-boilers and the like."

21043. Arthur Bentall Collis, for "Improved water-tube boiler."

21048. John Johnston Green, for "Improvements connected with the pans of waste water-closets."

21056. John Walter Hacking, for "Improvements in the method of, and means employed for fixing scaffolding and all pipes or ladders to buildings or chimneys."

21141. John Alcock Jones, for "Improvements in manufacture of plaster for walls, ceilings and the like."

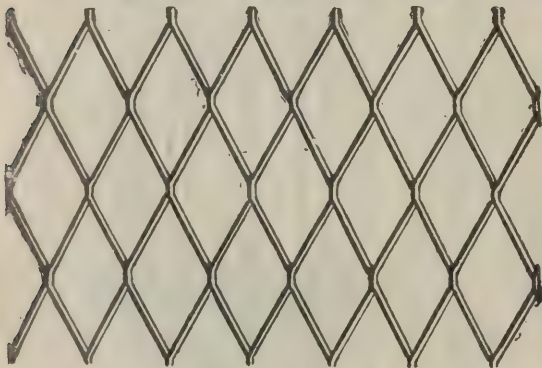
21169. Elias Samuel Ashcroft, for "Ball gully for the prevention of back pressure in drains."

21264. James Jemson, for "Improvements in or relating to slates for roofing."

21426. David Thomas Haylock, for "Improved method of laying drain pipes."

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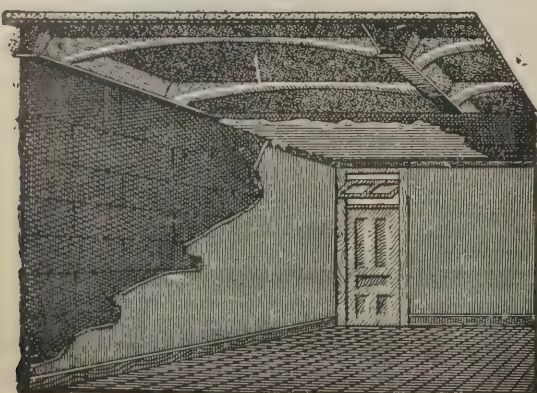
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TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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COMPETITIONS OPEN.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500l., 300l. and 200l. respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

COLNE.—Oct. 20.—Premiums of 50l. and 35l. for plans for technical schools, public library and public hall. Mr. T. H. Hartley, borough engineer, Colne.

DORKING.—Oct. 13.—Plans and estimates are invited for the erection of an infirmary. Mr. George Scales, clerk to the Guardians, High Street, Dorking.

SOUTHEND-ON-SEA.—Nov. 20.—Plans invited for new church. Rev. E. E. Kimber, St. Albans, Avenue Terrace, Southend-on-Sea.

UXBRIDGE.—Oct. 30.—The Uxbridge Rural District Council invite plans for a scheme of sewerage and sewage disposal. Mr. Charles Woodbridge, 38 High Street, Uxbridge

CONTRACTS OPEN.

ABERDEEN.—Oct. 13.—For erection of a monument at Duthie Park. Mr. John Rust, city architect, 224 Union Street, Aberdeen.

ABERDEENSHIRE.—Oct. 22.—For erection of distillery buildings and warehouse, excise officer's and manager's houses, offices, and workmen's cottages at Kennethmont Station. Mr. Charles C. Doig, architect, Elgin.

ALNWICK.—Oct. 19.—For additions to the training school in Northumberland Street. Mr. R. R. Temperley, clerk of works, Alnwick Castle.

ASTON-CUM-AUGHTON.—For erection of closet accommodation at the Swallownest Board Schools. Mr. W. Dust, 40 Bank Street, Sheffield.

BARNSELY.—For building eleven houses. Mr. William McCoy, Wellington Street, Barnsley.

BARNSELY.—Oct. 12.—For erection of four houses and butcher's shop at Hoyland Common. Mr. George Moxon, architect, Central Chambers, Church Street, Barnsley.

BATLEY.—Oct. 12.—For erection of a detached house in Deighton Lane. Messrs. C. H. Marriott & Son, architects, West Park Street, Dewsbury.

BELFAST.—Oct. 21.—For erection of new city hall. Messrs. E. Thomas & Son, architects, 7 Queen Anne's Gate, Westminster.

BERWICK-UPON-TWEED.—Oct. 12.—For erection of a urinal at the Scotsgates and coal shed at Tower waterworks. Mr. Wm. Weatherhead, clerk, Quay Walls, Berwick.

BIRSTALL.—Oct. 15.—For erection of boys' cloak-room at the Brownhill National Schools. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

BLETCHINGLEY.—Oct. 15.—For enlargement and alteration of the workhouse. Mr. Frederick Elliff, Caterham, Surrey.

BRADFORD.—Oct. 18.—For erection of nineteen houses in Cornwall Road. Messrs. Milnes & France, architects, Bradford.

BRIDLINGTON QUAY.—For erection of a villa residence. Mr. John M. Dossor, architect, 2 Manor Street, Hull.

BUCKFASTLEIGH.—Oct. 16.—For alterations and additions to farm buildings at Torr Dean, and for alterations and additions to the stables at Bigadon House. Mr. J. Fleming, 9 Billiter Square, London, E.C.

BURNLEY.—Oct. 11.—For erection of a stable at Altham. Mr. G. H. Pickles, surveyor, Burnley.

BURSLEM.—For erection of small farmhouse, Lea Heath, Stowe. Mr. W. H. Walley, architect, Queen Street, Burslem.

BURY.—Oct. 13.—For erection of a shelter for casuals and coverings to gangways at the workhouse at Jericho, Bury. Mr. James Isherwood, union clerk.

CARDIFF.—Oct. 13.—For additions to the Canton Police Station, Cowbridge Road. Mr. W. Harpur, borough engineer, Town Hall, Cardiff.

CARLISLE.—For erection of offices at Caldewgate. Messrs. Johnstone Bros., architects, 39 Lowther Street, Carlisle.

CASTLEFORD.—Oct. 13.—For extending the Dandelion Porter Brewery. Mr. John Townend, Morrison Street, Castleford.

CASTLEFORD.—Oct. 11.—For erection of residence in Pontefract Road. Mr. Arthur Hartley, architect, Carlton Chambers, Castleford.

CHESTER.—Oct. 11.—For extension of the infant school at Buckley. Messrs. J. H. Davies & Sons, 24 Newgate Street, Chester.

DEVONPORT.—Oct. 15.—For erection of a headmaster's residence and new boarding-house, at the Devonport High School. Mr. Robt. H. B. Neal, architect, Central Exchange, Plymouth.

DURHAM.—Oct. 13.—For erection of sixteen cottages at Crook. Mr. William Bell, architect, York.

EASTBOURNE.—Oct. 22.—For erection of model common lodging-house. Mr. William Chapman Field, architect, Town Hall, Eastbourne.

ENFIELD.—Oct. 13.—For erection of an isolation hospital on land adjoining the Northern Hospital, Winchmore Hill. Messrs. Young & Brown, 7 Southampton Street, Bloomsbury Square.



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ELGIN.—Oct. 11.—For erection of Rothes town hall. Mr. R. B. Pratt, architect, County Bank House, Elgin.

ESSEX.—Oct. 22.—For alterations to the present and building new schools at West Mersea to accommodate 365 children, with offices, boundary walls, &c. Mr. J. W. Start, architect, Colchester.

HACCONBY.—Oct. 14.—For erection of house and shop. Mr. F. G. Shilcock, architect, West Street, Bourne.

HALIFAX.—Oct. 12.—For erection of a drapery warehouse and offices in Rawson and Powell Streets. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HALIFAX.—Oct. 12.—For erection of new goods offices at North Bridge Station. Mr. A. Guille, secretary to the joint committee, King's Cross Station, G.N.R., London.

HALSTOCK.—For erection of two cottages on farm and for alterations of farm buildings. Mr. John Pring, Halstock, Yeovil.

HAMPSTEAD.—Oct. 26.—For enlargement and alteration of the fire brigade station in Heath Street. Architect's Department, London County Council, 13 Spring Gardens, S.W.

HARROGATE.—For erection of a detached villa on the De Ferrieres Estate, Ripon Road. Messrs. H. E. & A. Bown, architects, Harrogate.

HARROGATE.—For erection of a cabmen's shelter. Mr. H. E. & A. Bown, architects, Harrogate.

HAVERSTOCK HILL.—Oct. 13.—For erection of a gate porter's lodge at the North-Western Hospital. Messrs. Pennington & Son, architects, Hastings House, Norfolk Street, Strand, W.C.

IRELAND.—Nov. 1.—For repairs to Manorhamilton Court-house. Mr. E. O'N. Clarke, county surveyor, Carrick-on-Shannon.

IRELAND.—Oct. 13.—For erection of water-closets, &c., in the workhouse. Mr. Thomas P. Orford, Board Room, Workhouse, Athy.

IRELAND.—Nov. 1.—For repairs to Manorhamilton Court-house. Mr. E. O'N. Clarke, county surveyor, Carrick-on-Shannon.

KENT.—Oct. 12.—For erection of a fire brigade station and stables at West Street, Bromley. Mr. Fred. H. Norman, District Council Offices, Bromley, Kent.

LANCASTER.—Oct. 14.—For fixing Lancashire boiler at electricity works, Marton Street Yard. Mr. T. Cann Hughes, town clerk, Town Hall, Lancaster.

LANGTON-ON-SWALE.—Oct. 14.—For additions to schools. Messrs. Clark & Moscrop, architects, Darlington.

LEEDS.—Oct. 20.—For constructing concrete and brick-work walling and arching for the widening of Burley Street. Town Clerk, Town Hall, Leeds.

LEEDS.—Oct. 26.—For erection of public baths in Meanwood Road. Mr. Walter Hanstock, architect, Branch Road, Batley.

LEEDS.—For erection of stables, shops and dwelling-house in Cottage Road, Headingley. Mr. Albert E. Kirk, 13 Bond Street, Leeds.

LEYTONSTONE.—Oct. 13.—For erection of two external iron staircases at workhouse. Mr. Fred. E. Hilleary, clerk, Union Road, Leytonstone.

LIVERPOOL.—Oct. 13.—For alterations and additions to Richmond Lodge, Church Road, Wavertree. Mr. Walter W. Thomas, architect, 15 Lord Street, Liverpool.

LONDON.—Oct. 11.—For erection of three blocks of artisans' dwellings in Moira Place and Plumber's Place, City Road. Mr. H. Mansfield Robinson, clerk, Town Hall, Old Street, E.C.

LOWESTOFT.—Oct. 22.—For erection of timber-framed batteries and drill-shed, magazine and latrines, for the Royal Naval Reserve. Director of Works Department, Admiralty, Avenue House, Northumberland Avenue, W.C.

MORLEY.—Oct. 20.—For erection of public baths, Fountain Street. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

NORFOLK.—Oct. 12.—For erection of buildings for baths, water-closets, sinks, &c., at the union house, Great Snoring. Messrs. Edwd. Boardman & Son, architects, Queen Street, Norwich.

NORTH WOOLWICH.—Oct. 12.—For erection of a building for stores and offices at the main drainage works near Beckton, for the London County Council. The Engineer, County Hall, Spring Gardens, S.W.

NORTHUMBERLAND.—Oct. 13.—For erection of six cottages at Seghill, for the North-Eastern Railway Company. Mr. William Bell, company's architect, Central Station, Newcastle.

RAMSGATE.—Oct. 11.—For erection of thirty-four cottages in Church Road. Messrs. Hinds & Son, architects, 57 Queen Street, Ramsgate.

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SCOTLAND.—Oct. 12.—For erection of the proposed Fleming Cottage Hospital at Aberlour. Messrs. Stewart & M'Isaac, solicitors, Elgin.

SOUTHEAST.—Oct. 11.—For pulling down old buildings and rebuilding the new substructure of the Railway Tavern, Scratton Road and Nelson Street. Messrs. Thompson & Greenhalgh, architects, Bank Chambers.

SOWERBY BRIDGE.—For erection of a house in Clifton Street, Willow Hall Park. Mr. S. Wilkinson, architect, Sowerby Bridge.

STOCKWELL.—Oct. 13.—For erection of a pavilion and the reconstruction of the system of drainage at the South-Western Hospital, Landor Road. Mr. T. W. Aldwinckle, architect, 1 Victoria Street, Westminster, S.W.

TANFIELD.—For erection of a lodge at Rushwood, near Tanfield. Messrs. H. E. & A. Bown, architects, Harrogate.

WAKEFIELD.—Oct. 12.—For supplying and laying about 97 yards of earthenware pipe-sewer, 9 inches in diameter, together with a manhole and lamphole, and the draining and preparing of half an acre of land for irrigation purposes and other works connected therewith; also for 150 yards of wood fencing. Mr. T. H. Richardson, surveyor, Hemsworth.

WALWORTH.—Oct. 14.—For additions and alterations at Newington Workhouse, Westmoreland Road. Mr. Howard C. Jones, clerk, Union Offices, John Street West, Blackfriars Road, S.E.

WALES.—Oct. 11.—For alterations and improvements to the Cymmer Board Schools, Porth. Mr. Jacob Rees, Hillside Cottage, Pentre.

WALES.—Nov. 1.—For erection of new offices at Barry Dock. Secretary, Barry Railway Company, Barry Dock.

WIBSEY.—Oct. 14.—For erection of a store and six houses. Messrs. Rycroft & Firth, architects, Bank Buildings, Manchester Road, Bradford.

WINCHFIELD.—Oct. 22.—For erection of a cottage home at the Union House. Mr. F. S. Chandler, Odiham, Hants.

WINDSOR.—Oct. 26.—For erection of a new passenger station and other works at Windsor. Mr. G. K. Mills, secretary, Great Western Railway Company, Paddington Station, London.

WORSBOROUGH DALE.—Oct. 12.—For erection of four dwelling-houses and out-buildings in Clarkson Street. Messrs. Wade & Turner, architects, 10 Pitt Street, Barnsley.

WREXHAM.—Oct. 31.—For erection of latrines at the boys' school. Messrs. J. Morison & Son, 10 King Street, Wrexham.

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For erection of four through houses in East Parade. Mr. ABM. SHARP, architect, Albany Buildings, Market Street, Bradford.

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Ogden & Schofield, joiner.

W. Hodgson & Son, plumber.

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CASTLEFORD.

For alterations and additions to dwelling-house and shops, Carlton Street. Mr. ARTHUR HARTLEY, architect, Carlton Chambers, Castleford.

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W. Walker, bricklayer and mason.

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CASTLEFORD—continued.

For erection of a cart-shed in Wheldale Lane. Mr. W. GREEN, surveyor.

Accepted tenders.

W. Spencer, Bland Street, builder.

G. Dodsworth & Son, Carlton Street, joiner.

For painting and papering the Council Offices. Mr. GREEN, surveyor.

A. FIRTH, Temple Street (*accepted*).

CHESTERFIELD.

For alterations and additions to the Stephenson Memorial Hall. Mr. W. H. WAGSTAFF, architect, 57 Saltergate, Chesterfield.

J. WRIGHT, Butwell Street (*accepted*).

CLAYTON.

For painting the workhouse.

E. & B. BRIGGS (*accepted*) £86 16 0

CLOWN.

For erection of two houses. Mr. W. H. WAGSTAFF, architect, Saltergate, Chesterfield.

E. LEVICK (*accepted*).

DRAYCOTT.

For extensions to Victoria Mills. Mr. G. S. DOUGHTY, architect, Britannia Chambers, Pelham Street, Nottingham.

J. Shaw	£4,600	0	0
J. F. Price	4,551	0	0
J. W. Woodsend	4,500	0	0
T. Barlow	4,476	0	0
W. Maule	4,400	0	0
E. Woodward	4,275	0	0
G. Youngman & Son	4,253	0	0
J. H. Williamson & Co.	4,245	0	0
W. E. Shaw	4,220	0	0
H. Vickers	4,220	0	0
F. Messom	4,219	0	0
H. J. Robinson	4,140	0	0
J. Brown	4,065	0	0
F. PERKS & SON, Long Eaton (<i>accepted</i>)	4,025	0	0

DOVER.

For completing the construction of Longfield Road, North Street, and Underdown Road. Mr. H. E. STILGOE, borough engineer.

Longfield Road to Underdown Road.

G. Munro, Dover	£191	7	6
A. T. Catley	167	0	0
W. H. SAUNDERS & CO., Southampton (<i>accepted</i>)	144	10	11

Longfield Road west of Underdown Road.

G. Munro	159	11	9
A. T. Catley	153	0	0
W. H. SAUNDERS & CO. (<i>accepted</i>)	123	15	5

North Street.

G. Munro	94	6	0
A. T. Catley	93	0	0
W. H. SAUNDERS & CO. (<i>accepted</i>)	70	9	2

Underdown Road.

G. Munro	85	7	0
A. T. Catley	76	0	0
W. H. SAUNDERS & CO. (<i>accepted</i>)	63	18	8

DUDLEY.

For forming, kerbing, channelling and sewerage new streets on the Firs Estate. Mr. JOHN GAMMAGE, borough surveyor.

Curral, Lewis & Martin	£1,223	8	2
J. Davis	1,114	0	0
H. Holloway	977	0	0

H. HUGHES & SON, Lower Gornal, Dudley (*accepted*) 955 0 0

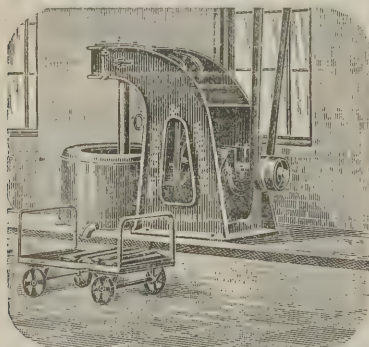
Borough surveyor's estimate 973 3 7

GRAVESEND.

For erection of new police cells and other buildings adjoining the Town Hall. Mr. WILLIAM HAWKER, architect, 60 Coleman Street, E.C.

W. P. Goose	£1,383	0	0
T. T. Barden	1,250	0	0
J. M. Dering	1,189	0	0
W. H. Rayfield	1,180	0	0
Multon & Wallis	1,139	0	0
H. W. Martin	1,125	0	0
W. TUFFEE, Gravesend (<i>accepted</i>)	1,017	0	0

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For about 380 yards of blue brick kerb and gutter at Row-hedge. Mr. JOHN ENNALS, surveyor, Copford, Colchester.

Rackham	£104	10	0
Glenney	95	0	0
W. Shead	90	4	0
BONNETT, Chelmsford (accepted)	76	0	0

GUILDFORD.

For constructing a surface-water drain. Mr. J. DEWHIRST, surveyor.

J. Jackson	£100	16	3
W. H. Wheeler	86	14	9
T. Turner	77	12	0
C. S. Mallett & Co.	74	19	6
G. A. Franks	61	15	0
STREETER BROS., Meadrow, Godalming (accepted)	49	0	0
Surveyor's estimate	73	0	0

HALIFAX.

For erection of a dwelling-house on the Blackwood House Estate, Pellon. Messrs. C. F. L. HORSEFALL & SON, architects, Lord Street Chambers, Halifax.

Accepted tenders.

H. Jenkinson & Sons, mason.
S. S. Thompson, plumber.
S. Barrett & Son, slater.
W. Gaines & Sons, joiner.
Moss Bros., painter.

HAM.

For sewerage of the parish of Ham and the construction and laying of sewer-pipes, sewage works. Colonel SEDDON, engineer, 27 Bow Lane, London. Mr. W. WARNER, surveyor, Kingston Road, Ham.

H. Lovett	£12,725	0	0
Martin, Wells & Co.	9,300	0	0
J. Jackson	8,300	0	0
S. Atkins.	7,706	0	0
W. Coker	7,131	0	0
S. Kavanagh	7,094	0	0
C. Iles	6,965	0	0
H. Saunders & Co.	6,899	0	0
Cunliffe	6,800	0	0
C. FORD, Harlesden (accepted)	5,454	0	0

HARRINGTON.

For sinking a well 24 feet deep, and walling the same with bricks.

J. WADDINGTON, Whitehaven (accepted) . . . £15 12 0

HENDON.

For kerbing, channelling, metalling, tar-paving, surface-water drainage and other works in various streets. Mr. S. SLATER GRIMLEY, surveyor, Hendon.

Allen Bros.	£2,200	13	5
M. S. Kitteringham	2,122	17	6
Adams	2,014	17	8
E. W. Hollingsworth	2,011	3	3
R. BALLARD, LIMITED, Child's Hill, N.W. (accepted)	1,977	9	6

HOMERTON.

For building boundary walls and laying-out exercise ground at Hackney Union Infirmary.

Barrett & Power	£5,300	0	0
N. J. Davenport	4,572	0	0
W. Shurmur	4,539	0	0
S. R. LAMBLE, Kentish-Town (accepted)	4,073	0	0
C. Ford	3,990	0	0
J. Liddiard	3,900	0	0

IRELAND.

For erecting a public pump and a concrete water-trough at Coolbaun, Castlecomer.

J. MULHALL, Chatsworth Row (accepted) . . . £30 0 0

For building a vestry-room and internal repairs and improvements of Lisbellaw Church.

W. Duncan	£249	11	9
J. Donnelly	217	0	0
D. Tunston	210	0	0
J. BLOOMFIELD, JUN., Brookeborough, co. Fer-managh (accepted)	163	12	0

KELSO.

For shop and dwelling-house.

W. Campbell, Heston, Roxburgh, mason.

T. Bennie, joiner.

J. Johnston & Son, plasterer.

J. Michie, jun., & Co., slater.

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For erection of six houses. Mr. W. H. WAGSTAFF, architect, Chesterfield.
THORPE & SYKES, Beighton, near Sheffield (*accepted*).

LEEDS.

For erection of an electric-light installation in Kirkgate Market. T. H. CHURTON, Leeds (*accepted*) . . . £1,325 0 0
For building St. Matthew's Church, Chapel Allerton. Mr. G. F. BODLEY, architect, 7 Gray's Inn Square, W.C. Quantities by Messrs. NORTHCROFT, SON & NEIGHBOUR, 8 St. Martin's Place, Charing Cross, W.C.
STEPHENS, BASTOW & CO., LIMITED, Bristol (*accepted*) . . . £13,276 0 0

LONDON.

For building foundations, lodges, &c., in connection with Lunatic Asylum at Chadwell Heath. Mr. LEWIS ANGELL, architect, Town Hall, Stratford, E.
J. Jackson . . . £8,066 0 0
J. & M. Patrick . . . 7,010 0 0
G. Sharpe . . . 6,900 0 0
Clift Ford . . . 6,235 0 0
GREGAR & SON, Stratford (*accepted*) . . . 6,000 0 0
For erecting houses, Malvern Road. Mr. R. BANKS MARTIN, architect, 103 Plashet Grove, East Ham.
J. H. STILWELL (*accepted*) . . . £920 0 0

NORTHAMPTON.

For additions and alterations to the British School. Mr. W. HULL, architect, 12 St. Giles Street, Northampton.
Wilford & Judkin . . . £4,970 0 0
Branson & Son . . . 4,930 0 0
R. Cosford . . . 4,900 0 0
Wingrove & Stanley . . . 4,897 0 0
Sharman . . . 4,857 0 0
H. Martin . . . 4,850 0 0
W. Beardsmore . . . 4,846 0 0
G. Fisher . . . 4,830 0 0
J. Garrett . . . 4,777 0 0
J. Dunkley . . . 4,729 0 0
Woodford & Smith . . . 4,725 0 0
SOUSTER (*accepted*) . . . 4,553 0 0

MAIDSTONE.

For interior painting, decorating, repairs, and alterations to the police court and adjoining rooms at the Town Hall.
H. J. Smith . . . £157 19 0
T. J. Barden . . . 135 0 0
M. Batchelor . . . 122 0 0
W. Brennan . . . 121 0 0

ORMSKIRK.

For erection of a new board-room and offices on land adjoining the workhouse. Messrs. WILLINK & THICKNESSE, architects, 14 Castle Street, Liverpool.
F. W. Mayor & Co. . . . £2,475 0 0
I. Dilworth . . . 2,310 0 0
T. Riding & Son . . . 2,310 0 0
J. Crake . . . 2,239 10 0
Preston & Hirst . . . 2,211 10 6
G. Woods & Son . . . 2,170 0 0
J. Pikington . . . 2,090 0 0
S. SPENCER, Bull Bridge, Aintree (*accepted*) . . . 2,035 19 6

PERSHORE.

For alterations to casual wards at workhouse.
D. Panter . . . £57 14 0
NICHOLSON BROS., Pershore (*accepted*) . . . 57 0 0

PLYMOUTH.

For additions to premises known as William Cottage, William Lane, including removing old premises, per order Sanitary Authority. Mr. JAS. HARVEY, architect, Plymouth.
JILLARD & BABE, Plymouth (*accepted*) . . . £230 0 0

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For erection of two dwelling-houses at Wainfelin Road.
Bailey Bros. . . . £460 0 0
C. H. HAMBLETON, Pontypool (*accepted*) . . . 440 0 0

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For erection of Wesleyan church. Mr. F. G. EVANS, architect,
Castle Road, Builth Wells.
M. Lloyd £1,399 0 0
E. Davies & Son 1,395 10 0
J. Wren 1,134 0 0

SEAFORD.

For alterations at sewage pumping station, and fixing additional machinery. Mr. B. A. MILLER, surveyor, 3 Clinton Place, Seaford.
S. H. Berry £493 0 0
C. MORLING, Seaford (accepted) 486 0 0

SEND.

For erection of new residence and stabling, for Mr. T. Lucas. Mr. HENRY A. WHITBURN, architect, 7 Broadway, Woking.
G. Kemp, Aldershot £1,494 0 0
J. Whitburn, Woking 1,350 0 0
W. W. Gale, Woking 1,245 0 0
J. PULLEN, Ripley (reduced and accepted) 1,000 0 0
" " stabling and greenhouse 235 0 0

SOUTHGATE.

For erection of two villas. Mr. GEO. K. DEAKIN, architect, 110 Strand, W.C. Quantities supplied.
C. Newby £1,520 0 0
S. Goodall 1,450 0 0
W. Wheeler 1,389 0 0
Brown and Sweetland 1,386 0 0
J. Pocock 1,367 0 0

SWANSEA.

For alteration and additions to the Waterloo Hotel, Oxford Street. Messrs. MARGRAVE & PEACOCK, architects, Metal Exchange, Swansea.
F. Marles & Sons £1,253 10 10
D. Jenkins 1,240 0 0
Gustavus Bros. 1,172 0 0
Walters & Johns 1,164 0 0
T. Richards 1,086 8 5
J. Williams 1,050 0 0
Bennett Bros. 1,050 0 0
J. & F. WEAVER, Manselton (accepted) 1,044 0 0
Jones Bros. 950 0 0

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For constructing works of water supply at Llandyfan, and laying about 5 miles of cast-iron water mains from that place to Llandilo. Mr. DAVID JENKINS, surveyor, Llandilo.
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B. Davies 3,500 0 0
H. Herbert 3,120 0 0
Evans & Bailey 3,020 0 0
E. Jones 2,951 0 0
P. DAVIES, Carmarthen Street, Llandilo (accepted) 2,950 0 0
Sheffield & Evans 2,825 0 0

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M. EDMUNDS, Mountain Ash (accepted) 291 6 8

For building twenty villas and fifty-two cottages at Barry. Mr. ARTHUR M. LEON, architect, Central Chambers, Working Street, Cardiff.
Lattey & Co. £18,944 0 0
W. Ingleson 15,180 0 0
D. Thomas & Co. 15,170 0 0
O. Purnell 14,200 0 0
F. Robbins 14,070 0 0
CADWALLADER & HOCKRIDGE, Roath, Cardiff (accepted) 13,990 0 0
Architect's estimate 14,780 0 0

For erecting a chapel at Pencoed.
W. H. Ingleson £560 0 0
D. Lloyd 455 0 0
J. A. Morgan 446 0 0
A. R. Meredith 425 0 0
C. H. COOKSLEY, Pontyclun, Glam. (accepted) 385 0 0

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T. DAVIDSON, Parton, Whitehaven (accepted) £92 0 0

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Sayce & Randall	5,322	13	0
G. Bell	5,076	10	6
Holme & King	4,886	4	2
MATHEWS, Nantwich (accepted)	4,411	0	0

WOKING.

For erection of three houses, York Road, Woking, for Mr. W. H. Last. Mr. H. V. A. WHITBURN, architect, 7 Broadway, Woking.

Ingram & Son	£1,980	0	0
Hooker	1,965	0	0
G. Kemp	1,920	0	0
Martin	1,835	0	0
W. W. Gale	1,796	0	0
Harris & Son	1,780	0	0
I. WHITBURN, Woking (accepted)	1,600	0	0

For erection of six cottages, Maybury Heath, for Messrs. Colyer & Colyer. Mr. H. V. A. WHITBURN, architect, 7 Broadway, Woking. Quantities by Mr. W. E. SEDGWICK, 37 Glenparke Road, Forest Gate, E.

Fyfield	£2,300	0	0
Ingram & Son	1,859	0	0
F. J. Kemp	1,750	0	0
Hooker	1,670	0	0
Martin	1,639	0	0
A. A. GALE, Woking (accepted)	1,430	0	0

YORK.

For erecting stores, offices, warehouses and public hall, Railway Street. Messrs. ATHRON & BECK, architects, Market Place, Doncaster. Quantities by architects.

T. S. Ullathorne	£20,083	12	0
J. Gofton	19,501	14	6
Parker & Sharp	17,963	2	5
W. Bellesby	17,616	0	0
J. Kiswick & Sons	17,108	0	0
Jackson Bros.	15,995	0	0
H. ARNOLD & SON, Doncaster*	14,560	0	0

* Accepted for the whole of the work.

VARIETIES.

THE Victoria Hall, Ancoats, erected by the Manchester and Salford Mission, at a cost of about 9,000 $\frac{1}{2}$., is now open.

MR. ALFRED AUSTIN, poet laureate, has been asked to open the New Science and Art School at Ashford on October 13, and has promised to do so.

A UNITARIAN chapel for Leigh, Lancashire, which has seating accommodation for 250 persons and has cost altogether about 3,000 $\frac{1}{2}$., was formally opened on Saturday, the 2nd inst.

LESMAHAGON parish church, Lanarkshire (which was one of the most important in Scotland in pre-Reformation times) is being reconstructed.

THE public hall erected to commemorate Her Majesty's Diamond Jubilee at Sutton Scotney, near Andover, has been formally opened.

ST. MARY'S Hospital, Paddington, which has been closed for two months for extensive repairs, has now been reopened for the reception of in-patients.

A GREAT fire occurred recently in Manilla by which the Philippine Islands library and museum and other public buildings were destroyed.

THE lady chapel of Gloucester Cathedral, which has been closed for nearly a quarter of a century, has been reopened for public worship, after having undergone extensive restoration.

THE new technical school erected by the Handsworth District Council in Gold's Hill Road is now open. The building, which has been designed by Mr. William Henman, F.R.I.B.A., has cost over 10,000 $\frac{1}{2}$., exclusive of the site.

THE new Grove Road Board school, Harrogate, was opened on Thursday, the 30th ult. This is the second Board school opened in Harrogate during the present year, and, including site, has been erected at a cost of 22,000 $\frac{1}{2}$..

THE new union offices, which have been erected at Leigh, Lancs, were opened on the 30th ult. The cost of the extensions, which comprise spacious offices, board-room, tramp-wards and laundry, is about 12,000 $\frac{1}{2}$..

SIR CHARLES SEELY, who offered 1,000 $\frac{1}{2}$.. conditionally towards the rebuilding of the chancel of Carisbrooke Church, as part of the Isle of Wight memorial to the late Prince Henry of Battenberg, has decided that, owing to continued opposition from the press, the scheme had better be abandoned. Princess Beatrice approves of the withdrawal of the scheme.

Telegrams, "Imperial, Wolverhampton."

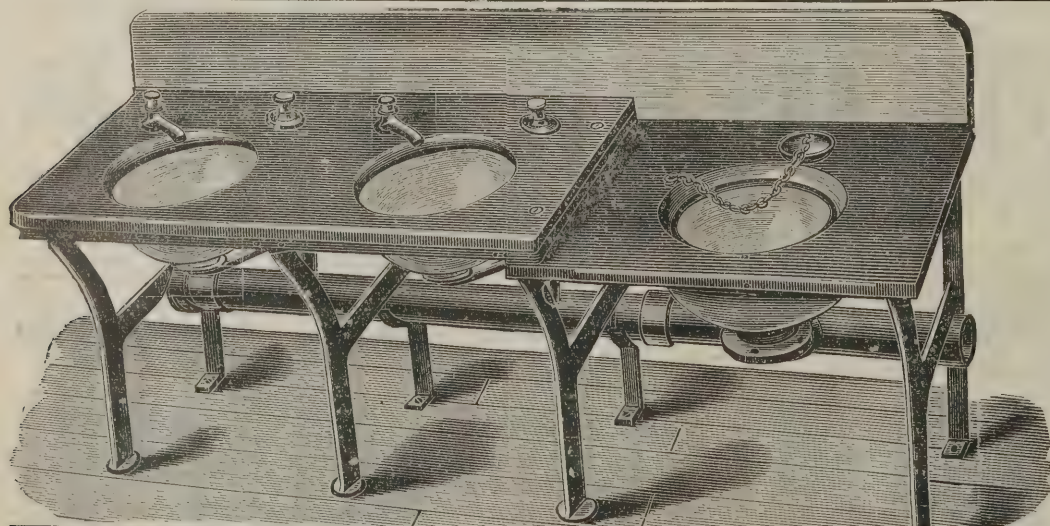
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A PORTION of an old Roman bath has been unearthed at Dover during excavations carried out in connection with the restoration of the tower of St. Mary's Church. A system of Roman baths is stated to have extended from this structure to the market square.

THE Wesleyan church, Higher Broughton, has been reopened, after being closed for seven weeks. During this period the church has been thoroughly renovated, and is now fitted with the electric light. The cost of alterations and improvements has been about 800*l*.

THE Bath City Council have unanimously decided to confer the freedom of the city on the Duke of Cambridge on the occasion of his forthcoming visit to open the new pump-room and lay the foundation-stone of the Victoria Art Gallery. This is the first time the freedom of Bath will have been conferred.

THE trustees of the Maryport Wesleyan chapel have accepted an offer from Messrs. J. & B. Williamson, two members of the congregation, to provide a new organ, renovate the chapel, enlarge the Sunday school and build a ladies' parlour. The renovation scheme includes the insertion of new windows, one of which is to be of stained-glass.

AT about half-past five on Saturday morning, the 2nd inst., Waltham Abbey and neighbourhood were awakened by a terrific rumble. It was found that an explosion had occurred at No. 5 Mill, Millhead. It appears that the mill was utilised for the purpose of mixing a special kind of powder, prepared principally for rockets. The mills in which the powder is being worked up hold rollers of Welsh granite weighing close upon 5 tons each. The mills were not at work, but a gang of men were just about to start in the factory when the explosion took place. The danger inspector, who was some considerable distance away from the scene of the explosion, had a narrow escape. He was blown off his feet by the force of the concussion, and a portion of one of the millstones weighing over a ton pitched close to where he had been standing. Fortunately no one was injured, but the place was completely wrecked.

AT a meeting of the Manchester City Council held on the 6th inst., the scheme of the city surveyor for conveying the effluent from the Corporation Sewage Works, Davyhulme, to a point in the Mersey estuary, about 20 miles from the city of Manchester, was considered, and it was resolved by a majority of 68, viz. 71 for, 3 against, to apply to Parliament for powers to construct the proposed works.

ANOTHER addition to the rapidly increasing list of suburban theatres was made by the opening on Monday evening, the

4th inst., of the elegant Royal County Theatre at Kingston-on-Thames. Built on the site of, or rather a reconstruction of the Albany Hall, Kingston's latest public building will accommodate fourteen hundred persons. The dimensions of the auditorium are as follows:—Width, 46 feet; distance from curtain to front of dress circle, 35 feet 6 inches; to back of pit, 46 feet 6 inches; to front of gallery, 37 feet 6 inches; to back of gallery, 60 feet; from back of gallery to back of stage, 100 feet; and height from stalls floor to dome of ceiling, 37 feet. The decorations of the interior are in salmon, ivory and gold; electric light is used throughout; there is a luxurious lounge, and ample dressing-room accommodation. Mr. J. Charles Bourne and the late Mr. C. J. Phipps were the architects.

ST. JOHN'S parish church, Edinburgh, which has been closed for two months for renovation, is now reopened for worship. It has been entirely repainted, the walls in different shades of terra-cotta with appropriate ornamental bands and friezes, and the roof in dainty pink and cream colours. A feature has been made of the front of the gallery, which shows an embossed flowing floral ornament in burnished gold on a bronze background. The electric light has been introduced into the church, and for the lighting of the area there is a large and handsome electrolier suspended from the centre of the ceiling. New heating apparatus has been put in, the organ has been overhauled, while downstairs the halls have been rearranged, cleaned and decorated. The cost of the alterations and renovations is about 600*l*.

THE first effect of the construction of the Marine Drive round Castle Hill, Scarborough, was felt last week, when the tenants of the boat-building shops, coal warehouses, sail lofts, &c., on the harbour front received notice from the Corporation that they would have to vacate their premises six months after the expiration of tenancy, as the sites would be required for the southern approach to the Marine Drive. What the tenants will do, whose business calling is such as requires a water frontage, remains to be explained. The sands are out of the question, and removed from the harbour, there seems no other site suitable. With a large locally-owned fishing fleet and with seven or eight hundred visiting boats from distant ports, repairs to hulls, spars, sails and cordage are constantly needed. The difficulty is one which the Corporation, whilst in quest of promoting holiday attractions to Scarborough, has apparently overlooked, and the practical work-a-day industry of the port is in serious danger.

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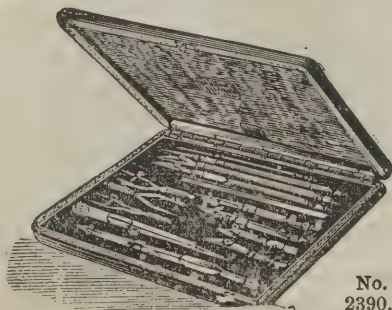
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THE Cardiff new reservoir in Breconshire was opened by the Cardiff Corporation on the 30th ult. The cost of the reservoir was 198,000*l*. It has a capacity of 335,000,000 gallons. The additional daily yield for Cardiff will be 3,000,000 gallons. The reservoir occupied about four and a half years in construction, and the cost will be about 200,000*l*.

NEW LAMPS FOR OLD.

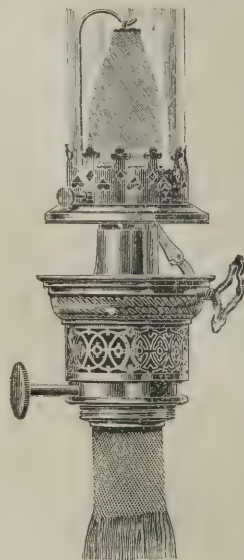
THE most recent development of the now well-known and universally approved incandescent mantle for illuminating purposes is its application to mineral oil lamps, whereby all the advantages which are admittedly gained by users of the incandescent gas-burner may be derived by those who prefer or are constrained, *faute de mieux*, to be content with lamps, with an important one in addition, which is that, owing to the generation of much less heat, the danger of explosion is to a large degree minimised.

The "Era" petroleum incandescent burner, the exclusive patent rights for which have been secured for Great Britain by the Incandescent Gas Light Company, is calculated to fulfil in all respects the necessary conditions of success as an incandescent oil lamp. The burner in appearance is very similar to the ordinary duplex burner, with the exception that it has a circular instead of a double horizontal wick. It is evident that special attention has been paid to producing a strong, well-made, well-finished burner of the best quality.

The burner is constructed with a lifter which enables the wick to be lighted without removing the chimney and mantle. There is also a patent and very clever contrivance for lifting and lowering the wick. The method of lighting the lamp is as follows:—

Having fixed the mantle and chimney on the burner the gallery carrying them is lifted by turning the screw of the lifter; this exposes the wick, which is lighted in the ordinary manner, and gives the ordinary flame of an oil lamp. The lifter is then lowered and the flame slowly turned up, and from being an illuminant flame as it is turned it becomes a perfect atmospheric flame, causing the mantle to become brilliantly incandescent. The full amount of incandescence is not obtained until the lamp has been lighted for about three minutes, and is thoroughly warmed.

The advantages of the "Welsbach" incandescent system when applied to oil lamps are as follows:—In the first place, a brilliant light of about fifty candle power is obtained, and at the same time only about a third of the amount of oil is used which would be consumed in an ordinary oil lamp giving the same light. The heat produced is considerably less than that of any other oil lamp giving the same candle power. There is perfect simplicity in dealing with it, and aided by the very explicit instructions which are sent out with each lamp, no one can experience the slightest difficulty.



The most important feature of the burner is that it can be fixed to any duplex lamp, the old burner merely being unscrewed and the "Era" burner being screwed on in its place. In one respect it has a great advantage over the incandescent gas light burner, and that is, in the event of the mantle being broken, and another not being readily obtainable, it is only necessary to replace the cap of the burner by a spare cap which is supplied with each burner, and by so doing the flame of an ordinary lamp is obtained.

SANITARY CONGRESS, LEEDS, SEPTEMBER, 1897.

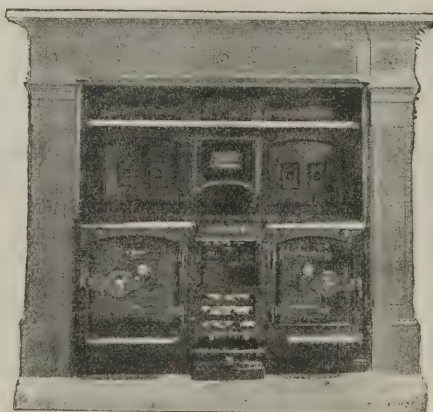
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HER MAJESTY'S THEATRE, HAYMARKET.—ROYAL
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TRADE NOTES.

THE Clergy Daughters' Schools, Casterton, Kirkby Lonsdale, are being warmed and ventilated by means of Shorland's patent Manchester grates.

IN consequence of their premises at 15 Parliament Street, Westminster (where the firm was established in 1777), being about to be pulled down by the Government, Messrs. Geo. Trollope & Sons have taken temporary offices at No. 5 Victoria Street, Westminster. There is no alteration as regards their other offices, No. 7 Hobart Place, Eaton Square; West Halkin Street, Belgrave Square; and 77 Grosvenor Road.

THE continued spread of the typhoid outbreak at Maidstone, and the severe strictures by the Press on those responsible, remind us of a most admirable system introduced by a well-known firm of water engineers (Messrs. Merryweather), by which the water sources of country houses may be periodically inspected and an analysis taken of water used for drinking. By the adoption of this system, anything in the water detrimental to health might be discovered before any serious harm resulted.

MESSRS. ROBT. NEILL & SONS of Manchester have had their tender of 253,000*l.* accepted for the building of the new Lancashire Lunatic Asylum, which is to be erected at Warwick, near Warrington. The electric lighting will cost a further sum of 14,000*l.*

MESSRS. EDISON & SWAN are sending out a neatly got-up "Souvenir of the Imperial Victorian Exhibition," which, besides containing particulars photographically illustrated of their exhibits, gives a historical review of the introduction of the electric light in England.

WE recently had an opportunity of inspecting some specimen slabs of marbles and labradores from the quarries of the Ankerske Marble Works in Norway. These offer a wide diversity of colourings, among them being the following:—

Pure white for statuary; white with blue-grey veins and streaks; white with blue-grey bands; rose spotted breccia in various shades; yellow red white spotted breccia; white with dark veins, streaks and spots in rich patterns; dark blue, grey and white streaked; light blue, grey and white streaked; light greenish, blue, grey and white streaked; yellow white with red, violet and greenish veins; red, partly with grey and greenish bands; grey, partly a little streaked; black with small spots of fossil shells; black with white veins and streaks, and dark green serpentine. These marbles, which are dolomite, possess great hardness and density, and it is claimed for them that they are practically impervious to the pernicious chemical influences of the London atmosphere, in which the white dolomite marble from Fauske has preserved its fine white colour for several years, while Italian calcareous marble after a short period, even in comparatively clean atmosphere, gets darker and takes a grey and plain-looking exterior, caused by a sort of oxidation on the surface; while as to strength several trials as to the resistance against pressure and absorption of water of this marble were made in 1885 at Königliche Prüfungs-Station für Baumaterialie, Berlin. The trials were made with cubes 6 centimetres on each side, of which some of them first were put into water for twelve hours, and after this they were exposed to a temperature of $\div 6$ till 9 deg. Celsius, and the result proved eminently satisfactory. Another important advantage offered by these marbles is the large sizes in which they can be quarried, as, for instance, columns some 30 feet in length and of proportionate diameter could easily be got. The stones can be supplied in any quantity, and in either rough or finished condition.

BUILDING AND BUILDERS.

THE foundation-stones of new technical schools and free library were laid at Middlewich on Saturday last. The building is admirably designed, and is founded in commemoration of the Diamond Jubilee.

THE young Earl of Dumfries, elder son of the Marquis of Bute, accompanied by his brother, Lord Ninian Crichton-Stuart, performed the ceremony of laying the foundation-stone of a new Roman Catholic church at Mountain Ash. Lord Dumfries, who is sixteen years of age, was presented with a chased silver trowel and an ebony mallet as a memento of the occasion. The stone was blessed by the Bishop of Newport.

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Canvas, Linen, Muslin, Calico, Paper, even Tissue Paper, will become waterproof when the paint is applied; in fact it will Waterproof anything and everything from a Stone Wall or Iron Girder down to Tissue Paper.

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ANY FURTHER PARTICULARS AND PRICES ON APPLICATION

THE ceremony of laying the corner-stone of a new chapel in connection with the convent of the Little Sisters of the Poor, Gilmore Place, Edinburgh, was performed on Thursday, the 30th ult. The building, which has already been commenced, is being erected by Messrs. Wm. Beattie & Sons from plans by Mr. James M. Monro, Glasgow. It is in the Romanesque style of architecture and is intended to accommodate about 250 persons. Besides the chapel proper, there will be behind the sanctuary a number of sacristies for the use of the sisterhood. The cost is expected to be about 3,000/.

THE foundation-stones of the Drill Hall, which is to be Chesterfield's permanent memento of the record reign, were laid under auspicious circumstances on Wednesday last. The building is to cost about 2,500/. Mr. W. Cecil Jackson is the architect, and in his design he has kept in view the purpose for which the hall is required. In style the structure will be Early Renaissance, and the hall measures 150 feet by 55 feet. It will be built of red brick, relieved by stone dressings and buttresses, and will have an imposing entrance facing Ashgate Road, near the bottom of Fairfield Road. The site has been given by the Corporation. Under the hall will be a large armoury, and an adjutant's-room, sergeants'-room and officers'-room will also be provided.

THE foundation-stone of the church of All Saints, Stechford, was laid on Monday, the 4th inst. The new church will take the place of the iron building in which the services have been carried on for some time, and which occupies a portion of the ground in Albert Road set apart for the purpose. It will consist of a nave, north and south aisles, baptistery, chancel, chancel aisle and vestry. The nave, including the baptistery, will be 87 feet long and 20 feet 2 inches wide, the aisles 10 feet wide and the chancel 30 feet by 19 feet. The total length of the church will be 117 feet 3 inches, and the width across the body of the church 44 feet 8 inches. The church when completed will accommodate 504 adults. The eastern portion of the church and three bays of the nave are to be erected first. The west end, with tower and spire, will be erected as soon as funds will permit. The exterior will be of brick and terra-cotta dressings, the interior of brick with Bath stone dressings, the style being Gothic of the Decorated period. Messrs. Collins & Godfrey, of Tewkesbury, are the contractors, and Mr. J. A. Chatwin, of Birmingham, is the architect.

ON the 2nd inst. the foundation-stone of St. Margaret's Church, Polmadie, was laid. This is the third church which

is being erected in connection with the scheme of further church extension initiated by the kirk-session of the parish of Govan. The building when completed will comprise a church to hold about 800 persons, halls to accommodate 300 and a manse. It is part of the scheme that the model plan adopted by the architect, Mr. Macgregor Chalmers, should be retained, so far as the exigencies of the different sites will permit. There will be a nave, with one large side aisle, in which the only gallery is placed; a deep chancel for the communion table and the choir, a transeptal chapel and an organ chamber. The whole interior is to be finished in dressed stone. The roofs are to be of open timber, and the congregation will be seated on chairs. Individual character will be given to each church by modifying the designs. In St. Margaret's the work will be carried out in an early, undecorated type of Norman work.

ELECTRIC NOTES.

FOLKESTONE is to be lighted by electricity as soon [as arrangements have been made with Earl Radnor for a site for the works. It is anticipated that the installation will be completed by spring.

As a result of the investigations undertaken in many of the principal towns by the special committee appointed by the Fulham Vestry to consider the best means of disposing of the dust and refuse of the parish, it has been determined to follow the plan adopted in Shoreditch and to establish a similar system of dust destructors and electric-light producers as was recently inaugurated by Lord Kelvin. The scheme utilised the heat produced by the combustion of the refuse for the generation of steam to drive the electric dynamos, and the success which has attended the Shoreditch experiment is said to be complete. At first provision is only to be made in Fulham for the destruction of one-half of the parish refuse. It is probable that the same method will be adopted both at Brentford and in Newington.

A REPORT has been presented to the St. Pancras Vestry showing a gross profit of 5,063/ 2s. 8d. earned by the Regent's Park station electrical installation during the half-year ending June 30 last, and a gross profit in respect of the King's Road station, subsequently opened, of 293/ 15s. 11d. The electricity committee regarded this as eminently satisfactory. In the case of the Regent's Park station it represented an increase of more

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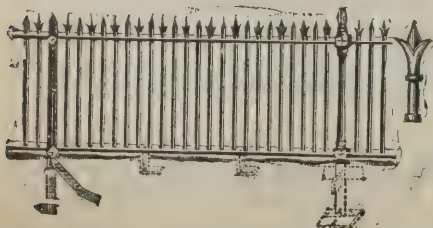
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than 15 per cent. per annum over the half-year ending December 31 last, whilst in the case of the King's Road station a gross profit of 293*l.* 15*s.* 11*d.* on the six months was earned, as against a loss of 847*l.* 2*s.* on last year's working. The net result of the six months' trading ending June 30 last, after meeting all payments of instalments of loans and interest, was a profit on the Regent's Park station of 2,040*l.* 2*s.* 9*d.*, and a loss on King's Road station of 739*l.* 15*s.* 9*d.*, to which was added the deficit of 800*l.* 12*s.* 7*d.* at December last, leaving a profit balance carried forward on account of both stations of 499*l.* 14*s.* 5*d.*

ABOUT a year ago the Eccles Corporation sought borrowing powers for carrying out an electric-lighting scheme for the borough at a cost of 18,000*l.*, but at the Local Government inquiry the opposition was so strenuous that the sanction was not given. The provisional order of the Board of Trade was, however, extended twelve months. In the meantime a modified scheme was prepared, and the Town Council thereupon sought borrowing powers for 11,408*l.* As the result of the inquiry a short time ago information was received by the town clerk that the amount asked for would be sanctioned, the period of repayment being fixed at twenty-five years. It is expected that the scheme will be carried out by the Edison-Swan Company of Manchester. The main thoroughfare will be lighted up by the Brighton system.

AT the meeting of the City Commission of Sewers on Tuesday a report was presented by the streets committee relative to the notice from the Postmaster-General requiring the consent of the Commission to laying underground telegraphs in the City, intimating that failing such consent a "difference" would be deemed to have arisen between the Commission and the Postmaster-General, and stating that the Postmaster-General would apply to the tribunal having jurisdiction to hear the difference, and recommending that the Commission adhere to their previous decision in the matter, that while they did not object to the Post Office authorities opening the streets for laying underground telegraph wires for their own purposes, they objected to give their sanction to wires being laid down for the use of the National Telephone Company unless the company were prepared to provide an improved service at a reduced cost. The report was agreed to, and the Commission also decided to refuse the application of the National Telephone Company for permission to lay eight pipes from St. Andrew's Street, Holborn Circus, straight down Holborn to the City

boundary because the company was not prepared to make any concessions for the easement in question.

AT a meeting of the lighting committee of the Liverpool Corporation held at the Municipal Offices, Dale Street, Mr. C. Petrie presiding, the committee was informed that owing to the great quantity of applications for the supply of electricity extensions of the main into Chatham Street, Bedford Street, Falkner Street, Scotland Road, Aigburth Drive, Bentley Road and Whitechapel were necessary. These extensions were sanctioned by the committee, and will be proceeded with at once. The engineer reported upon the necessity also of proceeding with the trunk main to Lord Street and Whitechapel, consequent upon the anticipated demands for electric light having been largely exceeded. This work, which will cost about 2,500*l.*, it was intended to defer until next year, but as a result of the engineer's statement the committee authorised it to be gone on with at once. The superintendent of lighting presented a report relative to incandescent lighting in the city, and with a view to arranging for the better illumination of the streets in the recently added areas, recommended the extension of the present system, at an outlay of about 1,500*l.* The committee approved of the report, and decided to apply to the Council for a supplementary estimate to enable them to carry out the recommendation contained in the report.

NATIONAL REGISTRATION OF PLUMBERS.

AT the last meeting of the Birmingham District Council a report was submitted by the secretary of the work done in connection with the local registration of plumbers from the inception of the movement to the present time, and also the accounts, which were approved and adopted. Owing to many alterations in the original constitution of the council, by reason of death and resignations, it is proposed to refill the vacancies by the appointment of other friends of the movement. The work has been much delayed publicly from various causes, chiefly by the proposed Registration Bill, which has for several sessions been before the House of Commons, but which, through pressure of other legislation and opposition from unexpected quarters, has not yet been successful in passing, although during the session this year it met with greater success than before. Other routine work was also performed, and it was arranged to hold a public meeting at an early date.

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WOODEN ENCLOSURES.

ON October 1 Mr. Mead gave his decision at the North London Police Court in the case of A. Payne, district surveyor of East Hackney (South) and North Bow v. William Slater. Mr. Payne, in his evidence, said that defendant had made a washhouse addition at the back of 21 Lauriston Road, Hackney, converting the wall of adjoining house into a party wall without carrying out the rules as to party walls with regard to it; he had erected an enclosure at the back of the yard of wood with door and two windows instead of a brick wall; he had also erected a copper and irregular chimney; he then allowed some time to elapse and converted the whole into a building by putting a roof on. Defendant had carried out an addition at the same premises before in 1893, and stated that the things complained of had been done a long time before, and tried to mix up the case with the work done in 1893. The magistrate took some time to consider his decision, and gave judgment on October 1. He stated that he had come to the conclusion that the work done by the defendant came within the Act, and must be done according to the rules. He inflicted a nominal fine of 10s. and 12s. costs, and intimated that if the work was not amended to the satisfaction of the district surveyor the defendant would be liable to further penalties.

SANITARY INSPECTORS' ASSOCIATION.

THE annual meeting of the Sanitary Inspectors' Association was held on Saturday evening at Carpenters' Hall. Mr. W. W. West (Walthamstow) presided. The annual report showed that there were 583 members on the books. The branches had continued to be active centres of influence among the inspectors in their several districts, while the Institute of Certificated Sanitary Inspectors had thrown in their lot with the Association. As the Superannuation Bill intended to help the members in conjunction with other public servants had not met with the success expected, the council had decided to take the necessary steps to have the measure framed by the Association reintroduced, in the belief that the claims of the Association would be conceded by Parliament. In this connection the council expressed their pleasure in acknowledging the continuance of the policy of the Local Government Board in urging local authorities to appoint their inspectors permanently. Owing to the death during the year of the president, Sir B. W. Richardson,

Sir John Hutton had been elected to fill the vacancy. The invitation to hold the provincial meeting next year at Newcastle has been accepted. On the motion of Mr. Dee, seconded by Mr. Gardner (Worthing), the report was adopted. The financial statement indicated that there was a small balance in hand. Mr. T. G. Dee (Westminster) then took the chair as the elected chairman of the council for the coming year. In referring to the work of the press in giving publicity to matters of sanitation, the chairman made allusion to the Maidstone epidemic. He said he thought the case of that town only showed that where there was no Government analysis of the water-supply of a town the sanitary inspector should be empowered to see that water companies supplied a pure article. The question of the admission of lady members to the Association was adjourned.

ARTISANS' DWELLINGS FOR BRIGHTON.

In a special report to the Brighton Town Council the sanitary committee mention that, in response to the advertisement inviting competitive designs and estimates of the cost for the erection of dwellings for the working classes upon the land in Elm Grove and Lewes Road, designs and estimates have been sent in by nine candidates. The committee have arrived at the conclusion that none of the designs comply in every detail with the conditions of the competition and by-laws, and they do not consider that any of the designs fully meet the requirements of the Corporation. They think, however, that the design under the title of "Sanitas" is an excellent attempt to comply with the conditions, and they therefore recommend that the sum of 75%, the first premium, be awarded to the author of that design, subject to his showing to the satisfaction of the Council that the works can be carried out for the sums specified in the estimate. With regard to the remaining designs, the committee consider that none of them comply with the conditions or meet the requirements of the Corporation in a sufficient measure to justify them in awarding the second premium. They think, however, that certain of these designs show that a great amount of thought, time and care have been expended in their preparation, and they recommend that the second premium of 25% be equally divided between the authors of the designs entitled "Pax," "O. K." and "Minimum and Maximum," which appear to be of about equal merit. "Sanitas" it should be explained, allows for 168 six-roomed houses in Elm Grove (three bedrooms), and estimates the cost

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at 174*l.* 13*s.* 2*d.* per house, 69 houses for the Lewes Road, five rooms (three bedrooms), and the cost 176*l.* per house. In the "remarks" accompanying the particulars it is pointed out that the pavement, curb and channel in Elm Grove is not included, and in Elm Grove the sewer is omitted. "Pax's" figures for 143 houses in Elm Grove and 66 in Lewes Road are 176*l.* 15*s.* 7*d.* and 175*l.* 7*s.* 4*d.* respectively for each dwelling, and he includes the sewer in the former thoroughfare; while "O. K.'s" estimate for 136 houses in Elm Grove is 176*l.* per house, "but no estimate for roads, &c., having been given, it is impossible to ascertain what has been included." "Minimum and Maximum" estimates for 145 five-roomed houses (three bedrooms) in Elm Grove, and allows 174*l.* 19*s.* 7*d.* per house, but does not include pavement, curb and channel, although the sewer is included. The highest amount per house is 185*l.* 7*s.* 11*d.* and the lowest 173*l.* 10*s.* 7*d.*

SEWAGE DISPOSAL, MANCHESTER.

THE plans of the proposed works for the conveyance of the sewage effluent from the Davyhulme works to the estuary of the Mersey were submitted lately to Sir Benjamin Baker and Mr. W. Santo Crimp. The following replies have been received:—

"To the Chairman of the Rivers Committee of the Manchester Corporation.

"Sir,—In a letter to the town clerk, dated August 28, 1896, I stated my opinion that the carrying of the effluent by an outfall sewer into the tidal waters of the river Mersey, near to Randles sluices, would afford the best solution of the Manchester sewage problem, but that before expressing my views of the details of the surveyor's plans, I required to give further consideration to the matter.

"During the past twelve months I have had an opportunity of giving the question more detailed consideration.

"At a meeting at my office on October 27, 1896, when yourself, Councillor Worthington, the city surveyor and Mr. Mansergh were present, the question of the possible influence of the proposed outfall sewer on the interests of the Ship Canal Company, the borough of Warrington and others was fully discussed, and at the same time local information of various kinds was communicated to me. More recently I have been furnished with additional data, enabling me to consider such details as the necessary size and cost of the outfall sewers and to make independent calculations of my own on the subject.

"As a result of these further investigations, I have found no

reason to modify the general conclusions expressed by me in the letter already referred to. I have to add that I approve of the proposal to put a second outlet into the Mersey just below Walton Lock. Indeed, as a matter of fact, I suggested myself at the meeting on October 27, 1896, that an outlet at that point, coupled with the original one at Randles sluices, would apparently obviate all difficulty as regards the alleged conflicting interests of the Ship Canal Company and the borough of Warrington, since the sluices at the respective outlets could be worked according to the varying conditions of flood discharge and of the river generally, so as to be beneficial rather than detrimental to the parties interested.

"The size of the outfall sewer proposed by the city surveyor is, according to my calculations, amply sufficient for the 70,000,000 gallons per day, and the city surveyor's estimate of 258,000*l.* is also sufficient, assuming the amount put down for easements is correct.—I am, your obedient servant,

"September 30." (Signed) "BENJAMIN BAKER.

Mr. W. Santo Crimp writes on the same date:—

"Manchester Drainage.

"Dear Sir,—In reply to your inquiry as to the relatively small cost of the Barking filters when compared with those proposed to be constructed at Manchester, I beg to say that in the construction of the Barking experimental filter—which filter was made by myself—no excavation was necessary, and the greater part of the area of the filter, was constructed against existing embankments. Thus no expensive structural works were necessary. Means also existed for carrying off the effluent water, which was admitted to the filter by means of wooden shoots of a temporary character. I may also say that the material of which the filter is composed was obtained from the gasworks adjoining the site of the works at the extremely small cost of 1*s.* 3*d.* per ton, delivered alongside. I am quite sure you would not get the enormous quantity of breeze or clinker required for your filters at anything like this price, and, as you are aware, the levels of the land necessitate a large amount of excavation and also expensive enclosing works.

"I certainly would not recommend you to reduce the estimates of the cost of these filters. You are no doubt aware that the cost of proprietary filters amounts to upwards of 10,000*l.* per acre, and my experience of Barking showed that these filters were not more effective than those made of breeze.

"With regard to the proposed effluent culvert, I was struck with the recent remarks in the public press. The fact appears

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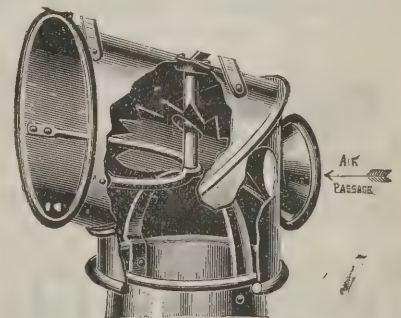
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to have been overlooked that the canal water does not contain those natural agencies which are necessary for the destruction of the organic matter, which must remain in a chemical effluent, no matter what process is adopted for the clarification of the sewage. The conditions prevailing in the estuary are entirely different, as at high-water the river Mersey at that point is practically sea, which contains all the elements for the final purification of the sewage. The proposed outlet is, in short, more satisfactorily placed than the outlets discharging the London effluent into the Thames, being so much nearer the mouth of the river.

"I need hardly point out to you that there is a finality about this scheme that neither of the other suggested alternatives possesses, and, to adopt the wording of your own report of September 1, 1896, 'by the adoption of the scheme the sewage problem would be solved once for all,' and I would add that it would be solved at the least possible cost to the ratepayers of Manchester, whilst the works contemplated would be of a permanent character.—Yours very truly,

(Signed) "W. SANTO CRIMP, M.Inst.C.E.

"T. de Courcy Meade, Esq., Manchester."

It was decided on Wednesday, the 6th inst., that an application be made to Parliament to obtain an Act authorising the construction of the culvert by the Corporation.

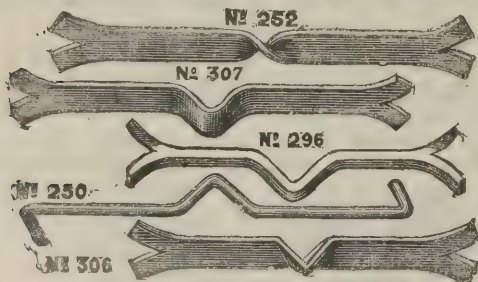
LEEDS ASSOCIATION OF ENGINEERS.

THE first meeting of the session was held at the rooms of the Association, 5 Park Lane, on September 30, when the president (Mr. William Sheldon) delivered an address. Reviewing the past year, he said that a noteworthy feature had been the formation of large numbers of companies and syndicates with enormous capitals, but it was to be doubted whether these gigantic speculations represented sound commercial trading. With regard to technical education in relation to commercial success, he doubted whether, if it were freely adopted in this country, we could defy all competitors. The success of our goods in the markets of the world depended not so much on the cost of production as on the art of selling. If we allowed our competitors to establish the first footing in Japan, it would be our own fault. Civil engineering had not recently made such strides in this country as it had done abroad, perhaps owing to want of scope. Our railways had, however, been considerably extended. In mechanical engineering

the main interest had centred in the Belleville boiler and the motor car—in the former because of the great scale on which the Admiralty had tried it with success, in the latter because of its public importance. Unfortunately the general public expected the motor car to do impossibilities, and it had as yet no existence in the commercial sense. The principal event in shipbuilding had been the Bazin roller boat, certainly a novelty and possibly a success. The inventor fully expected the boat, which was having her engines put in at Rouen, to travel at a speed which would entirely revolutionise our Transatlantic records. In the agricultural line much had been heard of the new steam digger, but its use was at present confined to a few places. The chief foreign invention was the rotary plough, exhibited at Buda-Pesth and Hamburg, which was in reality a very old English invention revived. The chief field for electrical engineering in the United Kingdom was electric lighting, which was now so fully recognised as a promising investment that public bodies were becoming unwilling to allow private companies to acquire powers of supply. There was an increasing development of electricity for tramways. The overhead direct current system, with a trolley, had been installed in various towns, notably in Leeds, Bristol, Hartlepool and Coventry; whilst in Dublin the three-phase current with overhead wires appeared to give satisfaction. Electrical driving for large works was coming daily more to the front. Experience, taken as a whole, showed that for plants using not less than 100 horse-power electrical transmission was much the most economical. Its adoption commonly resulted in a large reduction of cost, and if the change was carried out with caution and judgment it was invariably satisfactory. With regard to Leeds, in recent years we had seen a spread of industries unequalled at any other time, so that employers had found some difficulty in securing workmen, and wages had proportionately increased. Mr. Sheldon concluded by expressing a hope that in the future, as in the past, we should hold our own as a nation, steadily progressing year by year, not wavering because we hear of this, that, or the other country achieving the highest success in any particular line of trade, but trying ourselves to excel in all, especially in mechanical engineering.

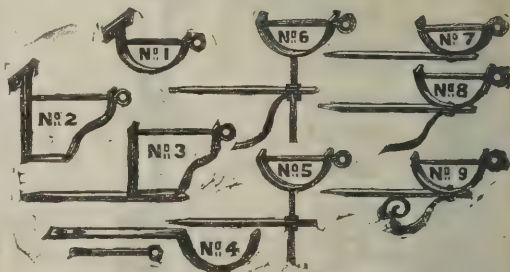
The vice-president (Mr. J. A. Tempest), Messrs. A. Towler, A. Atkinson, W. H. Drake, R. Lupton, R. W. Crabtree, A. M. Casperson and C. H. Holgate also addressed the meeting, after which a vote of thanks was accorded to the President on the motion of Mr. T. Craister, seconded by Mr. Jas. Bowers.

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TRAMWAYS IN ROME.

THE application of electricity to tramways in Rome has of late been largely developed, and the results have proved satisfactory. The first electric line was opened for public use in 1895, under a concession which secures to the already existing tramway-omnibus company the extensive privilege of working that line for twenty-five years, viz. up to the end of August, 1920. Various other important lines subsequently adopted electricity, in respect of which the same privilege alluded to above was conferred upon the company. The system of overhead wires has been adopted up to the present, but the question is open whether the same system is to be applied to other important lines still worked by horses. It does not seem that overhead wires meet with much favour at the hands of the municipality, because they are not pleasing to the eye, so that it will have to be decided what other system is to be adopted, taking into account local requirements, especially connected with winding roads and their altimetric conditions. The electric energy is furnished by the gas company, which owns the large electric works of Tivoli, with hydraulic motors.

The financial success of the tramway-omnibus company, embracing electric and horse trams and omnibus, is not such as one would expect, judging from the large crowds of passengers on its lines, chiefly on those worked by electricity. It is probable, however, that when electricity will have been applied to all the lines and the company will be more settled, the advantages of the new system may have some bearing on the financial results of the undertaking.

ELECTRIC LIGHTING IN LANCASHIRE.

THE assertion that electricity is likely to become the light of the future is receiving proof of its near realisation almost every day. The thoroughfares in the centre of Liverpool are now brilliantly lit up by the electric light, and the improved lighting power and other advantages are appreciated by the people. The electric power for lighting purposes is also being carried into the outer districts near Liverpool. For the borough of Bootle a provisional order has been obtained, and it is anticipated that the streets of that rising centre of industry will soon be lit up by this illuminant. The popular and increasing neighbourhoods of Seaforth, Waterloo and Crosby

have, with remarkable enterprise and energy, says the *Liverpool Courier*, adopted the system of electric lighting, which will be brought into operation in the course of a day or so. The adoption of this improvement is taken by the inhabitants as an evidence of the energy and watchfulness which the different public functionaries of those districts exercise over the well-being of those over whom they have control.

With commendable forethought and anxiety for the benefit of the populace, and with an idea of obviating existing difficulties which do frequently occur in many households and institutions as regards a better lighting system, the whole of the members of the Crosby District Council over twelve months ago formed themselves into a committee to take into consideration means for adopting the electric-lighting system throughout the neighbourhood. The Council were favourably disposed to the undertaking being immediately taken in hand. It was mainly through the advances made by the Liverpool District Lighting Company to the Crosby District Council that a provisional order, under the Electric-lighting Act of 1896, was applied for to the Board of Trade and granted. The company immediately set about laying extensive mains which will distribute the electric current through Great Crosby, Blundellsands, Waterloo and Seaforth. The streets and roads which will come within the boundary for the reception of the electric light are Serpentine North, Serpentine, Serpentine South, Burbe Bank Road, Blundellsands Road West and Warren Road. Trunk lines have been laid along Blundellsands Road West, Bridge Road, Mersey View, Oxford Road, Mount Pleasant and St. John Street to the generating station, Waterloo. From the station mains will be laid along Great George Road with distributing mains along Waterloo Road, Alexandra Road, Victoria Road and Brunswick Parade. A main will extend along Crosby Road South to the point where it joins Seaforth Road. This latter portion of the undertaking will not be entirely completed for nearly two years yet. The line of electric current is shortly to be laid on to Waterloo Park, and 1,000 16 candle-power lights are at present waiting connection. The company's area of supply, covered by the above provisional order, is 6 miles long. In January 1888, the number of 16 candle-power incandescent lamps supplied by the company was 997, and at the present time the supply is equivalent to over 14,000 16 candle-power lamps. The system of supply that will be used is low tension, direct current, at an E.M.F. of 220. The plant at present fixed is capable of supplying 1,000 lamps at one time, but the buildings are large enough for plant for about

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7,000 lamps, and land has been acquired for further extensions when required.

The generating station at Waterloo is a magnificent building, which possesses all the necessary electrical appliances. In one spacious room there are two batteries of 116 cells each, the latest pattern of the E.P.S. type, K33. Another room contains a similar plant. With regard to the machinery necessary for generating the electrical current, the boilers are of the Lancashire type, each being 28 feet long and 7 feet 6 inches in diameter, made of mild steel. The shell plates and end plates are $\frac{3}{4}$ inch thick, and the ends are strengthened by gusset stays. The boilers have two flues, 3 feet diameter, tapered to 2 feet 6 inches diameter at the back end, and made of mild steel plates, 7-16 inch thick, and each flue is fitted with six steel Galloway tubes. The working pressure is 110 lbs. to 120 lbs. per square inch. The water supply is taken into storage tanks from the town mains, and, where practicable, a duplicate service has been carried into the station from a second main. Two feed pumps (or a feed pump and injectors) are provided at the station, and a complete double system of feed pipes, with separate check valves on each boiler. The engines are Browett Lindley's central valve compound engines. The dynamos have magnets of the single inverted horseshoe type, with massive wrought-iron limbs. The armature shafts are coupled directly on to the crank shafts of the engines. The dynamos are wound to give an output of 150 amperes and an E.M.F. of from 110 to 290 volts, and are made by Messrs. W. & S. Robinson. The maximum safe rate of discharge of the cells is 150 amperes, and the storage capacity about 500 ampere hours at ordinary rates of discharge. All the distributing mains of the Liverpool Electric Supply Company are laid underground, and have been manufactured and laid by Callender's Cable and Construction Company, Limited, under the supervision of Mr. F. A. Pocklington, A.I.E.E., district engineer. The mains are laid in cast-iron troughs, $\frac{1}{4}$ inch thick and about 6 feet long, with socket joints. When the troughs are placed in position, about $\frac{1}{4}$ inch of refined bitumen, in a molten state, is run in, and, before setting, spacing bridges of wood are placed in it, about 18 inches apart. These bridges support the cables, and hold them in place, clear of the sides and bottom of the trough, and of each other. Bitumen is then run in, so as to entirely cover the cables and fill up the iron troughs to within $\frac{1}{8}$ inch of the top. The troughs are then finished by a covering of Portland cement concrete, about 1 inch thick. The service lines from the distributing mains to the consumers' premises are made of 7,

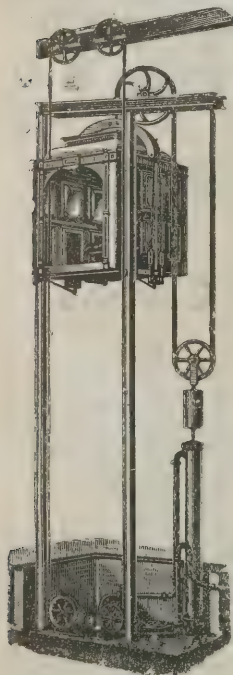
No. 14, wires, insulated. The connections of the various lengths of main to each other, and of the feeders to the distributors, are made by sweating copper lug-pieces on to the ends of the cables and by bolting copper connecting bars to the lugs. The distributing mains are joined in a similar way, the connecting-bar being fitted with terminal screws for the attachment of fusible tin strips, to which the service lines are attached. The main switchboard in the station is fitted with an ampere-meter and registering pressure indicator for each pair of feeders, all being of the Weston type. The Chamberlain-Hookham electric metre is used by the company, and consists of a simple electric motor, doing work against the retarding influence of Foucault currents, generated in a copper disc, rotating between the poles of a permanent magnet. The armature coils are built up on a copper brake disc, and the axis carries a worm upon which actuates a train of counting gear. The meter is calibrated so that the dial reads directly in Board of Trade units. The speed of rotation (subject to a small fractional error at small loads) is proportional to the current.

The current will be turned on for 200 receptacles, and it is expected that the number will rapidly increase when its benefits become more widely known. The company, whose offices are in Hackins Hey, have undertaken with singular success such large enterprises as the New Brighton Tower Grounds and the Eastham Grounds, which they have fitted up with the electric luminant. The whole of the extensive operations described are under the supervision of Mr. W. M. Horsfall, engineer to the company, who has the valuable advice of Mr. A. Bromley Holmes, consulting engineer to the company. The great majority of the residents express their satisfaction at the establishment of such extensive works in the neighbourhood, and assurances of assistance and taking up of the electric light have been given by most of the well-known residents in the district. The whole undertaking is estimated to cost 20,000*l.*, and the adoption of the system is stated to work out a remarkably economical figure.

STRAIGHTENING A CHURCH SPIRE.

A VERY skilful piece of work has just been executed by a firm of building contractors, Messrs. Hunter & Co., of Belfast, and the details of the feat performed by the firm, viz straightening *en bloc* of a church spire in the county Cork, may be of interest. For some time past, says the *Irish Times*, it had been noticed

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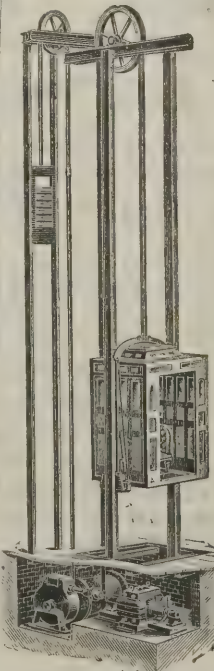
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that the spire of Trinity Church at Newmarket, county Cork, was considerably out of plumb, and latterly was leaning over to such an extent as to threaten to topple down on the body of the sacred edifice. Such a dangerous state of affairs could not be allowed to continue, and when Colonel and Lady Mary Aldworth returned from abroad they had steps taken immediately to have the matter remedied. This was no light undertaking, as to all appearance the work necessitated the complete taking down and rebuilding of the spire of the church. A skilful architect was engaged to inspect the church tower and spire, after which a contract was entered into with the well-known firm of Hunter & Co., Belfast, to promptly execute the work. Mr. Hunter and his staff of experienced steeplejacks attended specially from Belfast and set about the work of taking down and rebuilding the spire, but to the surprise of all, they found that the spire could not be taken down except it was done *en masse*, as the stones of which it is built were hermetically bound to each other with a combination of molten lead and sand, which rendered it absolutely impossible to separate one stone from another, the whole spire being, as it were, one solid block. On further and closer inspection it was found that the entire building was erected in a similar manner, no other mortar or binding substances of any kind being used save the sand and molten lead—a very curious and interesting circumstance to note. This most firm and enduring (but at the same time most expensive) form of construction was, it appears, much in use in Ireland over a century ago. A huge iron shaft runs through the top portion of the spire, on which the stones were slipped like rings and irrevocably rivetted with lead and sand. Under this extraordinary circumstance the idea of taking down the tower had to be abandoned, as being quite impracticable if not utterly impossible; but the desired end has been attained in as satisfactory a manner by an ingenious and clever method adopted by the contractor and his staff. The spire has been brought back to its original true perpendicular position, and now tapers beautifully straight, standing out very handsomely, the joints being beautifully pointed with mastic cement. This difficult and tedious piece of workmanship—the straightening of this spire—has been accomplished in a most successful and satisfactory manner, and reflects much credit on Mr. Hunter and his efficient staff of workmen, and Colonel and Lady Mary Aldworth, as well as the clergy and laity of the parish, have been very well pleased with the excellent way in which the spire of Trinity Church has been dealt with and put again into its proper position.

LEAD PIPES AND WATER SUPPLY.

A PAPER by Mr. C. H. Tattersall, medical officer of health for Oldham, on "The Action of Moorland Water on Lead," was read at the Leeds Congress. The action of moorland water, he said, on lead was a matter of the utmost importance to all authorities who obtained their water supply from the moors. Water from this source was, generally speaking, most satisfactory, being soft and remarkably free from contamination of any kind. Whatever contamination there might be was due to the presence of small quantities of organic matter dissolved by the water from the peat. Unfortunately, the presence of this small amount of organic matter causes an action on lead more or less active in proportion to its amount. This action has at times proved very destructive to various communities using this kind of water, one of the best-known examples being Sheffield, which suffered severely from plumbism between 1886 and 1889. In the autumn of 1895 there were a number of cases of lead-poisoning in Oldham. The water in each case was sampled, and found to contain lead in quantities varying from one-tenth to two-fifths of a grain per gallon. In one of the worst cases the old lead service pipes were removed and replaced by block tin-lined pipes. An examination of the old pipe revealed the presence of a copious brown deposit in flaky masses lining the pipe, and this was found to contain some salt of lead. The waters were more or less acid, although the amount of acidity in the worst sample was very slight when compared with many of the moorland water supplies in the West Riding of Yorkshire, notably Sheffield and Wakefield. The waters containing the greatest amount of albumenoid ammonia were the most acid, and this albumenoid ammonia was almost certainly derived from the peat. In Sheffield the difficulty had been met by allowing the water to flow over a substance known as "Paris white," from which it dissolved about two grains of chalk per gallon. Since this treatment had been inaugurated there had been no further trouble with regard to lead-poisoning from the water-supply. It had not been considered necessary by any of the Lancashire or Yorkshire authorities to filter this moorland water. Filtration in the ordinary method through filters of sand and gravel would prove effectual in preventing this action upon lead, in addition to improving the general appearance of the water, and acting as a safeguard against the possible introduction of pathogenic germs such as have been shown to occur at Rotherham and other places. The methods referred to have all reference to the treatment of the water

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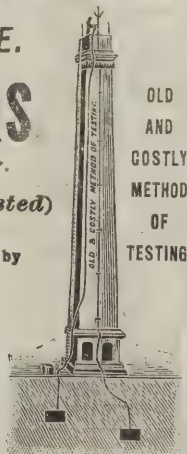
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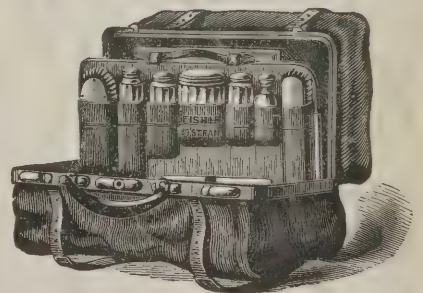
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before its distribution to the town. Attempts had also been made to save the population from plumbism by substituting tin-lined lead pipes for the ordinary kind. This had been tried in Oldham, where, unfortunately, a large quantity of so-called tin-lined lead pipe had been used for domestic water service. This pipe was supposed to be washed with tin in a molten condition on its inner surface, and it had a whiter and brighter appearance than ordinary lead pipe. He had obtained a portion of this lead pipe, and experiments showed conclusively that it was absolutely valueless in preventing the action of the water on the lead, for there was no difference in any way between the action of the water on this pipe and the ordinary lead pipe. The best means of preventing lead-poisoning by moorland water were—(1) That the water be got off the peaty gathering-grounds as quick as possible; (2) that as much time as possible be given for subsidence and bleaching; (3) and most important, that the water be filtered through sand filters, or, failing this, be passed over "Paris white," as at Sheffield; and (4) that blocked tin-lined lead piping of good quality be used for water service pipes instead of ordinary lead pipes.

The president, Mr. W. Whitaker, F.R.S., contended that each case must be dealt with on its merits. While it was a good thing to expose moorland waters to the sun, a similar exposure deteriorated pure limestone water. Light should be kept away from all chalk water. They were addicted to using technical terms, which few understood. He failed to understand what Mr. Tattersall meant by "Paris white." He hoped some one would explain the term. He was surprised to find that tin-lined pipes did not act as a protection against lead-poisoning.

Mr. Richardson thought that a certain preventive of lead-poisoning was to pass the water over limestone. Water with only 1·2 degs. of hardness could in this way be easily increased to 2 or 2½ degs. It would be interesting to know whether water came into contact with sulphates of iron in crossing over a moor. The Paris white referred to he believed was a species of powdered lime.

The Rev. W. Carter asked what advantage was gained by substituting iron service-pipes for lead pipes in districts troubled with lead-poisoning? Whilst there was an objection to lead pipes in this district, there was an equally strong objection to iron pipes in some parts of Derbyshire.

Dr. Brown thought lead-poisoning was due almost entirely to dissolved oxygen. Occasionally he had found inorganic acid. A good deal of iron was obtained from millstone grits.

There was always more or less iron in water obtained from the moorlands. It was the simplest thing in the world to cure lead-poisoning. They could avoid all risk by not using lead pipes. He had substituted lead pipes at his home for iron pipes. The objections to the latter were, first, that iron pipes would not bend easily; secondly, that they were apt to become oxidised; and, thirdly, lead pipes gave way under the influence of frost, whilst iron ones invariably split. Persons using iron pipes must have stop-cocks fixed outside, and when a burst occurred turn off the water and send for the plumber.

Mr. Branson said the source of organic action was bacterial. Carbonate of soda, he believed, would render moorland water of 2 or 3 degs. of hardness free from the risk of causing lead-poisoning. Of course, in some waters it was not admissible to have more lime. Manufacturers objected to it. Carbonate of soda, however, was a ready agent in that case.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

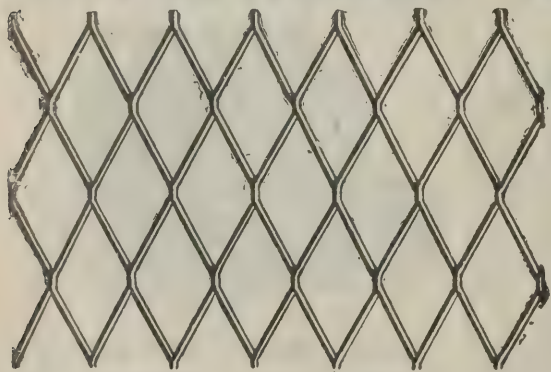
21492. William Crowther, for "Improvements in and in the method of producing drainage or sewerage traps."

21547. Thomas Robert Hay, for "Improvements in or applicable to seats for water-closets, in part applicable to doors and other structures."

21568. William Henry Heywood, for "Improvements in the construction of bars for securing and carrying glass for roof and other glazing purposes."

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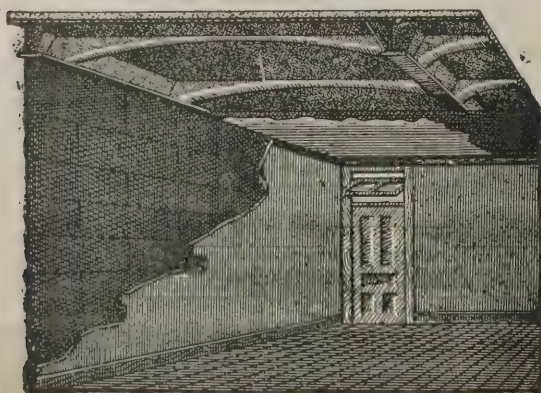
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Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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COMPETITIONS OPEN.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500*l.*, 300*l.* and 200*l.* respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

COLNE.—Oct. 20.—Premiums of 50*l.* and 35*l.* for plans for technical schools, public library and public hall. Mr. T. H. Hartley, borough engineer, Colne.

SOUTHEEND-ON-SEA.—Nov. 20.—Plans invited for new church. Rev. E. E. Kimber, St. Albans, Avenue Terrace, Southend-on-Sea.

UXBRIDGE.—Oct. 30.—The Uxbridge Rural District Council invite plans for a scheme of sewerage and sewage disposal. Mr. Charles Woodbridge, 38 High Street, Uxbridge.

CONTRACTS OPEN.

ABERDEENSHIRE.—Oct. 22.—For erection of distillery buildings and warehouse at Kennethmont station, and excise officer's and manager's houses, offices, and workmen's cottages, ditto. Mr. Charles C. Doig, architect, Elgin.

ABERDEEN.—For erection of offices, Annfield, Messrs. D. Rose & Co., Union Street, Aberdeen.

ABERDEEN.—Oct. 20.—For erection of public school at Kittybrewster. Messrs. Brown & Watt, architects, Union Terrace, Aberdeen.

ALNWICK.—Oct. 19.—For additions to the training school in Northumberland Street. Mr. R. R. Temperley, clerk of works, Alnwick Castle.

ASHTON-UNDER-LYNE.—For erection of seven houses, Stockport Road. Mr. Edwd. Garside, architect, Town Hall Chambers, Ashton-under-Lyne.

BARKING.—Oct. 19.—For erection of public baths at the rear of the Public Offices, East Street, and supply and erection of twenty cast-iron and five welded-steel ventilation columns, together with nine brick manholes in various parts of the town. Mr. E. H. Lister, clerk, Public Offices, Barking.

BARNES.—Nov. 3.—For erection of six shops and dwelling-houses on the Elm Grove Estate, Rocks Lane. Messrs. F. & W. Stocker, surveyors, 90 and 91 Queen Street, Cheap-side, E.C.

BARROW-IN-FURNESS.—Oct. 19.—For additions to caretaker's house, Barrow Island school. Mr. W. Hutchinson, clerk.

BELFAST.—For rebuilding licensed premises and two dwelling-houses, Peter's Hill. Mr. John J. O'Shea, architect, 16 Chichester Street, Belfast.

BELFAST.—Oct. 21.—For erection of new city hall. Messrs. E. Thomas & Son, architects, 7 Queen Anne's Gate, Westminster.

BIRMINGHAM.—Oct. 28.—For erection of dining-hall and stores at the workhouse. Mr. W. H. Ward, architect, Paradise Street, Birmingham.

BRADFORD.—Oct. 18.—For reinstating Hill Crest Oil Works, Laisterdyke. Messrs. Empsall & Clarkson, architects, 7 Exchange, Bradford.

BRADFORD.—Oct. 18.—For construction of baths, &c., at Wapping Road school. Mr. C. H. Hargreaves, architect, Exchange Buildings, Bradford.

BRADFORD.—Oct. 18.—For erection of nineteen houses in Cornwall Road. Messrs. Milnes & France, architects, Bradford.

CHESTER.—For pulling-down and removal of the chaplain's house, Chester Cemetery. The Secretary, Chester Cemetery Company, St. Werburgh Chambers.

CHRISTCHURCH.—Oct. 30.—For erection of an addition to workhouse, Fairmile. Mr. E. H. Burton, architect, Bournemouth.

COVENTRY.—Oct. 20.—For additions to Board schools, Red Lane. Messrs. G. & I. Steane, architects, 22 Little Park Street, Coventry.

CROYDON.—Oct. 19.—For erection of a boundary-wall at cottage homes, Mayday Road, Thornton Heath. Mr. Frederick West, 23 Coombe Road, Croydon.

DAGENHAM.—Oct. 26.—For erection of an additional ward pavilion at the smallpox hospital, Dagenham, Essex. Mr. Lewis Angell, borough engineer, Town Hall, Stratford, E.

DUBLIN.—Oct. 18.—For erection of stationmasters' houses at Warrenpoint, Maguiresbridge, Crumlin and Ballinderry, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

EASTBOURNE.—Oct. 22.—For erection of model common lodging-house. Mr. William Chapman Field, architect, Town Hall, Eastbourne.

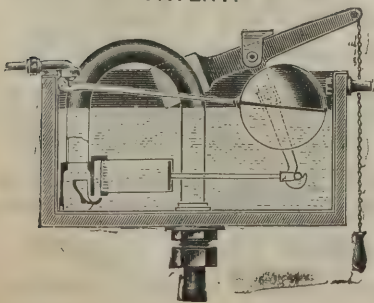
ESSEX.—Oct. 22.—For alterations to the present and building new schools at West Mersea to accommodate 365 children, with offices, boundary walls, &c. Mr. J. W. Start, architect, Colchester.

FALMOUTH.—Oct. 30.—For erection of a new infirmary at the workhouse. Mr. John H. Genn, clerk.

FARNHAM.—Nov. 3.—For erection of joint isolation hospital. Mr. Sydney Stapley, architect, West Street, Farnham.

ARCHITECTS PLEASE NOTE.

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FEATHERSTONE (YORKS).—Oct. 26.—For erection of a villa residence. Messrs. Garside & Keyworth, architects and surveyors, Ropergate, Pontefract.

GLASGOW.—Oct. 21.—For construction of underground urinal and lavatory at Parkhead Cross. Mr. John Lindsay, clerk, City Chambers, Glasgow.

GOOLE.—Oct. 19.—For alterations in ventilation of market hall, erection of hoarding, &c. Mr. Geo. England, clerk.

GREAT YARMOUTH.—Oct. 22.—For erection of house, Gordon Road, Southdown. Mr. Chas. G. Baker, architect, Town Hall Chambers.

HAMPSTEAD.—Oct. 26.—For enlargement and alteration of the fire-brigade station in Heath Street, for the London County Council. Architect's Department, 13 Spring Gardens, S.W.

HORRABRIDGE.—Oct. 30.—For alterations and additions to the Board school, Horrbridge. Mr. William Squire, architect, Tavistock.

IRELAND.—Oct. 20.—For erection of dwelling-house, stables, &c., at Ballyclare. Mr. T. H. Jordan, 31 Garfield Street, Belfast.

IRELAND.—For erection of house and shop, High Street, Donaghadee. Mr. Thomas Pentland, architect, 35 High Street, Belfast.

IRELAND.—Oct. 21.—For repairs to labourers' cottages, Roskeen and Rosnalee, Kanturk. Mr. T. Linehan, clerk.

IRELAND.—Nov. 1.—For repairs to Manorhamilton Court-house. Mr. E. O. N. Clarke, county surveyor, Carrick-on-Shannon.

KENDAL.—Oct. 26.—For erection of Roman Catholic schools, classrooms, workshops, covered playgrounds, &c., in Gillingate. Mr. John Stalker, architect, Kendal.

KNOTTINGLEY.—For erection of stables, outbuildings, &c., at Lamb Inn. Messrs. Tennant & Bagley, architects, Pontefract.

KNUTSFORD.—Oct. 20.—For erection of range of piggeries at workhouse. Mr. Robert J. McBeath, architect, Birnam House, Sale.

LEEDS.—Oct. 20.—For constructing concrete and brick-work walling and arching for the widening of Burley Street. Town Clerk, Town Hall, Leeds.

LEEDS.—Oct. 26.—For erection of public baths in Meanwood Road. Mr. Walter Hanstock, architect, Branch Road, Batley.

LONDONDERRY.—Oct. 20.—For erection of a lecture-hall in connection with Ebrington Presbyterian church. Mr. Wm. Barker, architect, Richmond Street, Londonderry.

LOWESTOFT.—Oct. 22.—For erection of timber-framed batteries and drill-shed, magazine and latrines, for the Royal Naval Reserve. Director of Works Department, Admiralty Avenue House, Northumberland Avenue, W.C.

MANCHESTER.—For erection of premises for the Grange Park Dairy Company, in Mulberry Street, Hulme. Mr. E. W. Leeson, 49 Princess Street, Manchester.

MANCHESTER.—Oct. 25.—For erection of engine and boiler-houses, offices, workshops, &c., at hydraulic pumping-station, Pott Street. Secretary, Waterworks Offices, Town Hall, Manchester.

MARGATE.—For alterations and additions to the Hope and Anchor public-house. Mr. A. Latham, architect, 15 Cecil Square, Margate.

MORLEY.—Oct. 20.—For erection of public baths, Fountain Street. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

PRESTON.—Oct. 21.—For erection of a sanatorium, Royal Cross school. Messrs. Sames & Green, architects, 65 Northgate, Blackburn.

PONTEFRAC.—Oct. 20.—For erection of two houses and shops at Purston, near Pontefract. Messrs. Garside & Keyworth, architects, Pontefract.

PURTON AND SUCKLEY.—Oct. 26.—For erection of cottages at Collins Lane crossing, near Purton, Gloucestershire, and at Suckley station, Worcestershire, for the Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station.

RADNOR.—Oct. 28.—For pulling-down the old buildings at present on the site of the Presteign County Intermediate School for the old materials contained in same, and for erection of the school. Mr. H. Teather, architect, Andrew's Buildings, Queen Street, Cardiff.

ROCHDALE.—Oct. 20.—For erection of a retaining wall in Robinson Street. Mr. James Leach, town clerk, Town Hall, Rochdale.

RUGBY.—Oct. 26.—For erection of branch stores at New Bilton. Mr. J. T. Franklin, architect, 40 Bridget Street, Rugby.

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SCOTLAND.—Oct. 18.—For extensive additions to Craigellachie Hotel, Craigellachie. Messrs. A. & W. Reid & Wittet, architects, Elgin.

SHREWSBURY.—Oct. 29.—For erection of engine and boiler-houses, coal store, chimney shaft, and other works at Coleham. Messrs. John Taylor, Sons & Santo Crimp, 27 Great George Street, Westminster, London, S.W.

SOWERBY BRIDGE.—For erection of a house in Clifton Street, Willow Hall Park. Mr. S. Wilkinson, architect, Sowerby Bridge.

STOCKTON.—For plastering-work of two cottages. Mr. Robert Jobson, Moses Street, Bowesfield Lane, Stockton.

SURBITON.—Oct. 28.—For erection of a branch post-office and sorting-office. Mr. C. W. Stevenson, 38 Parliament Street, S.W.

SWANSEA.—Oct. 21.—For erection of refreshment-rooms and dwelling-house at the Pier Terminus, Mumbles. Mr. E. A. Watkins, secretary, 2 Rutland Street, Swansea.

WALES.—Oct. 20.—For seating and renovating the Richmond Road Baptist chapel, Pontnewydd. Mr. James Russell, Commercial Street, Pontnewydd.

WALES.—Nov. 1.—For erection of new offices at Barry Dock. Secretary, Barry Railway Company, Barry Dock.

WESTBURY.—Oct. 26.—For erection of a cottage at Westbury crossing, near Grange Court. Mr. G. K. Mills, secretary, Great Western Railway Company, Paddington Station.

WINCHCOMBE.—Oct. 21.—For enlargement of two cottages and the rebuilding of a new one in Gloucester Street. Mr. Conrad Hall.

WINCHFIELD.—Oct. 22.—For erection of a cottage home at the Union House. Mr. F. S. Chandler, clerk, Odiham, Hants.

WINDERMERE.—Oct. 28.—For erection of a residence. Mr. Robert Walker, architect, &c., Windermere.

WINDSOR.—Oct. 26.—For erection of a new passenger station and other works at Windsor. Mr. G. K. Mills, secretary, Great Western Railway Company, Paddington Station, London.

WREXHAM.—Oct. 31.—For erection of latrines at the boys' school. Messrs. J. Morison & Son, 10 King Street, Wrexham.

TENDERS.

BETHNAL GREEN.

For erection of four houses and workshops, Vallance Road. Mr. CHARLES LEGG, architect. Quantities by Mr. W. HAWKER.

S. Salt	£4,250	0	0
H. Dearsley	4,215	0	0
W. Gladding	4,159	0	0
G. Barker	4,030	0	0
J. Howlett & Son	3,950	10	0
Coulsell Bros.	3,893	0	0

BOVEY TRACEY.

For erection of a school building at Heathfield. Messrs. J. W. ROWELL & SON, architects, Newton Abbot.

W. J. Norris	£770	0	0
Mingo & Boone	749	0	0
F. A. Stacey	679	0	0
L. Bearne	638	0	0
Davie & Palfrey	625	6	0
Winsor & Mardon	625	0	0
R. F. Yeo	625	0	0
J. Turner	610	0	0
H. MILLS, Newton Abbot (accepted)	597	5	0

BRADFORD.

For erection of business premises in Ivegate. Mr. JAS. LEDINGHAM, architect, District Bank Chambers, Bradford.

Accepted tenders.

W. North, mason.
Briggs Bros., joiner.
Simpson & Moore, plumber.
W. Crabtree, slater.
J. Throp, plasterer.
T. H. Hewitt, painter.

BRIDLINGTON QUAY.

For erection of two pairs of villas, Marshall Street. Mr. J. EARNSHAW, architect, Bridlington Quay.
R. BAILEY, Bridlington Quay (accepted) . £1,740 0 0

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F. & H. F. Higgs	950	0	0
Food & Sons	910	0	0
J. Barnes	880	9	0
Food & Hudson	850	0	0
GODSON & SON, Kilburn Lane, W. (<i>accepted</i>)	750	0	0
Surveyor's estimate	875	0	0

BRISTOL.

For construction of two new streets, with sewers and boundary walls, at Pile Marsh. Messrs. G. C. ASHMEAD & SONS, surveyors, Small Street, Bristol.

Lloyd & Son, Maurice Road, St. Andrew's Park	£565	0	0
Mereweather, Bedminster	399	0	0
Thatcher, St. George	294	13	0
G. Jones, Pile Marsh, St. George	276	17	6
F. Martin, St. George	257	13	4

BURNLEY.

For construction of a 15-inch earthenware pipe sewer at Smallshaw, with manholes, lampholes, &c.

Holme & King	£684	6	0
G. Read & Son	562	7	0
E. Heap	556	8	0
J. WADGE, Willow Street (<i>accepted</i>)	495	8	0

CONWAY.

For alterations to receiving wards at workhouse.

J. ROBERTS & SONS (*accepted*).

CROYDON.

For alterations and additions to the Board schools, Morland Road, Woodside. Mr. ROBERT RIDGE, surveyor.

J. Smith & Sons	£3,127	0	0
J. & C. Bowyer	3,085	0	0
Akers & Co.	3,039	0	0
Saunders	3,020	0	0
G. E. Bryan & Co.	2,997	0	0
A. Bullock	2,973	0	0
Bulled & Co.	2,969	0	0
Huntley Bros., Croydon	2,890	0	0

* Accepted provisionally.

DARTMOUTH.

For building a large flushing-tank in Lower Street, and fixing ten large flushing-valves, laying about 150 lineal feet of 9-inch stoneware pipe sewers in Cole's Court. Mr T. O. VEALE, borough surveyor.

R. Pillar	£99	0	0
J. Back	93	0	0
R. C. PILLAR, Old Castle House (<i>accepted</i>)	75	0	0
Surveyor's estimate	75	0	0

EDGWARE.

For drainage works, Orange Hill. Messrs. POLLARD & TINGLE, engineers, 31 Old Queen Street, Westminster.

J. Dickson	£262	14	0
C. W. Killingback	259	0	0
H. J. Crouch	249	7	0
R. W. Swaker	230	0	0
H. WILLIAMS, Harpenden (<i>accepted</i>)	226	12	0
F. A. Jackson (<i>withdrew</i>)	214	0	0
D. H. Porter (<i>withdrew</i>)	197	0	0
G. Carpenter (<i>withdrew</i>)	165	0	0
D. Brewer (<i>withdrew</i>)	136	10	0

ENFIELD.

For erection of block of cottage residences, Bertram Road. Mr. EUGENE C. BEAUMONT, architect, 78 Fleet Street, E.C.

MARSDEN & BAILEY 69 Canonbury Road, London, N. (<i>accepted</i>)	£1,750	0	0
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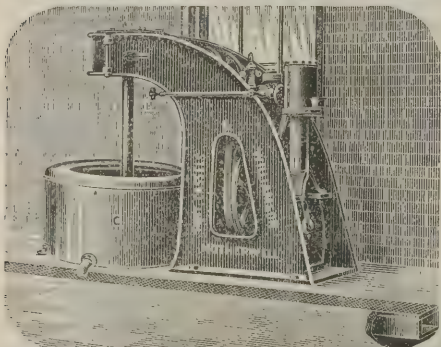
For making-up Hillaries and Frederick Roads. Mr. H. H. HUMPHRIES, engineer and surveyor.

CURRALL, LEWIS & MARTIN, Birmingham (<i>accepted</i>)	£854	5	0
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For erection of nineteen houses. Messrs. GARSIDE & KEY-WORTH, architects, Pontefract.

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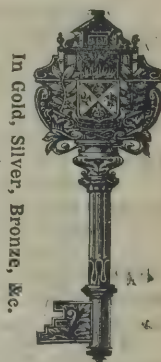
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H. Bott	135	0	0
B. Dixie	126	0	0
D. Walls	120	16	0

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W. Watson	71	12	0
H. Sedgwick	52	0	0
J. E. Oates	49	10	0
Cressey	49	10	0
THOMAS & BILTON, Harrogate (accepted)	48	0	0

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For erection of the County School. Messrs. GRAYSON & OULD, architects, 31 James Street, Liverpool.

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T. Browne	3,306	0	0
Jones & Sons	2,970	0	0
G. Woods & Sons	2,891	0	0
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W. & T. Bailey	2,548	5	0

HECKMONDWIKE.

For paving a portion of Market Street. Mr. JAMES SAVILLE, surveyor.

S. Hainsworth & Co.	£325	16	8
J. Speight	282	0	0
FOWLER & SPEIGHT, Leeds (accepted)	255	6	3

HOXTON.

For erection of stabling and horsekeeper's house at Turner Square, for the Hoxton Brewery Company, Limited. Mr. CHARLES R. WINTER, architect, 119 Finsbury Pavement, E.C.

Lascelles & Co.	£1,172	0	0
Sparkes & Sons	1,146	0	0
Wilkinson Bros.	1,094	0	0
JARVIS & SONS, Hackney Road (accepted)	1,086	0	0

HOLBORN.

For alterations to the Nag's Head Tavern, Leather Lane. Mr. CHARLES R. WINTER, architect, 119 Finsbury Pavement. Quantities by Mr. HENRY THEOBALD, 48 Finsbury Pavement, E.C.

Lawrance & Sons	£1,847	0	0
Burman & Sons	1,845	0	0
Sparkes & Sons	1,837	0	0
Todd & Co.	1,783	0	0
Lascelles & Co.	1,781	0	0
ELKINGTON & Co., Dalston (accepted)	1,620	0	0

HUDDERSFIELD.

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For erection of dwelling-house in William Street, Crosland Moor. Mr. J. BERRY, architect, 9 Queen Street, Huddersfield.

Accepted tenders.

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G. Ainley, joiner.
Sanderson Bros., plumber.
G. H. Day, plasterer.
T. Cartwright, painter.
Pickles Bros., slater.
J. Cooke, concreter.
Total, £450.

For erection of offices and extensions to mill, Taylor Hill. Mr. J. BERRY, architect, 9 Queen Street, Huddersfield.

Accepted tenders.

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D. Taylor & Sons, plumber.
N. Jessop & Son, plasterer.
J. H. Stuttard, painter.
H. B. Aspinall, slater.
J. & J. W. Longbottom, ironwork.
J. Cooke, concrete and wood block.
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E. Roberts & Son	6,391	0	0
S. Warburton	5,503	2	0
R. L. ROBERTS, Craigydon, Llandudno (accepted)	5,004	13	6

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For extending the electric-lighting system to the new staff blocks now in course of erection at the North-Western Hospital.

G. F. Ratcliffe & Co.	£859	15	6
Fricker, Miller & Co.	754	0	0
J. Sax & Co., Limited	536	8	0
Hill, Upton & Co.	520	0	0
Laing, Wharton & Down, Limited	497	16	0
P. Speedy	395	0	0
T. S. Anderson, Royal Insurance Buildings, Sheffield *	380	0	0
Consulting engineer's revised estimate	400	0	0

* Recommended for acceptance.

For erection of a detention shelter at the South Wharf.

G. Sharp	£1,300	0	0
J. J. Richards	1,194	10	0
C. Wall	1,083	0	0
S. Ransom & Co.	1,034	0	0
H. Wall & Co., Carlton Works, Kentish Town, N.W.*	976	0	0
Architect's revised estimate	950	0	0

* Recommended for acceptance.

For rebuilding detached house, High Street, Bromley-by-Bow, E. Messrs. C. FOULSHAM & HERBERT RICHES, joint architects, 3 Crooked Lane, King William Street, E.C., and Bromley-by-Bow, E.

J. T. Robey	£724	0	0
S. Salt	705	0	0
J. C. Edmunds	682	0	0
Howlett & Son	665	0	0
A. J. Sheffield	650	0	0
T. OSBORN & SONS (accepted)	598	0	0

LONDON—continued.

For painting-work, &c., at the Prince of Wales, Stratford, E. Messrs. C. FOULSHAM & HERBERT RICHES, joint architects, 3 Crooked Lane, King William Street, E.C., and Bromley-by-Bow, E.

W. G. Brown	£199	15	0
T. Osborn & Sons	174	0	0
J. T. Robey	149	13	0
A. W. DERBY (accepted)	131	12	0

LONDON SCHOOL BOARD.

For converting No. 1 Grange Street, Gopsall Street, into a schoolkeeper's residence.

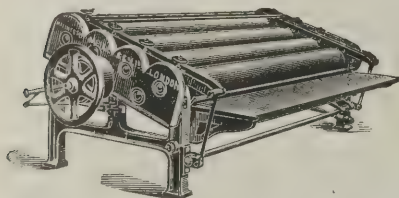
J. Grover & Son	£410	0	0
W. Shurmur	395	0	0
W. Martin	380	0	0
E. Lawrance & Sons	357	0	0
G. WALES (accepted)	250	0	0

For providing and fixing sectional boiler and auxiliary heating in three classrooms, infants' department, and fixing hot-water radiators in corridors, boys, girls and infants' departments, Lyham Road:

Strode & Co.	£229	0	0
Ward & Nock	213	14	0
C. Seward & Co.	210	0	0
Russell & Co.	194	0	0
A. H. Skinner & Co.	193	0	0
W. Truswell & Son	187	0	0
Duffield & Co.	172	0	0
Turner & Co.	166	10	0
E. OLDROYD & CO., LIMITED (accepted)	134	0	0

For overhauling apparatus and providing additional heating surface and relief mains, Blundell Street.

J. C. & J. S. Ellis, Limited	£195	0	0
J. Defries & Sons, Limited	176	0	0
J. Wontner-Smith, Gray & Co.	148	10	0
J. Grundy	120	9	0
Duffield & Co.	120	0	0
Vaughan & Brown, Limited	120	0	0
G. Davis	118	0	0
W. G. CANNON & SONS (accepted)	107	0	0

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HIGH-CLASS LAUNDRY MACHINERY.

52 QUEEN VICTORIA ST., E.C.

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J. GREEN & CO.,
THE BIRMINGHAM CITY LOCK WORKS,

236 BRADFORD STREET.



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All Samples not paid for that are on the market are our property.

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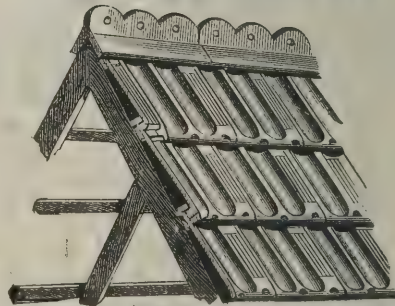
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MALVERN LINK.

For erection of a tower to St. Matthias Church. Mr. F. W. HUNT, architect, 30 York Place, Portman Square, W.			
Stephens, Bastow & Co., Limited	£2,778	0	0
C. Hayes	2,677	0	0
Broad	2,475	0	0
Collins & Godfrey	2,420	0	0

MANSFIELD.

For painting the Forest Hospital, Southwell Road. Mr. R. FRANK VALLANCE, borough surveyor.			
J. Norburn	£41	0	0
C. E. Greenwood	35	15	6
R. FROST, West Hill Drive (accepted)	35	0	0

MIDDLESBROUGH.

For alterations and additions to 4 and 6 Gurney Street. Mr. W. G. ROBERTS, architect, Middlesbrough.			
PERKS & SON, Stockton-on-Tees (accepted)	£210	0	0
BAKER BROS., Middlesbrough, plumbing, glazing and gasfitting (accepted)	28	10	0

MILE END.

For works in breaking-up old sewers and constructing new brick sewers in lieu thereof in Bow Common Lane, Erric Street and Brantridge Street. Mr. J. M. KNIGHT, surveyor.			
R. Jackson	£2,460	0	0
Killingback & Co.	2,300	0	0
J. JACKSON, Forest Gate (accepted)	2,128	10	6

MITCHAM.

For erection of laundry machinery, inclusive of boilers, engine and laundry fittings for new laundry at Mitcham. Mr. C. E. VAUGHAN, architect, 25 Lowther Arcade, Strand, W.C.			
Joel & Co.	£2,841	0	0
W. Summerscales & Sons	2,400	0	0
D. & T. Tullis	2,363	0	0
Goddard, Massey & Warner	2,302	18	0
J. & F. May	2,240	0	0
T. Bradford & Co.	2,171	0	0
Thomas & Taylor	2,077	0	0
Mackintosh, Meikle & Co.	1,980	0	0
W. Williamson & Co.	1,777	0	0
Benham & Sons, Limited	1,471	10	0

NEWBURY.

For erection of offices and alterations at the Atlas Brewery, Bartholomew Street. Mr. JAMES H. MONEY, architect, The Broadway, Newbury.			
E. & H. James	£1,100	14	0
Pope & Co.	965	12	0
G. Elms & Sons	965	0	0
E. FITT MCCARTHY, Reading (accepted provisionally)	945	0	0

NUNEATON.

For construction of a new street between Duke Street and Manor Court Road, about 63 yards long, with sewer, surface water drainage, &c. Mr. J. S. PICKERING, surveyor.			
H. MAYO, Nuneaton (accepted)	£148	0	0

PADIHAM.

For excavating, underbedding, paving, &c., of Victoria Road and Back Victoria Road. Mr. J. GREGSON, surveyor.			
W. Chews	£223	13	1
G. Read & Sons	143	0	10
J. HOLDEN, Brierfield (accepted)	126	6	3

PETERBOROUGH.

For erection of a house, shop and bakehouse in Buckle Street. Mr. J. G. STALLEBRASS, architect, Peterborough.			
Wenlock	£538	12	9
Watson & Lucas	448	10	0
D. Gray	445	0	0
W. Sibley	435	0	0
J. Guttridge	430	0	0
Hicks Bros.	423	13	5
R. J. NICHOLS (accepted)	419	5	0
T. Bailey (withdrawn)	399	10	0

PORT TALBOT.

For erection of a schoolroom, boiler-house, &c., Grove Place. Mr. F. B. SMITH, architect, Port Talbot.			
Rees & Co.	£645	0	0
H. David & Sons	570	0	0
J. Nicholas	518	0	0
J. Davies	490	0	0
LEVERSTON BROS., Aberavon (accepted)	475	0	0

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ASPINALL'S ENAMEL. LTD., NEW CROSS, LONDON, S.E.

RAWMARSH.

For construction of Peasehill Street, Rawmarsh, and New Street, Parkgate.

New Street.

W. H. Trehern	£145	3	5
G. Eyre & Co.	129	10	0
B. BOOL, Rawmarsh (accepted)	124	3	6

Peasehill Street.

W. H. Trehern	330	0	0
G. Eyre & Co.	272	3	8
B. BOOL (accepted)	270	7	4

READING.

For levelling, paving, kerbing, channelling, forming, metalling, &c., in Cranbury Road. Mr. JOHN BOWEN, borough surveyor.

W. Reeves	£1,442	15	0
Free & Sons	772	10	0
F. Talbot	758	13	6
R. PILGRIM (accepted)	647	15	4

ROTHERHITHE.

For erection of a chimney shaft, 150 feet high, in connection with a new refuse destructor, Rotherhithe Street. Mr. NORMAN SCORGIE, surveyor.

General Builders, Limited	£4,985	0	0
H. KNIGHT & SON, Tottenham, N. (accepted)	2,428	3	0
Myles & Warner	2,291	3	10

SCOTLAND.

For additions to the Cluny Hill hydropathic establishment, Forres, and the supply of grates in connection therewith. Mr. JOHN FORREST, architect, 129 High Street, Forres.

Accepted tenders.

D. Ross, mason.
J. Smith, carpenter.
J. Gray & Son, slater.
Angus & Ross, plasterer.
Boyne & Martin, plumber.
A. Macdonald, painter and glazier.
W. Smith & Son, blacksmith and grates.
Total, £1,558 5s. 6d.

SCOTLAND—continued.

For erection of public hall for Lumphanan. Mr. G. SPARK, architect, Lumphanan.

Accepted tenders.

Coutts & Calder, Aboyne, builder	£203	0	0
W. G. M'Robbie, Lumphanan, carpenter	196	5	0
R. Wright & Son, Aboyne, slater	73	7	0
G. Merson, Banchory, plasterer	46	5	0
T. Davidson & Co., Banchory, plumber	37	10	0

STRATFORD.

For erection of a small factory at Abbey Lane. Mr. EUGENE C. BEAUMONT, architect, 78 Fleet Street, E.C.

J. Noakes	£385	0	0
Taylor & Son.	355	0	0

SLEAFORD.

For providing and laying 1,000 yards of 3-inch cast-iron pipes, with valves and fittings. Mr. JESSE CLARE, surveyor.

R. D. Wood & Co.	£594	0	0
C. S. Mallett & Co.	409	4	6
W. Gould	349	0	0
F. Pattinson	299	0	0
J. T. Barnes	260	8	0
S. C. SKINNER, Heckington (accepted)	257	15	8

SOUTH KENSINGTON.

For alterations in converting shop and premises into a dairy, for Lord Rayleigh. Mr. F. W. ADAMS, architect, 18 Eldon Street, E.C.

R. E. Clarke, Finsbury Pavement	£325	0	0
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STOCKPORT.

For supplying wooden polling booths, tin ballot boxes, &c. Mr. JOHN ATKINSON, borough surveyor.

Polling booth.

A. GOTHARD, Stockport (accepted)	£109	3	4
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Ballot boxes.

Asquith	16	12	11
J. Crossley	13	19	3
C. Crossley & Sons	12	9	2
R. & W. Brownword	11	4	8
Leigh & Downs	10	12	6
E. Shore	8	13	6
F. WILLIAMSON, Stockport (accepted)	8	12	5

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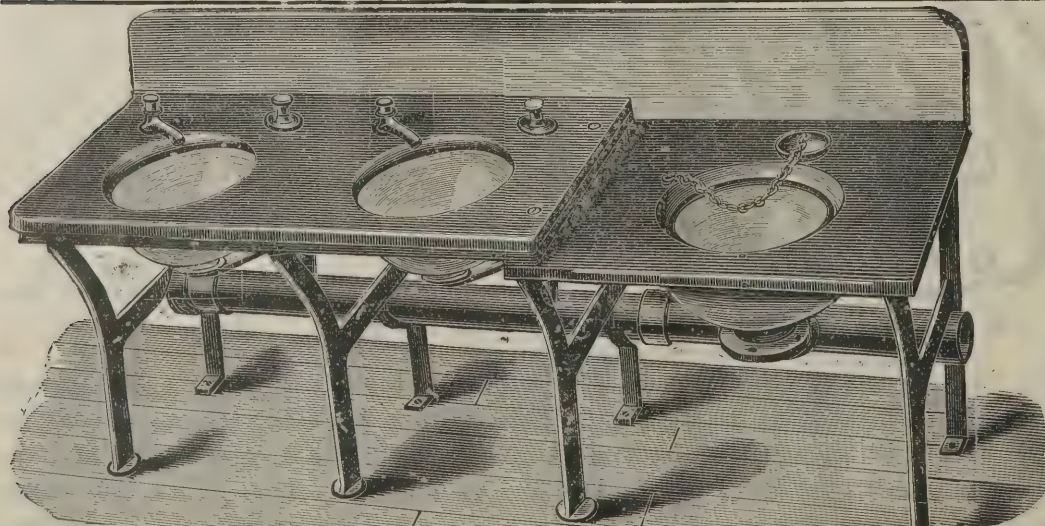
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147 STRAND, LONDON, W.C.

STOCKPORT—continued.

For painting greenhouses, museum, railings, &c., at Vernon Park. Mr. JOHN ATKINSON, borough surveyor.	
Greaves & Sutcliffe	£235 0 0
W. Ormesher	190 0 0
T. Barnes	178 15 0
J. Wrigleys	160 0 0
W. Fantom	140 0 0
W. Baker	136 14 6
A. ALLEN, Stockport (accepted)	105 0 0

STRATFORD-UPON-AVON.

For erection of stores in Sheep Street. Mr. C. G. HUINS, architect, Redditch. Quantities by Mr. HERBERT R. LLOYD, Birmingham.	
J. Harris	£1,530 0 0
J. Roberts	1,350 0 0
Smallwood & Co.	1,330 0 0
Callaway Bros.	1,295 0 0
E. T. KENNARD (accepted)	1,217 18 0

STREATHAM.

For decorations and repairs to Queenwood, Palace Road, for Mr. W. Cambden. Mr. F. W. ADAMS, architect, 18 Eldon Street, E.C.	
S. Blow, Royal Mint Street	£270 0 0

WALTHAM CROSS.

For erection of a laundry, dwelling-house and stables, for Mr. J. Saban. Mr. F. W. ADAMS, architect, 18 Eldon Street, E.C.	
W. Gardener, Waltham Abbey	£1,390 0 0
For alterations and additions to house and shop, for Mr. J. Church. Mr. F. W. ADAMS, architect, 18 Eldon Street, E.C.	
W. Gardener, Waltham Abbey	£560 0 0
For construction of new road, Swan Field, for Mr. R. B. Colvin. Mr. F. W. ADAMS, architect, 18 Eldon Street, E.C.	
W. Griffiths & Son, Bishopsgate Street, E.C.	£995 0 0
For erection of stables, for Mr. T. Hamilton. Mr. F. W. ADAMS, architect, 18 Eldon Street, E.C.	
W. Gardener, Waltham Abbey	£500 0 0

WALES.

For re-erection, additions, alterations and reparations of shop and house, &c., at Tonyrefail. Mr. J. J. EVANS, architect, Penarth.	
M. R. Rowlands	£672 0 0
Griffiths Bros.	650 10 0
L. EVANS, Tonyrefail (accepted)	650 0 0
Enoch Bros.	610 0 0

WIMBLEDON.

For making-up Queen's Road, Florence Road, Trinity Road and Effra Road.

Florence Road.

Laurence & Thacker	£1,470 0 0
Mowlem & Co.	1,455 0 0
E. Dees	1,339 0 0
S. Hudson	1,334 0 0
Surveyor's estimate	1,455 0 0

Effra Road (Section 1).

S. Hudson	524 0 0
Mowlem & Co.	522 0 0
E. Dees	495 0 0
Laurence & Thacker	460 0 0
Surveyor's estimate	479 0 0

Trinity Road (Section 2).

H. Bentham & Co.	1,724 0 0
Mowlem & Co.	1,478 0 0
Laurence & Thacker	1,381 0 0
E. Dees	1,377 0 0
S. Hudson	1,336 0 0
Surveyor's estimate	1,361 0 0

Queen's Road (Section 3).

H. Bentham & Co.	988 0 0
Mowlem & Co.	923 0 0
Laurence & Thacker	881 0 0
E. Dees	863 0 0
S. Hudson	831 0 0
Surveyor's estimate	810 0 0

WISBECH.

For erection of offices. Messrs. LANGFORD & WARD, architects, Wisbech. Quantities by architects.	
Elworthy & Son	£955 0 0
S. Hipwell	950 0 0
E. Girling & Co.	920 0 0
RAND & SON (modified), (accepted)	—

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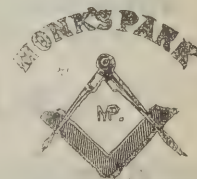


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WRITTLE.

For erection of a classroom at Highwood School.

F. Johnson	£256	0	0
H. Kennel	248	10	0
F. Moss, Whittle (<i>accepted</i>).	220	0	0
A. Woodward	215	10	0

WORKINGTON.

For additions and alterations to the Central Stores, Jane Street. Messrs. W. SCOTT & Co., architects, Victoria Buildings, Workington.

Accepted tenders.

J. Steel, joiner	£1,150	0	0
J. Murchie, mason	835	0	0
J. Lawson, plasterer	335	0	0
W. Strathern, plumber	209	0	0
W. Strathern, painter and glazier	193	0	0
L. Ferguson, slater	156	5	0
J. Taylor, ironfounder	146	1	0

Note.—Heating not yet let.

TRADE NOTES.

THE proprietors of Condy's Fluid notify us that they find it necessary to remove to more extensive premises at Condy's Fluid Works, 65 Goswell Road, London, E.C.

MESSRS. THOS. WALKER & Co., West Hartlepool, inform us that they have just now an exceptionally fine stock of seasoned woods, comprising Crown Austrian wainscot, Odessa oak planks and flooring, pitch pine, yellow pine, &c., strips for block flooring, wood-block flooring, dry, in oak, teak, pitch pine, and redwood.

MESSRS. EDGAR KEELING, TEALE & Co., of Clovelly Mansions, Gray's Inn Road, are sending cut a new illustrated list of their hammered ironwork, in which will be found an enormous variety of designs for electric light, gas, oil and candle fittings, finials, vanes, grilles and balustrades, shop signs and fittings, bell-pulls, fire implements and fittings, and ornamental items of all kinds. The firm make a specialty of art work for ecclesiastic and domestic purposes in silver, copper, brass and iron.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: ST. GABRIEL'S CHAPEL CRYPT.—THE WEST DOOR.

ROTHERHITHE TOWN HALL.

MINTERNE CHURCH: MEMORIAL WESTERN GALLERY TO THE LATE LORD DIGBY.—FRONT AND END OF LORD DIGBY'S PEW.—NEW SEAT AND ENDS.

BUILDING AND BUILDERS.

PLANS have been prepared for a handsome Gothic church to be erected in Savile Town, Dewsbury, and dedicated to St. Mary. It will take the place of the present mission church.

A CHANCEL is to be added to the church of All Saints, Grays, Essex, as a memorial to the late Mr. James Theobald, M.P., for the Romford Division. Mr. Theobald, who was lord of the manor of Grays, gave the site and built the present church.

THE parish church of Clarkston, after being closed for a considerable time for internal alterations and repairs, was reopened for public worship on the 10th inst. It has been resealed and floored, and the lighting arrangements have been greatly improved.

A PAINTER has just met with a terrible death at Blackburn. He was being hoisted up outside the tower of St. Paul's Church in a swing seat in order to paint the woodwork at the top, when the rope broke, and he was precipitated from a great height to the flagged pavement below, sustaining terrible injuries, from which he died a few hours afterwards at the infirmary.

MESSRS. SPENCE'S new premises now being erected on the old site, which gained considerable notoriety through Mr. Maskelyne's Jubilee speculation, have been designed by Messrs. Banister Fletcher & Sons, and will be architecturally a very great improvement on the buildings which they replace. They will consist of a basement, ground floor and four upper floors. The front, which is Elizabethan in style, will be faced with Portland stone, and the ground floor will contain four large bay shop windows. Five Ionic columns, with consoles over, crowned with groups of statuary representing the main features of the Queen's Jubilee (the centre piece being a statue

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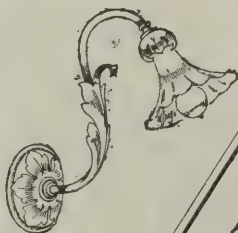
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LOUIS XVI.
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of Her Majesty), ornament the front. The basement will contain the packing-room, country order-room, a buyers' order-room and large and well-ventilated lavatories. The show-room on the ground floor will be constructed without any division walls, and the first floor will also contain large showrooms. The counting-house and offices will be placed on the second floor, and the third floor will contain dining-rooms for the staff and for the partners, and serving-room from the kitchen. On the fourth floor will be situated the housekeeper's accommodation, a large kitchen and scullery, bedrooms, lavatory, bathroom and water-closets. The construction will be fireproof throughout, the floors and partitions being of steel and concrete. The different floors will be approached by a handsome circular staircase formed in teak. The windows will be fitted with large plate-glass, and the rain-water will be collected into massive leaden heads of old English design. The roofs will be covered with green Westmoreland slates in graduated courses, and the ridge finished with ornamental lead and copper work.

GENERAL SIR REDVERS BULLER laid on Tuesday the foundation-stone of the new church of Emmanuel, St. Thomas, Exeter. The parish of Emmanuel was some years ago divided from that of St. Thomas, of which Sir Redvers Buller is the patron, and he has given the site for the new church. The building is to cost 9,000*l.*, is to be erected from designs by Mr. H. Brakspear, A.R.I.B.A., will be in the style of the sixteenth-century Gothic, and will provide accommodation for 600 persons.

ELECTRIC NOTES.

AN electric clock has been erected on the south-east side of Piccadilly Circus. It is beautifully designed and can be seen at any time of the day or night at a great distance. The illumination is very effective, electric light being carried along the moving hands, with fixed stars at each figure. It is stated that when adjusted the clock should go for years without attention.

A SPECIAL meeting of the Llandudno council was held to receive the report of the electric-lighting and refuse disposal committee. Mr. T. W. Griffith (ex-chairman) presided. Mr. T. T. Marks, in moving the adoption of the minutes, with reference to the tenders, &c., and also a recommendation that the council sanction proceeding with the work at once, said that

the total cost of the scheme amounted to about 1,300*l.* less than the committee estimated. The committee hoped to fulfil their promise to have the town lighted with electricity by next spring. The plan for lighting the town was then submitted, and the minutes were confirmed.

THE report on the electric lighting and power, water supply, &c., prepared by Mr. F. J. Warden-Stevens for the Guardians of Poplar, has been printed and circulated. This report shows that a great saving can be effected in such instances by combining the plant for the various purposes, while it also points out that the waste heat can be utilised. The committee who have the matter in hand are considering the adoption of the combined scheme as recommended by Mr. Warden-Stevens.

WE note that the directors of the Hanover Electric Tramways have decided as to the merits of the accumulator and overhead trolley systems. The decision, which is in favour of accumulators, is one of great importance, as the directors have had considerable experience with both forms on their lines. The accumulators have been charged *en route* in the suburbs to run the cars through the centre of the city. The cost of maintenance for 1896 was 14*4d.* per car mile, including cost of renewals, and it was found that the cost of accumulator working came out at only .0026 of a penny per car mile more than that of the overhead trolley. Taking everything into consideration, it has been decided to work the whole system with accumulators as soon as the change can be carried out.

A NEW electric-lighting station at Bradford was formally opened on the 8th inst. The building is situate in Valley Road, and the plant and premises have cost close on 40,000*l.*, whilst the capacity of production is 12,000 eight candle-power lamps. The new machinery consists of two six hundred imperial horse-power engines, two six hundred electrical horse-power dynamos, feed pumps, two boilers, condensing plant, switchboards, &c., and all of the latest and most improved type. The dynamos have an output of 750 amperes at 500 volts when running at a speed of 300 revolutions per minute. The steam boilers are cylindrical and single ended, 9 feet 9 inches in main diameter by 10 feet 6 inches in length. The new switchboards consist of ten slate panels, 1 foot 6 inches by 6 feet 4 inches long by 1½ inches thick, and two slate panels 4 feet wide by 6 feet 4 inches long by 1½ inches thick. The volt-meter switchboard consists of three slate bases fitted together in a cast-iron frame, and is fitted with Lord Kelvin's

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electrostatic volt-meters. Mr. J. L. Morley, Bradford, has supplied the condensing plant, which includes air and circulating pumps. The new machinery has cost 10,325 $\frac{1}{2}$ l.

HAMMERSMITH is to be congratulated on the possession of a scheme of electric lighting at once efficient and economical. Under the supervision of Mr. A. H. Preece, a generating station has been erected in Fulham Palace Road, from which electricity is distributed under the high-pressure alternating current system, whereby the supply is generated at a pressure of 2,000 volts, and consumers are served from low-pressure mains of 110 volts from underground sub-stations. All told, there are four main circuits, arranged so as to meet the wants of the Broadway, King Street, Goldhawk Road and Uxbridge Road districts, and the "compulsory" area alone is a very extensive one. For the purpose of the street lighting arc lamps have been employed, each fixed 20 feet from the ground, and giving about 1,200 candle-power. On each post, however, there are two glow lamps of 32 candle-power. Between sunset and midnight the streets are lighted by the arc lamps, giving a light equal to 1,200 candle-power. After that hour the glow lamps are used. Private consumers, of whom there are forty, using an electrical equivalent of 4,000, are encouraged to adopt the new light by a scale of charges which at Brighton is said to have shown a saving on the price of gas when lamps are used for a certain number of hours. Sixpence a unit is charged for the first two hours, and fourpence a unit for succeeding hours, a unit of electricity being equal to the light of a gas-burner consuming 120 cubic feet of gas. The alternative scale is that of the Board of Trade—2 $\frac{1}{2}$ d. per unit, with a fixed charge of 1s. 3d. per quarter for every 8 candle-power lamp. The cost of the installation has been 40,000 $\frac{1}{2}$ l., and between 8,000 and 9,000 lamps must be in use before a profit can be made.

VARIETIES.

THE new church of St. Gabriel, Willesden Green, was consecrated on the 8th inst.

A NEW Board school has been erected in Kennington Road for the accommodation of over 700 children, at a cost of 31,000 $\frac{1}{2}$ l.

A NEW Unitarian church was opened at Northampton on the 7th inst.

A CHURCH bell has been cast at Zehlendorf, near Berlin, to the order of the Evangelical community at Paarl, Cape Colony. The bell is to commemorate the Queen's Jubilee.

HAWES INN, South Queensferry, made famous by Sir Walter Scott in "The Antiquary," was attacked by fire on Tuesday night. Owing to the efforts of the Edinburgh fire brigade the damage was confined to stores and outhouses.

THE Girls' County School at Bangor, having been rebuilt at an expenditure of 2,320 $\frac{1}{2}$ l. from the designs of Mr. J. R. Phillips, of Cardiff, were formally opened on Saturday, the 9th inst. They now provide accommodation for 100 girls and are thoroughly up-to-date in all particulars.

THE Carlisle City Council have adopted the scheme for obtaining a water-supply for the city from Geltsdale, to replace the Eden supply, which is condemned. The scheme will cost 120,000 $\frac{1}{2}$ l., and Parliamentary powers are to be sought during the ensuing session.

THE opening of new union offices at Leigh, Lancs., took place recently. The new buildings have been erected owing to the want of additional accommodation consequent upon the increase of members under the Local Government Act 1894, and a subsequent order of the Lancashire County Council. The cost of the extensions, which comprise spacious offices, board-room, tramp wards and laundry is about 12,000 $\frac{1}{2}$ l.

AT the last meeting of Linlithgow Town Council the provost read a letter from Mr. Ferguson, town clerk, stating that had he been present he would have intimated to the Council that it was his intention soon after the ensuing municipal election to resign the office of town clerk, which he had had the honour of holding for nearly thirteen years. His retirement was caused by the state of his health.

THE date of the formal opening of the new meat market and slaughter-houses in Bradford Street, Birmingham, has been definitely fixed for Wednesday, the 27th inst. The ceremony will be performed by the Lord Mayor, and in the evening the members of the City Council, the chief officials and representatives of the meat trade will be entertained to dinner at the Grand Hotel by Councillor Parkes, M.P., the chairman of the markets and fairs committee.

SMOKY CHIMNEYS

"EMPRESS" SMOKE CURE.

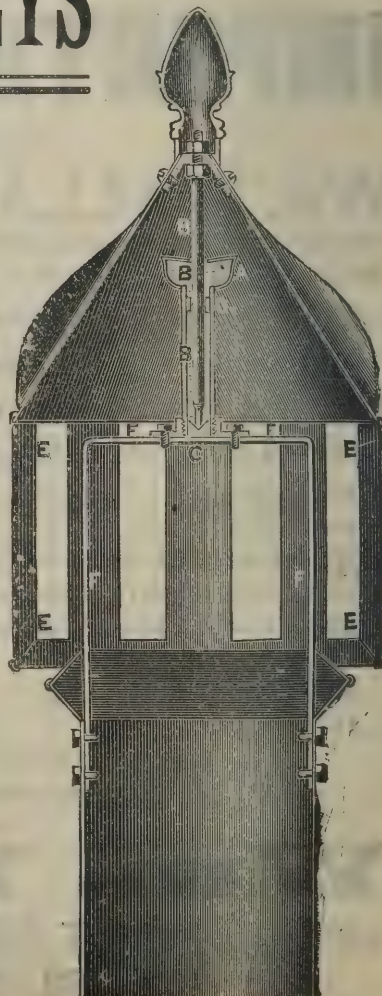
The "Empress" Smoke Cure has held its ground with constantly increasing sales for many years, and is now widely recognised as the best chimney-pot. The chimney which the "Empress" will not cure may be considered hopeless so far as any outside treatment goes. It must be reconstructed or the fireplace altered. At least 90 per cent. of smoky chimneys on which "Empress" is fixed are Cured.

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At a meeting of the stewards of the freemen of Newcastle, at the close of the Michaelmas Guild, it was decided by a large majority to grant a site for the new infirmary which Mrs. Hall proposes to build on the Leazes. It was also resolved that the site should be an absolute gift as far as the freemen's interest in it is concerned. The freehold of the Leazes and other parts of the town moor belongs to the Corporation, but the freemen own pasturage rights which give them an effective share in the control or disposal of the land.

THE magistrate sitting at Southwark Police Court had before him a claim by a district surveyor against Patrick & Son, builders, for over 23/., charges for inspecting and superintending the erection of Jubilee stands. The complainant admitted that he saw nothing of the work except from the street, but still he said he was entitled to his fees. The defence was that the stands were not "structures" within the meaning of the Act, and that the surveyor was not entitled to do his work by deputy. The case was adjourned.

THE Lord Mayor of Sheffield (the Duke of Norfolk) on the 7th inst. formally opened a block of cottages which the Guardians of the Sheffield Union have had erected for the accommodation of aged poor. The homes are part of the Guardians' scheme for the classification of the recipients of relief, by which the deserving are treated better than the undeserving. They consist of an administrative block in the centre, which will be occupied by a man and his wife as officers, and four one-storey cottages with a single room on either side of this block. Each room is for the accommodation of either an aged married couple, two old men, or two old women.

WE understand that Messrs. Douglas Young & Co., of Coleman Street, have disposed of the historic manses and grounds known as Gildea Hall, Romford, which formed one of the assets of the late Liberator Building Society. This, together with Chingford and Tilbury, disposes of three out of five estates offered to auction in July last. The remaining estates at Clapham and Norbury are now under negotiation, and it is thought that further sales will be announced in a few days. The total realised for the three estates is 135,000/.

THE new bridge which has been erected at Talycafn, in the Vale of Conway, to replace the ancient ferry, and the construction of which has occupied nearly two years, was formally declared open on Saturday, the 9th inst. It is a substantial structure, which, if not very artistic, will prove an immense boon to foot and vehicular traffic. The length of the bridge

between the abutments is 353 feet. The centre span has a width of 150 feet, and a clear minimum headway of 18 feet at high water, while there is a span over the public road (Carnarvon side) of 20 feet; the total length of the three approved roads and the bridge is 1,370 feet. Messrs. Dawson & Fyson, Victoria Street, London, were the engineers, their resident representative being Mr. H. F. Richards.

EARLY on Monday morning it was discovered that the Rye Lane, Peckham, railway station of the London, Brighton and South Coast Railway Company had taken fire. Through a light being carelessly thrown down the up main line platform had caught fire, and over 30 yards of the platform were blazing when the firemen arrived. For a time the fire presented a very serious aspect, but the firemen scaled the roofs of the adjoining buildings, and poured such continuous streams of water on to the blazing mass that it became obvious, in the course of an hour, that the waiting-rooms and general offices of the Brighton Company, as well as those of the London, Chatham and Dover Company, which also runs into the Peckham Rye station, would be saved. About 100 feet of the main line up platform, however, was destroyed. The fire did not interfere with the ordinary traffic.

THE scheme which is about to be carried out for the water supply of Bedworth is the constant supply system, and the well that has been sunk by the parish will be utilised; the supply having been proved, after continuous testing, satisfactory, and the quality good, after careful analysis. A dry well of iron cylinders will be constructed adjacent to the present well, from which the supply will be drawn, and over this will be a water tower carrying a tank of 60,000 gallons capacity. This tank will be erected about 100 feet from the ground, and will give at all times adequate pressure over the town. The daily requirements of the population are estimated at 85,000 gallons. This allows 15 gallons per head for a population of 5,500; and the yield of the well has been found to be as much as 210,000 gallons in twenty-four hours.

THE foundation-stone of the free library to be presented to the town of Stalybridge by Mr. J. F. Cheetham at a cost of 6,000/., was laid on Saturday afternoon by Mrs. Astley-Cheetham. Mr. Medland Taylor, of Manchester, is the architect of the library, and Mr. H. Tanner has prepared the design for the post-office, a similar treatment for both buildings being adopted. The elevations show a handsome block of buildings, Jacobean in style, with big mullioned windows and bold cornices.

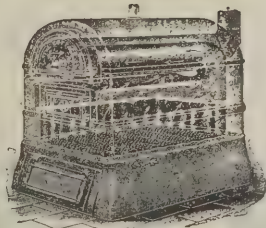
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The work will be carried out in stone, with some red brick introduced in the chimneys and in the plain wall surfaces. To Trinity Street there is a frontage for the two buildings of about 130 feet, two-thirds of which is occupied by the library. This façade is broken up by boldly projecting and gabled bays. There are upper floors to both library and post-office along Trinity Street front, that of the library being mainly occupied by a lecture-hall, which extends nearly the whole length of the building. The other principal rooms of the library are a large newsroom, a reference library, a lending library, and boys' and ladies' reading-rooms. A central hall gives access to all these rooms, which are ranged round it, divided off by glazed partitions. The reference library will be furnished and treated as a comfortable private reading-room. It has two large bays and an angle nook, in which there will be an open fireplace. Active building operations will probably be commenced early in the new year.

THE "Paris Charity Bazaar Fire and its Lessons" is the subject of the paper to be read by Mr. Edwin O. Sachs before the Architectural Association on Friday, October 22. The paper will deal not only with technical facts regarding the construction of the fatal building and include particulars of the fire, but will be fully illustrated by views of the structure taken before and after the conflagration, copies of the contractor's drawings and other details which Mr. Sachs has brought over from France. The policy of the architect in generally trying to oppose or avoid regulations governing buildings will be dealt with, and the policy of the architect in saving his clients a few pounds and thereby incurring a moral responsibility of much of the annual loss of life will also be treated of. Among those who have been invited by the Association to attend the meeting with a view of participating in the discussion of the subject are Mr. Thomas Blasbill, the architect to the London County Council; Mr. Roberts, of the London County Council theatres committee; Mr. William Archer, the critic, as representing the public; and several of the leading fire-brigade officers.

THE plans for the extension of the Middlesex Hospital for the development of the medical school provide for the pulling down of part of the buildings on the west face of the garden, but the museum will remain as a lecture theatre. The new block will contain two wings set at right angles, and facing respectively the hospital garden and Union Street. The latter site, with a frontage of some 80 feet, has been acquired for the purpose of the school extension. The new garden block will contain a complete chemical department, with laboratories and lecturers' room, while on the upper floor will be the pathological

department. The basement and ground floor of the new Union Street block will be occupied by the physical laboratory and a physiological department. The upper floor will be utilised for a dissecting-room and anatomical classroom. It is expected that the new buildings will be completed and ready for use early next year.

At the last monthly meeting of the Helensburgh Town Council, Provost Anderson referred to the fact of Mr. Maclachan having just completed his jubilee as clerk to the Board, and said it was only in deference to Mr. Maclachan's wishes that the event had not been marked by a tangible token of the appreciation in which he was held by the Council and the entire community. The Provost concluded by offering the warmest congratulations to Mr. Maclachan, and it was the heartfelt hope of all that he would be spared for many years to serve the Council. Ex-Provost Breingan said he did not think there was any town clerk in Scotland who had served under so many provosts without offending any one of them. Nobody was more delighted than he was to see Mr. Maclachan enjoying such good health. It was remitted to the Provost to prepare an appreciative minute in recognition of Mr. Maclachan's services.

THE Chiswick Urban District Council has shown a good example to other districts by the adoption of a steam dustcart. The carts, which have a capacity of six cubic yards, are built on the familiar tip-waggon model. They can carry a weight of four tons. The weight of a car unloaded is three tons. The cars are driven by steam. The engine can run up to 400 revolutions a minute, and can be thrown in and out of gear without shock by means of a special clutch. This is, of course, very convenient when constant stoppages have to be made. A run of five or six hours can be made without taking in water. During a working day of ten hours collecting dust and taking it to the tip, about two hundredweights of steam coal are consumed. On an average eighteen cubic yards of refuse are collected and tipped in the day. One man drives and steers. The Chiswick authorities estimate a saving of 250% a year on each steam waggon over the old system of collecting.

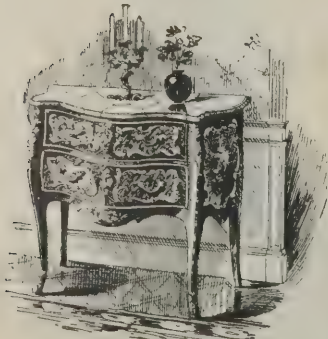
THE "University Hall for Women Students" at Bangor was recently opened by Miss Helen Gladstone. It is in the Queen Anne style, and consists of a basement and four storeys, the main block being flanked at either end by a wing placed at right angles. Through the building there runs a main corridor with staircases at either end. The principal rooms on the ground floor are the dining-hall, drawing-room, two common studies, housekeeper's room and offices, cloakrooms, dormitories,

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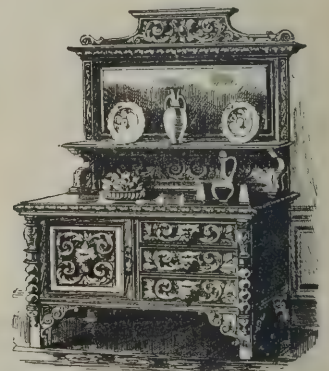
LOUIS XV. COMMODE, fitted with 2 drawers, with marble top, beautifully inlaid, and mounted with chased ormolu, £4 10s.

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kitchens, &c. On the first floor are fine students' double study, bedrooms—six single, and cubicle accommodation for nine. On this floor also is the lady principal's suite of rooms, with heated linen-rooms; bathrooms, &c. The second floor is practically a replica of the first floor, except that here is provided an isolated sick-room, with hospital bath for use adjoining. In the attic are servants' quarters, with box and store-rooms. There is accommodation for fifty students. A feature in the internal arrangements is the faience fireplaces throughout, from the special designs of the architect, and made, together with all the brick and terra-cotta work, by Mr. J. C. Edwards, of Ruabon. The grounds contain two large tennis courts and a croquet green. The cost of the structural portion of the buildings is 5,000*l.*, an additional 200*l.* having been expended on the grounds.

THE ancient church of St. Alkmund, Shrewsbury, has been reopened after undergoing partial restoration, the object of which was to render the inside of the building more churchlike and dignified. The work just executed has been the removal of the west gallery (which on examination proved to be absolutely rotten and unsafe), the lowering and reconstruction of the seating to a more convenient form, putting concrete and solid wood-block floors under same in place of the old boarded floors which were found to be in a bad state of dry rot; the formation of a chancel by throwing out a projection in the nave, in which are placed oak stalls for the clergy and choir; and the erection of oak screens for forming vestries and organ-chamber. The organ, which formerly stood in the west gallery, is now placed in the chancel. The new chancel floor is paved with blue stone in squares, the sacarium with polished coloured marbles, and a beautiful oak-traceried pulpit is placed against the north screen. One of the nave windows has been filled in with stone tracery and cathedral glass, and it is proposed later to fill in the other windows in a similar manner, though with some variety in detail.

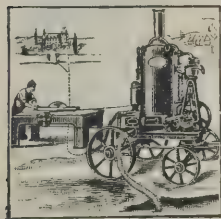
A HANDSOME and commodious building has been erected in the Minories to replace the Seething Lane Police Station, the accommodation in which has for a considerable time past been found inadequate. Situated at the corner of Goodman's Yard and the Minories it has a considerable frontage in both streets, and especially in Goodman's Yard. It is a red brick building, with the principal entrance at the corner of the two streets, the rounded corner being surmounted by a turret. On the ground-floor are the charge-room, the inspector's room and

the muster-room, and opening out of the latter is an apartment for the use of the detectives. Seven cells are provided, cased with white glazed brick, and lighted directly from the inner courtyard, instead of, as is usually the case, deriving their light from a passage. These cells are all heated and ventilated upon the most approved principles. In the basement are the mess-room and a large kitchen, together with the necessary offices and the coat and helmet-room. The ground floor contains, in addition to the official rooms mentioned above, a reading-room and a large recreation-room. The sleeping accommodation is excellent; every man will have his own cubicle, a little apartment 9 by 6 feet, each of which has its own window and a cupboard in which clothes can be kept. There are three floors of these cubicles, and on each landing there is abundant lavatory accommodation, with a bath-room. In all some sixty-five constables and sergeants can be accommodated at this station, in addition to a housekeeper. The building has been constructed from plans prepared by Mr. A. Murray, the City surveyor, and the work has been carried out under the personal superintendence of Mr. T. R. W. Mossman, of the City surveyor's office.

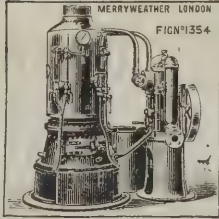
CEMENT PAVING TILES.

MR. F. S. BALESTRA, of the firm of Cosenza & Co., is now showing at 95 Wigmore Street a selection of artistic paving tiles, which are well worthy of the inspection of architects and others interested in such matters. These tiles, which are of admirable colour and design, are manufactured by a new patent process from hydraulically pressed Portland cement, and the advantages they offer are at once numerous and obvious. They join perfectly, and give a fine, perfectly smooth, but unpolished surface, and consequently an excellent foothold. They are quite impervious to moisture, and so hard that the surface will not pulverize with any amount of wear. Any design can easily be made to order, but the patterns in stock offer a wide selection, comprising as they do classical and geometrical designs of all colourings and sizes. They are easily kept clean, and as the pattern and colour, instead of being superficial, goes through the tile, the pavement cannot wear shabby. They will be found especially suitable for churches, schools, hospitals, halls, conservatories, courtyards, &c.; while for stables Mr. Balestra is showing grooved and corrugated tiles admirably adapted to the purpose, but devoid of the novelty which pertains to the ornamental section of the exhibition.

MERRYWEATHER on WATER SUPPLY TO COUNTRY MANSIONS, &c.



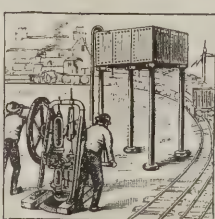
"Estate" Steam Pumping and Driving Engine.



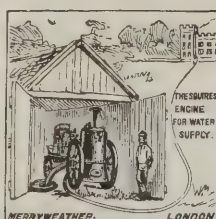
Light Pumping Engine and Boiler.



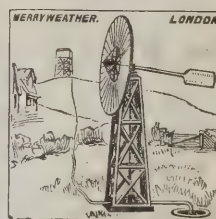
Water Wheel Pumps.



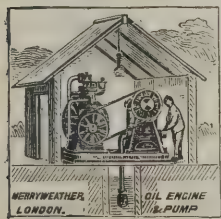
"India" Pattern Pumping Engine.



"Squire" Portable Fire Engine.



Windmill Pump.



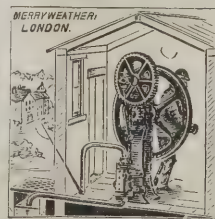
Oil Engine and Pump.



Estate Manual Force Pump.



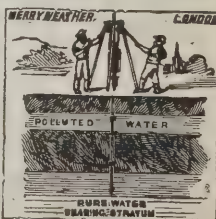
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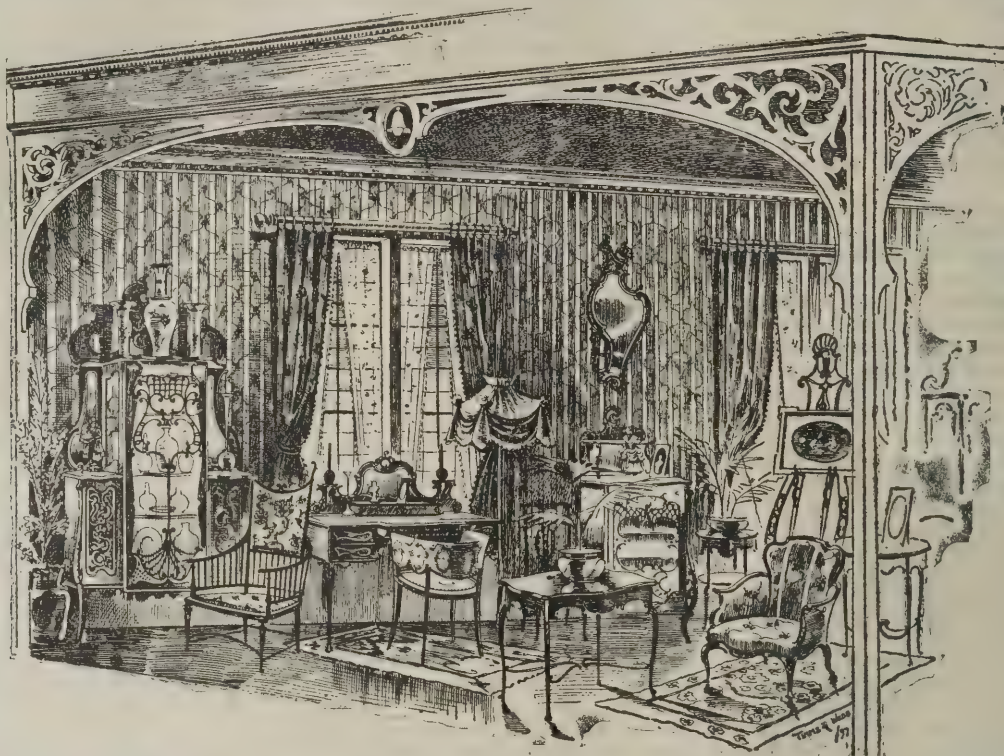
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AMONG all the sights at that very interesting exhibition which is now open—though it will soon be closed—at Earl's Court very few excite more curiosity and wonder than that part which is called "Old London," or by some persons "Antique England." Here may be seen several different kinds of shops,

Furniture Shoppe," and herein is to be found a very beautiful and most interesting display of furniture from the factories of the great firm whose title heads this article.

The furniture which Messrs. Wallace, of 151-155 Curtain Road, London, are exhibiting is of course very largely such as dwellers in "Old London" would have used, or rather did use, the object of the exhibitors having apparently been to show the



all with old-time signs and lettering, and some with prehistoric lanterns swinging over the signboard.

Of these reproductions of the establishments in which our ancestors carried on their business one is called "Ye Olde

public what old-time furniture was, just as the promoters of the exhibition have shown them old-time houses. If so, that object has been most successfully achieved, for a more representative and interesting display it would not be easy to find.

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SPECIAL ATTENTION GIVEN TO ARCHITECTS' DESIGNS

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Yet not all of the exhibits were strictly of the old fashion, for there were one or two modern items therein contained, presumably to show the styles in contrast and juxtaposition, or perhaps the artistic result which would be secured by a tasteful blending of the two. But of the exhibits of Messrs. Wallace we had better speak in some detail, although it would be quite impossible even to enumerate them—to say nothing of describing them or dilating on their special features—in the limited space at our command.

The furniture is set out in a suite of rooms, and in the first of these is a cabinet quite in the antique style. It is in stained mahogany, and has a carved panel, while the shelves at the sides, as well as the top, carry some elegant vases of Della Robbia ware. Then there is a writing table in the same wood, and with carved back and plush-covered top. This is not strictly antique, but it is a very pretty table, and made a good contrast to its more old-fashioned surroundings.

A card table on the old lines stood open, with its cloth-covered top and sunk bowls for the money of the players. This top of course folds and revolves. In the same rooms were two very comfortable-looking easy-chairs which were entirely covered in tapestry, and some smaller chairs with tapestry seats. In this room, too, is to be seen a very beautiful antique cabinet in stained mahogany. The centre of this throughout and the lower part generally is enclosed, and the doors are glazed with small panes, which, being convex, have a very curious and striking effect. Near to this is a very pretty smaller cabinet.

A very remarkable music and book stand is on a square table or lower part, and the upper part, which is also square, can be either kept in that position or revolved in any direction. This is a very handsome and withal very useful article of furniture. Close to this is a fine cabinet with circular corners, all enclosed and lined with rich plush. It stands on a plinth, and thus has a solid and substantial bearing—a great desideratum where frail and valuable china is set out. Hereabouts also is a more old-fashioned show cabinet, intended—as is implied in its title—to contain and show china or other ornaments. Close to this there is a pretty little stand for holding flower-pots or other decorative articles, while ensconced in one corner is a corner cabinet which is quite in the old style. In this room there are also a settee with carved back and arms, and an arm-chair and single chairs, all *en suite*, in striped tapestry.

Then comes the dining-room, which is in oak. There is an

imposing sideboard with looking-glass back and the lower part enclosed. This sideboard is a very fine piece of work indeed, solid, substantial and handsome. The chairs and arm-chairs are *en suite* and covered in scarlet morocco.

Next to this dining-room is a dressing-room, the furniture of which is ash stained dark green, a curious and yet not unpleasing arrangement. There is a quaintly designed dressing table with dressing glass on top, this being not in the centre, but at one end, thus leaving space for a cabinet to contain toilet requisites. This room also contains a very elegant wardrobe and cabinet combined, which with a large plate-glass door had a very fine appearance.

Of the bedroom furniture it is not possible to speak at any length, for it is all most interesting and beautiful. A splendid winged wardrobe, each wing with bevelled looking-glass panel and the centre with finely-carved panel has a very good effect. Then there are a dressing table and washstand *en suite*, the latter having a tiled back and marble top, and a pedestal dressing table in which brass handles to the drawers make a good contrast to the dark wood. In this room, too, is a fine brass bedstead with handsome hangings in printed velvet.

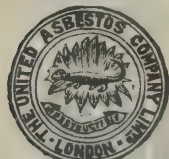
In a smaller bedroom is a single wardrobe, one side of which has a bevelled glass door and the other a shorter wardrobe over two drawers. This is a very strikingly designed and very handsome article of furniture. There are also a fine washstand and dressing table to match, each being on the well-known cabriole legs in the old French style.

Of the chairs generally it should be said that, while most of them were in morocco or tapestry, some had the old English rush seats with a depression in the centre. These chairs are very comfortable, while the seats can be washed as often as required without fear of injury.

Here, however, our observations on the exhibits of Messrs. Wallace & Co., Curtain Road, London, at the Earl's Court exhibition must perforce be concluded. It only remains to be said that the display is one of the fullest and finest which it would be possible to arrange. For novelty, beauty, workmanship and high finish it could hardly be matched—most certainly not surpassed.

THE new workhouse infirmary, Newton Abbot, is being warmed and ventilated throughout by means of Shorland's patent Manchester stoves, with descending smoke-flues, by Messrs. E. H. Shorland & Brother, of Manchester.

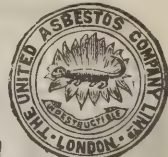
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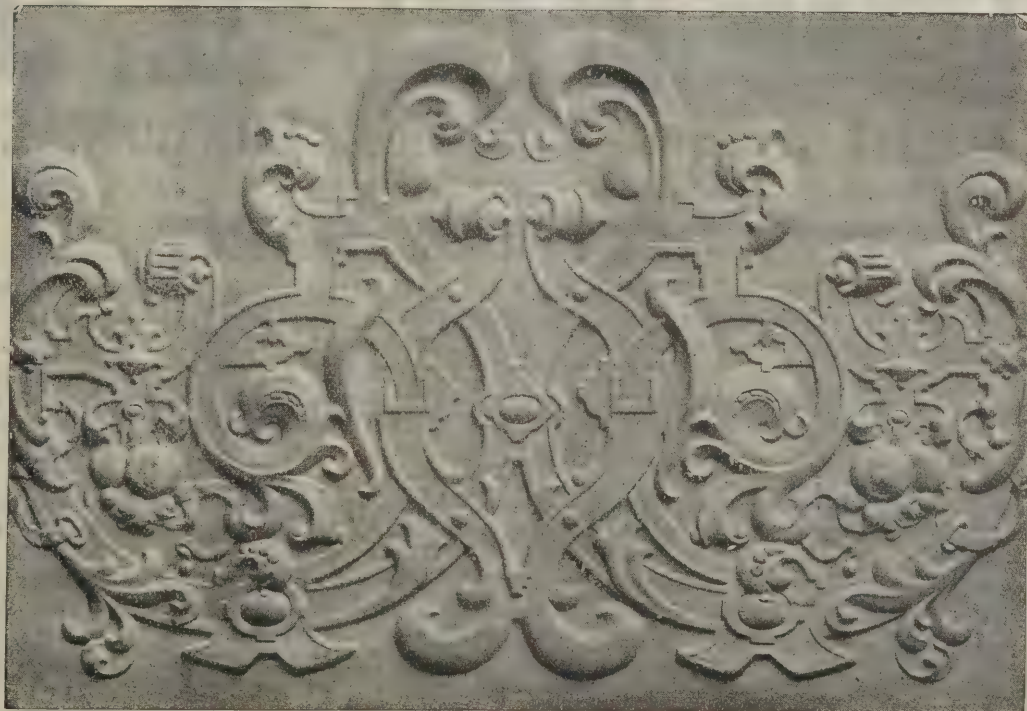
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A RUSSIAN CANAL.

A DEEP and long canal is to be built by Russia, to connect the Baltic with the Black Sea. This canal, as projected, is to connect Riga, on the Baltic, with Cherson, on the Dnieper, near the Black Sea. It is to be 1,000 miles long, 213 feet wide at the surface and 115 feet at the base, with a depth of 28 feet. According to a recent report of the United States Consul at Chemnitz, it is to carry the largest battleships of the world. From Riga the canal is to run into the River Dvina, thence by canals from Dvinaburg to Lapel, through the Beresina and Dnieper to Cherson. It is further projected to cover all the river regions with such a network of canals as will aid very materially in developing the whole surrounding country. Ships that went hitherto by way of the Atlantic, Mediterranean, and Sea of Marmora, taking more than twelve days, will now need less than six. Basins and harbours are to be built at all important points along the canal. Traffic is to be carried on day and night at a possible and permitted speed of about seven miles an hour. The cost of the canal is put down at about 20,000,000*l.* sterling, but it is anticipated that it will cost a great deal more than this. It is to be ready for traffic in five years.

SOCIETY OF ENGINEERS.

At a meeting of the Society of Engineers, held at the Royal United Service Institution, Whitehall, on Monday evening, October 4, 1897, Mr. G. Maxwell Lawford, president, in the chair, a paper was read by Mr. James Croll, entitled "Filter Presses for Sewage Sludge."

The author first referred to the filter press as being the most commonly adopted method for reducing the moisture contained in sewage precipitation works. The press is constructed of a number of iron plates with drainage surfaces, and with slight modifications it can be applied to a variety of purposes. When first used for the treatment of sewage sludge it was found that the feed passages occasionally became blocked, causing the destruction of the plates by the excessive pressure on one side only. To remedy this defect special plates are now made.

There are two methods of introducing the sludge into the machine:—(1) The direct forcing system, consisting of pumping the sludge direct into the press by means of hydraulic forcing engines, (2) the pneumatic or air-pressure system, consisting of running the sludge into a vessel provided with a dip pipe,

and applying compressed air to the top of the sludge, thus forcing it up into the press. The air pressure generally used is about 100 lbs. per square inch. The addition of a small quantity of lime to the sludge facilitates the solidifying process, but hard cake can be produced without the aid of lime if sufficient time be given for pressing.

The author described the filter pressing machinery at the works of the Richmond Main Sewerage Board. This consists of six filter presses and appliances for the direct-forcing and the air-pressure systems. The advantages and disadvantages of the different processes were discussed, together with trials of the various filtering materials, lime, &c. Tables were given showing comparative work with the direct and pneumatic systems, also details of quantity of sludge cake produced in the district of the Richmond Main Board, with the cost per ton of producing pressed cake including all expenses. This comes out at 1*od.* for labour, 9*d.* for lime, 4*d.* for cloths, 3*d.* for coal, oil, &c., giving a total of 2*s.* 2*d.* per ton.

THE MANCHESTER SEWAGE CULVERT.

THE rivers committee of the Manchester Corporation are taking action in anticipation of their proposals with regard to the sewage culvert being approved by the ratepayers. The city surveyor has been instructed to prepare detailed plans and surveys of the scheme. The town clerk has been instructed to retain the following engineers to give evidence before a parliamentary committee in favour of the Bill if the necessary sanctions under the Borough Funds Act are given, viz. Sir Benjamin Baker, Mr. James Mansergh, Mr. Santo Crimp and Mr. Baldwin Lathom, and a sub-committee consisting of Aldermen Thompson and M'Dougall, Councillors Saxon, Bradley, Dreyfus and Grimshaw have been appointed to retain chemical evidence. With regard to the suggestion that Salford and Eccles should join with Manchester in the proposed culvert, arrangements have been made to receive deputations from any district authorities who care to send them. There are, however, difficulties in the way which are likely to prevent any combination of this kind. Owing to the different methods of chemical precipitation the aggregate effluent might not, it is said, be such as would be satisfactory. The only way out of this difficulty, if it be one, is to chemically treat the sewage from all these places at one centre.

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It is non-poisonous and innocuous, and can be used without fear of paint colic.

The saving in time, labour and material by using this paint is enormous. A Builder, for instance, instead of using three or more coats of ordinary paint, coupled with a coat of varnish, and waiting a considerable time between each for it to dry, and paying labour for each, can with a much smaller quantity of "The Pittman Paint" accomplish all he needs. He can paint a house in the morning and it can be moved into in the afternoon with impunity. Moreover, the paint will not require renewal for a great length of time.

Canvas, Linen, Muslin, Calico, Paper, even Tissue Paper, will become waterproof when the paint is applied; in fact it will **Waterproof anything and everything from a Stone Wall or Iron Girder down to Tissue Paper.**

There is no unpleasant smell attached to it, and it can be scented with any perfume desired by the user.

For the Ironwork of Railway Stations, Girders, Pillars, Machinery, Safes, &c., it will be found invaluable, lasting for years, without the necessity of renewal, and preventing all rust or oxidation.

It is useful for Baths and Tin Work, Stoves and Mantel Pieces, for Metal Advertisement Plates, and in cases where enamel is now used.

It does not sink into the material.

A quick-drying and brilliant paint, too, for Bedsteads, Bicycles and Fancy Metal Articles requiring a fine polish. Carriage Builders will find a wonderful saving in using it.

It is non-corrosive and can be applied to ships and shipbuilding purposes.

ANY FURTHER PARTICULARS AND PRICES ON APPLICATION

THE OLD DEER PARK, RICHMOND.

THE Old Park first cited in a survey of the manor, 21st Edward I., includes the grounds of the Sheen Palace, reinstated by Henry V. and rebuilt by Henry VII., whose successor bestowed it in dower on Anne of Cleves after her divorce. In a survey of 1640, its extent is given as 349 acres; these, with the manor, were settled on Queen Henrietta Maria in 1627. In 1707 Queen Anne demised the lodge for a term of ninety-nine years to James, Duke of Ormonde, who rebuilt the house, which on his attainder was bought, under an Act of 1721 in that behalf, by his brother the Earl of Arran, who sold it to the Prince of Wales (George II.). The lodge was then assigned to Queen Caroline, who had a dairy and menagerie in the park, and employed Rysbrack to make busts of English kings and queens for the Merlin's Cave, and Stephen Duck as her librarian. The gardens were first planted by Bridgman and then altered by "Capability" Brown. The lodge, whose site is marked in Rocque's plan of 1748 and his survey of 1762, was pulled down circa 1770; close by was erected, 1768-69, after Sir William Chambers's designs, the Observatory, latterly used by the British Association for the Advancement of Science. Chambers laid out the old Kew Palace gardens and designed various buildings, including the Pagoda, Mosque, Temple of Æolus, Temple of Victory (Minden), and the "Ruins," which he has described and illustrated. In 1785 an Act was passed enabling the king to close Love Lane and so unite Kew Gardens and the Old Deer Park into one. Sir Jeffry Wyatville built the Doric Temple, or "Pantheon," for William IV. The Queen presented the collection of mechanical models and philosophical instruments formed by George III. at the Observatory to King's College, London.

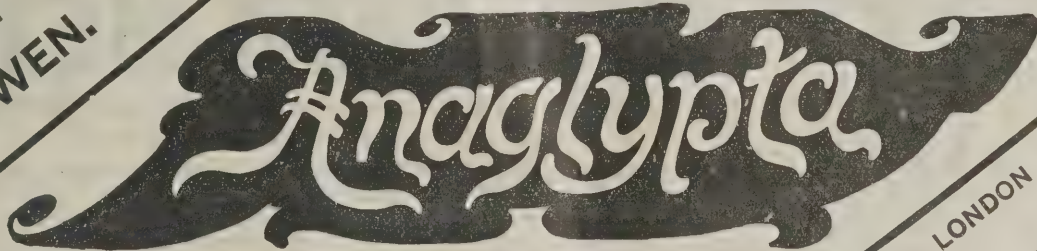
THE STUDLEY CASTLE ESTATE.

A FEW months ago Mr. J. R. Twentyman purchased the Studley Castle estate with the intention of living upon it, but business engagements have made it impossible for him to do so, and, as he is about to depart for China, he decided to resell the property rather than go to the expense of keeping it in order during his absence. It was offered in thirty different lots at Birmingham. The auctioneer said that prior to 1830 Sir Francis Goodrich spent an immense sum of money in making the estate one of the most valuable agricultural properties in

the county. He laid it out with a special view of making it a sporting estate. About 1833 Sir Francis commenced to build the castle, which, when completed, cost upwards of 125,000*l.* In 1864 his successor parted with the property to the late owner, Mr. T. E. Walker. The area then was 2,662 acres, and the purchase money 145,000*l.* exclusive of timber. Mr. Walker spent 30,000*l.* in improvements, making it of the value of 66*l.* an acre, exclusive of timber. Between 1864 and 1880 additional purchases were made, bringing up the estate to 3,750 acres. In 1893 100,000*l.* was offered for the lot, exclusive of timber. The total amount realised by the sale on the 7th inst. was 46,643*l.* The castle, standing in a finely-timbered park of nearly 270 acres, and containing in all an area of about 339 acres, and including valuable fixtures, was started at 5,000*l.* It was announced that a lady living in the Isle of Wight had offered to take it on a lease if it was not sold. The timber to be taken to was valued at 4,900*l.*, and, besides, there was a land tax of 11*l.* 3*s.* 3*d.* per annum. Mr. J. Green, Manor House, Studley, was the purchaser at 7,550*l.* Next the Home Farm, with a capital private residence attached and modern farm buildings, and having a total area of 328 acres, and with a rental of 901*l.*, was offered. The timber valuation was 961*l.*, and the land tax 7*l.* 6*s.* 8*d.* This was sold for 6,050*l.* The other lots were disposed of at reasonable prices, averaging twenty years' purchase of rental.

THE pile of buildings erected at Leicester for the purposes of technical and art schools were opened recently by the Bishop of London. The buildings, which cost 40,000*l.*, are erected on a site of 6,000 square yards in a central position in the Newarks, near the historic castle of Simon de Montfort. Two of the floors are devoted to technical instruction in hosiery, boot and shoe, engineering, dyeing and plumbing industries, while a building in the rear provides accommodation for instruction in dressmaking, &c. The hosiery and boot and shoe departments have been fully equipped with all the various kinds of machinery. The two upper floors, which comprise the school of art, have been furnished in the most complete manner. The local efforts have been supported by the authorities of South Kensington, while the art authorities of the French Republic have provided a number of large casts, screens, figures, &c., on the same terms as they are supplied to schools of art in France.

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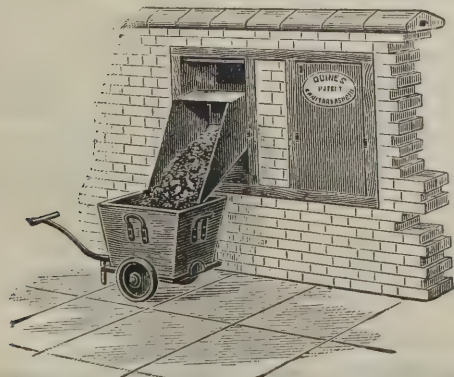
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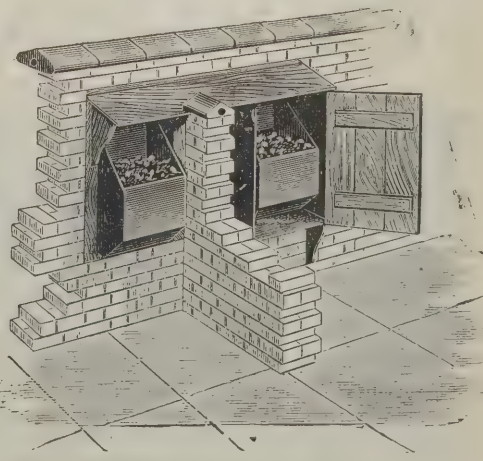
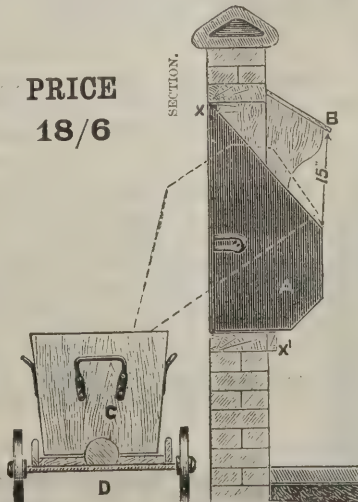
THE BRONZE MEDAL, SANITARY INSTITUTE, 1897.

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THE LIVERPOOL DOCKS.

THE announcement made a few days ago that the Mersey Docks and Harbour Board are contemplating the adoption of a project of the highest importance in connection with the development of the dock system of Liverpool has caused a flutter of expectation, says the *Liverpool Courier*, in local shipping and commercial circles. The magnitude of the undertaking may be guessed from the fact that it is proposed to spend no less a sum than four millions sterling in carrying it into effect. It is intended to disburse the whole of the money on the Liverpool side of the river. Some people—shipowners especially—may contend that the Cheshire side is better adapted to the demands of modern shipping, and doubtless a great deal may be advanced in favour of that view. But the plain fact remains that the Dock Board have not the smallest intention of moving in that direction. They believe that their money would be more judiciously spent in utilising and adapting the existing Liverpool docks to present-day necessities, rather than in launching into new schemes in the locality of Tranmere.

At least half a dozen different plans have for some time past been under the careful consideration of the works committee of the Board. Generally these have involved the deepening of certain old docks, the widening of dock entrances, the increase of quay space, and other adaptations all calculated to alleviate the necessities of trade at the Liverpool docks. It may incidentally be pointed out that the members of the Board view the increasing tendency to build larger vessels as wholly favourable to the port. The major portion of the money is to be expended upon the alteration and improvement of the southern and still more of the central docks. In many instances these are quite old-fashioned and totally out of date, but they are to be so changed as to bring them into line with the most modern docks in the possession of the Board. A number of improvements are to be effected at the North End, but these are by no means of so sweeping and far-reaching a character as are in contemplation at the other parts of the estate.

The scheme may be accepted as evidence of the new spirit of activity and enterprise which has been infused into the Board since Mr. J. W. Hughes accepted the chairmanship of its works committee. Already that committee has been instrumental in securing a number of improvements in the estate at a cost of upwards of 300,000*l.*, but its latest project entirely eclipses any previous exploit.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

22083. Thomas Madderson, for "An improved apparatus for use as a water-meter.

22080. Carlos Gonzalez y Perex, for "Apparatus for displaying luminous devices for advertising purposes."

22090. John Dibble and Samuel Henry Dibble, for "Improvements in or addition to a combined water-closet and sink."

22093. John Benjamin Meeson, for "An improved water-closet tank and connections."

22184. Charles Tomlinson and George Tomlinson, for "Check-spring cord rack for window-blinds."

22209. John Green, for "Improvements in or connected with machines for sowing seed."

22212. Hugh Basil Holme, for "An improved apparatus for raising and lowering blinds and the like."

22223. Edmund Fisher Hartshorn, for "Improvements in pulleys, chiefly designed for use with window-blind fixtures."

22252. Harvey Spencer, jun., for "Improvements in or relating to blinds."

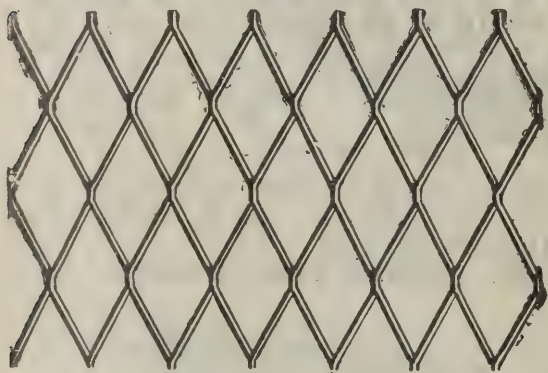
22271. Karl Kunze, for "Improvements in the manufacture of artificial stones."

22315. David Black, for "Improvements in brick-making and other moulding machines."

22345. Henry Richard Barnard, for "Improved means for controlling the rise and fall of sliding sashes for windows of buildings, applicable also to carriage windows."

TO INVENTORS.—Patents for Inventions, Trade-marks and Designs secured; every assistance given to inventors. Specialists in Building matters. Information free.—Messrs. RAYNER & Co., Patent Agents, 37 Chancery Lane, London, W.C.

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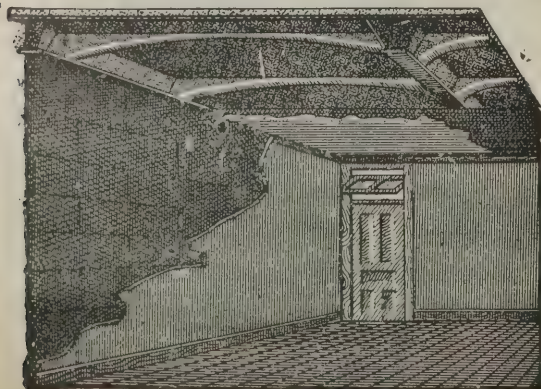
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EDITORIAL NOTICES.

The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.

Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

For Advertisement Scale, see page xv.

COMPETITIONS OPEN.

BOOTLE.—The Corporation invite plans for a central fire station, firemen's dwellings and district police station. Full particulars may be obtained on application to Mr. J. A. Crowther, borough engineer, Bootle.

BYFLEET.—Nov. 13.—The committee of the proposed village hall for Byfleet invite competitive plans for a village hall and working-men's club, to be erected at a cost not exceeding 1,500l. A premium of 25 guineas will be awarded. Mr. F. C. Stoop, hon. sec., Albany House, Byfleet, Surrey.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500l., 300l. and 200l. respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

DORKING.—Dec. 15.—Competitive designs and plan, with descriptive report thereon and approximate estimates, are invited for erection of infirmary upon workhouse grounds. Mr. George Scales, 35 High Street, Dorking.

LONDON.—Oct. 30.—The Tottenham School Board invite competitive designs for their proposed new offices. Mr. J. F. Adams, clerk, School Board Offices, Tottenham, N.

SOMERSET.—Nov. 30.—The Council invite competitive plans for large hall, with cloakrooms and retiring-rooms over

present post office, market house and fire-engine house communicating with the town hall, and for conversion of market house, &c., on ground-floor. Premiums of 25l., 15l. and 10l. will be awarded. Mr. Regd. L. Foster, town clerk, 1 Cathedral Green, Wells.

SOUTHEND-ON-SEA.—Nov. 20.—Plans invited for new church. Rev. E. E. Kimber, St. Albans, Avenue Terrace, Southend-on-Sea.

UXBRIDGE.—Oct. 30.—The Uxbridge Rural District Council invite plans for a scheme of sewerage and sewage disposal. Mr. Charles Woodbridge, 38 High Street, Uxbridge.

CONTRACTS OPEN.

BARNES.—Nov. 3.—For erection of six shops and dwelling-houses on the Elm Grove Estate, Rocks Lane. Messrs. F. & W. Stocker, surveyors, 90 and 91 Queen Street, Cheapside, E.C.

BATH.—Oct. 28.—For repairs, &c., to buildings of the Park Farm. Chairman of the Corporate Property Committee.

BATLEY.—For alterations in engine-house. Messrs. J. Brook Jubb & Co.'s Union Mills, Batley.

BATLEY.—Oct. 25.—For erection of two houses, Healey Lane. Mr. B. Watson, architect, Bradford Road, Batley.

BEDFORD.—Nov. 5.—For erection of a post-office. Messrs. Widnell & Trollope, 13 Parliament Street, S.W.

BIDEFORD.—Nov. 1.—For alterations and additions to the Kingsley Hotel. Mr. R. T. Hookway, architect, 12 Bridgeland Street, Bideford.

BIRMINGHAM.—Oct. 28.—For erection of dining-hall and stores at the workhouse. Mr. W. H. Ward, architect, Paradise Street, Birmingham.

BRADFORD.—Oct. 26.—For extension of a drawing-shed, Bowling. Mr. T. Leadley, architect, 3 Coleridge Place, Bradford.

BRADFORD.—Oct. 26.—For erection of a house in St. Paul's Road, Manningham. Messrs. Walker & Collinson, architects, Central Avenue, Swan Arcade, Bradford.

BRADFORD.—Nov. 1.—For erection of a pair of semi-detached villas in Heaton Grove, Frizinghall. Messrs. Isitt, Adkin & Hill, architects, Prudential Buildings, Bradford.

BRIGHTON.—Nov. 2.—For erection of a block of buildings for the accommodation of children, adjoining infirmaries, Brighton Workhouse. Mr. H. S. Reed, architect, Parochial Offices, Prince's Street, Brighton.

CARDIGAN.—Oct. 30.—For erection of four dwelling-houses at Gordon Terrace. Captain Thomas Williams, Catherine Row.

CHELMSFORD.—Oct. 30.—For erection of a detached cottage residence on the Mount Hill Avenue Estate. Mr. George E. Clare, architect, 66 Duke Street, Chelmsford.

CHOPWELL.—Oct. 28.—For erection of forty-three cottages, with sewerage and street formation. Consett Iron Company, Limited, Blackhill, co. Durham.

CHRISTCHURCH.—Oct. 30.—For erection of an addition to workhouse, Fairmile. Mr. E. H. Burton, architect, Bourne-mouth.

CONSETT.—For rebuilding about 600 yards of a 5-feet rubble stone wall, with two courses of binders and rough coping stones. Mr. T. Turnbull, Red Houses, Woodlands, Consett.

CORNWALL.—Oct. 23.—For erection of a dwelling-house at Carbis Bay. Mr. Oliver Caldwell, Penzance.

DAGENHAM.—Oct. 26.—For erection of an additional ward pavilion at the smallpox hospital, Dagenham, Essex. Mr. Lewis Angell, borough engineer, Town Hall, Stratford, E.



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DARWEN.—Oct. 28.—For erection of a Jubilee tower on Darwen Moor. Mr. R. W. Smith-Saville, C.E., Municipal Offices, Darwen.

DOUGLAS.—Oct. 26.—For erection of a school near Murray's Road, Douglas, Isle of Man, with accommodation for 1,000 children. Mr. J. Mitchell Bottomley, architect, 46 Albion Street, Leeds.

DROITWICH.—Nov. 2.—For passenger station, for the Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station, London.

EAST PRESTON.—Oct. 25.—For erection of a board-room, offices and wards at the union workhouse. Mr. H. Howard, surveyor, Town Offices, Littlehampton.

ESSEX.—Nov. 1.—For erection of a mixed school for 150 children, and teacher's residence, with offices, fencing, &c., at South Hornchurch. Mr. E. M. Whittaker, architect, 1 Gresham Buildings, Basinghall Street, E.C.

FALMOUTH.—Oct. 30.—For erection of a new infirmary at the workhouse. Mr. John H. Genn, clerk.

FARNHAM.—Nov. 3.—For erection of joint isolation hospital. Mr. Sydney Stapley, architect, West Street, Farnham.

FEATHERSTONE (YORKS).—Oct. 26.—For erection of a villa residence. Messrs. Garside & Keyworth, architects and surveyors, Ropergate, Pontefract.

GORING-ON-THAMES.—For erection of a private residence. Mr. H. S. Hedges, Newbury Brewery Company.

GOSPORT.—Nov. 1.—For erection of the Old Northumberland public-house in High Street. Mr. Alfred H. Bone, architect, Cambridge Junction, Portsmouth.

HAMPSTEAD.—Oct. 26.—For enlargement and alteration of the fire-brigade station in Heath Street, for the London County Council. Architect's Department, 13 Spring Gardens, S.W.

HEBBURN-ON-TYNE.—Oct. 27.—For alterations at Hebburn Hall. Mr. James W. Thompson, architect, Newcastle-on-Tyne.

HECKMONDWIKE.—Oct. 25.—For erection of Board offices and caretaker's house in High Street. Mr. A. A. Stott, architect, Heckmondwike.

HORRABRIDGE.—Oct. 30.—For alterations and additions to the Board school, Horrabridge. Mr. William Squire, architect, Tavistock.

HULL.—Oct. 27.—For erection of an isolation hospital at the Hull Royal Infirmary. Messrs. Freeman, Son & Gaskell, architects, Albert Chambers, 11 Carr Lane, Hull.

HULL.—Nov. 3.—For pulling-down existing buildings and erecting kitchen, stores, &c., at the workhouse, Beverley Road. Mr. T. Beecroft Atkinson, architect, 11 Trinity House Lane, Hull.

INGLETON.—Oct. 28.—For erection of shops and houses. Mr. John Kassell, architect, Kirkby Lonsdale.

IRELAND.—For building a chancel, &c., at Fahan church. Mr. J. E. Walsh, Bishop Street, Londonderry.

IRELAND.—Nov. 1.—For repairs to Manorhamilton Court-house. Mr. E. O. N. Clarke, county surveyor, Carrick-on-Shannon.

KEIGHLEY.—Oct. 28.—For erecting roller warehouse, stabling, &c., Park Wood Street. Messrs. W. & J. B. Bailey, architects, Bradford.

KENDAL.—Oct. 26.—For erection of Roman Catholic schools, classrooms, workshops, covered playgrounds, &c., in Gillingate. Mr. John Stalker, architect, Kendal.

LANCHESTER.—Nov. 3.—For erection of fitters' shop at workhouse. Mr. Geo. Thos. Wilson, architect, 121 Durham Road, Blackhill.

LEEDS.—Oct. 27.—For erection of water-closets and additional lavatory accommodation at the workhouse. Mr. Thomas Winn, architect, 90 Albion Street, Leeds.

LEEDS.—Oct. 26.—For erection of public baths in Meadow Road. Mr. Walter Hanstock, architect, Branch Road, Batley.

LIMERICK.—Nov. 5.—For tiling of the front kitchen of the library. Mr. W. E. Corbett, surveyor, 28 Glentworth Street.

MANCHESTER.—Oct. 25.—For erection of engine and boiler-houses, offices, workshops, &c., at hydraulic pumping-station, Pott Street. Secretary, Waterworks Offices, Town Hall, Manchester.

MANCHESTER.—Oct. 26.—For erection of workshops, offices, &c. Mr. C. W. Bayley, Hunt's Bank, Manchester.

MARYPORT.—Nov. 9.—For enlargement and alterations at the Glasson Board schools. Mr. C. Eaglesfield, architect, Maryport.

PLYMOUTH.—Oct. 26.—For construction of an additional exit from the male lunatics' dormitory at workhouse. Mr. H. J. Snell, architect, 13 Courtenay Street, Plymouth.

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PLYMOUTH.—Oct. 26.—For erection of a partition and sundry works at King Street school. Mr. E. Chandler Cook, 18 Princess Square, Plymouth.

PONTYPRIDD.—Oct. 28.—For erection of twenty or more houses near Aber station. Mr. W. Dowdeswell, architect, Treharris.

PURTON AND SUCKLEY.—Oct. 26.—For erection of cottages at Collins Lane crossing, near Purton, Gloucestershire, and at Suckley station, Worcestershire, for the Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station.

RADLETT.—Oct. 27.—For erection of a village hall, Radlett, Herts. Mr. A. G. Bond, architect, 51 Corn Street, Bristol.

RADNOR.—Oct. 28.—For pulling-down the old buildings at present on the site of the Presteign County Intermediate School for the old materials contained in same; and for erection of the school. Mr. H. Teather, architect, Andrew's Buildings, Queen Street, Cardiff.

REDRUTH.—Oct. 30.—For erection of farmhouse, near Four Lanes. Mr. Sampson Hill, architect, Green Lane, Redruth.

RUGBY.—Oct. 26.—For erection of branch stores at New Bilton. Mr. J. T. Franklin, architect, 40 Bridget Street, Rugby.

SHEFFIELD.—Nov. 9.—For erection of stables, loose-boxes, cartsheds, foremen's houses, offices, boundary wall, &c. on a site between Charlotte Road and the Olive Grove Football Ground. Mr. Charles F. Wike, surveyor, Town Hall, Sheffield.

SHREWSBURY.—For additions to premises, Castle Foregate. The Architect, the Co-operative Wholesale Society, Limited, 1 Balloon Street, Manchester.

SHREWSBURY.—Oct. 29.—For erection of engine and boiler-houses, coal store, chimney shaft, and other works at Coleham. Messrs. John Taylor, Sons & Santo Crimp, 27 Great George Street, Westminster, London, S.W.

SOWERBY BRIDGE.—Oct. 28.—For erection of a bakery. Mr. E. C. Morley, architect, Fountain Street, Halifax.

SURBITON.—Oct. 28.—For erection of a branch post-office and sorting-office. Mr. C. W. Stevenson, 38 Parliament Street, S.W.

WALES.—Nov. 3.—For extension of Trerobart infant school—accommodation for thirty infants—for the Llanwonno School Board. Mr. A. O. Evans, architect, Post Office Chambers, Pontypridd.

WALES.—Nov. 1.—For erection of new offices at Parry Dock. Secretary, Barry Railway Company, Barry Dock.

WAKEFIELD.—Oct. 26.—For construction of lavatories and works in connection therewith in Westgate. City surveyor, Town Hall, Wakefield.

WATERFORD.—For alterations and additions to new rectory, West Street, Tallow. Rev. J. R. H. Becher, M.A., Rectory.

WEST BROMWICH.—Oct. 29.—For extensions to and remodelling of public baths and erection of an engineer's house, Lombard Street West. Mr. Albert D. Greatorex, surveyor, Town Hall, West Bromwich.

WESTBURY.—Oct. 26.—For erection of a cottage at Westbury crossing, near Grange Court. Mr. G. K. Mills, secretary, Great Western Railway Company, Paddington Station.

WINDERMERE.—Oct. 28.—For erection of a residence. Mr. Robert Walker, architect, &c., Windermere.

WINDSOR.—Oct. 26.—For erection of a new passenger station and other works at Windsor. Mr. G. K. Mills, secretary, Great Western Railway Company, Paddington Station, London.

WREXHAM.—Oct. 31.—For erection of latrines at the boys' school. Messrs. J. Morison & Son, 10 King Street, Wrexham.

WESTON-SUPER-MARE.—Oct. 23.—For alterations, additions, &c., to Huntley's Restaurant, Regent Street. Mr. S. J. Wilde, architect, Boulevard Chambers, Weston-super-Mare.

WHITEHAVEN.—Oct. 25.—For building fire-engine station, workshops, boundary-walls, &c. Messrs. Moffat & Bentley, architects, Church Street, Whitehaven.

WHILE digging the foundations for some houses at Plymouth last week, the workmen came across a number of human bones. Several skulls, rib bones, leg bones and jaws were unearthed. One of the jaws contained a complete set of teeth, showing no signs of decay, but the other bones bore indications of great age. The spot where these remains were found is not far from Freedom Park, where, after several hours' fighting, in 1643, the Roundhead garrison of Plymouth finally routed the Cavalier army, which had surprised the outworks and nearly taken the town, after a protracted and unsuccessful siege.

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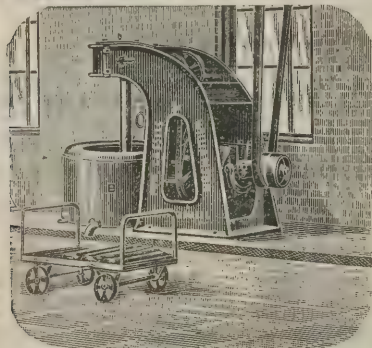
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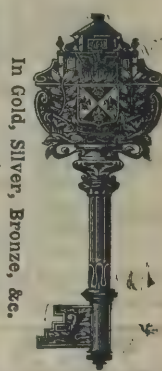
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D. Debenham	3,682	0	0
D. Waller	3,650	0	0
E. J. Saunders	3,600	0	0
D. W. Barker	3,353	0	0

CROYDON—continued.

For alterations and providing 408 additional places to boys
and girls' departments and new cookery and laundry-room
at the Board schools, Morland Road, Woodside, for the
Croydon School Board. Mr. ROBERT RIDGE, architect,
12 Katharine Street, Croydon. Quantities by Mr. MANS-
FIELD PRICE, Cedar Road, Sutton.

J. Smith & Sons	£3,127	0	0
J. & C. Bowyer	3,085	0	0
W. Akers & Co.	3,039	0	0
E. J. Saunders	3,020	0	0
G. E. Bryan & Son	2,997	0	0
A. Bullock	2,973	0	0
E. P. Bulled & Co.	2,969	0	0
Huntley Brothers, Croydon*	2,890	0	0

* Accepted subject to the approval of the Education
Department.

For repairs, cleaning, distempering, painting, &c., at infirmary
Mayday Road, Thornton Heath, and for repairs to and
relaying portions of the tar paving at workhouse, Queen's
Road. Mr. FREDERICK WEST, surveyor, 23 Coombe
Road, Croydon.

Vigor & Co.	£548	10	0
Fuller & Co.	487	5	0
Smith & Son	487	0	0
W. & P. Hards	475	0	0
R. F. Seed	415	0	0
W. J. Penfold	359	7	0
Barber & Oliver	351	0	0
E. Mills	338	0	0
Umlandt & Nicoll	320	0	0
J. J. Richards	287	0	0

DEVONPORT.

For erection of a head-master's residence and boarding-house at
the High School. Mr. ROBT. H. B. NEAL, architect,
Central Exchange, Plymouth. Quantities by the architect.

J. Cockerell	£4,550	0	0
G. B. Turpin	4,500	0	0
A. N. Coles	3,975	0	0
J. P. Berry	3,900	0	0
Laphorn & Co.	3,780	0	0
J. H. Palmer	3,654	0	0
F. C. AMBROSE, Plymouth (accepted subject to deductions and variations)	3,600	0	0

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EDINBURGH.

For construction of a sewer from Easter Road to Back Drum, the reconstruction of sewer in rear of Gay Field Square, and the resilling and repair of Melville Street sewer.

Accepted tenders.

J. Morris & Sons, Easter Road to Back Drum sewer	£678 17 4
A. Waddell & Son, Gay Field Square sewer reconstruction	178 2 6
A. Waddell & Son, resilling and repair of Melville Street sewer	165 1 0

ELTHAM.

For construction and laying down of about 1,620 feet of 15-inch and 12-inch pipe sewers in Green Lane.

KILLINGBACK & Co., James Street, Camden Town, N.W. (*accepted*) £637 0 0

ENFIELD.

For erection of an isolation hospital at World's End.

Whiteley	£29,755 0 0
Dove Bros.	27,795 0 0
Fairhead & Son	26,720 0 0
Kirk & Randall	26,717 0 0
Gordon & Son	26,360 0 0
CHESSUM & SON (<i>accepted</i>)	25,501 0 0

FARNBOROUGH.

For erection of business premises, Farnborough, Hants, for Mr. C. Hammerton. Mr. STANLEY PARKER, architect and surveyor, 427 Edgware Road, W.

W. SMITH, Farnborough (*accepted*) £1,182 0 0

HALIFAX.

For erection of water-tower for sprinklers, &c., and the formation of tanks, filtering beds, &c. at Hipperholme Mills. Mr. MEDLEY HALL, architect, 29 Northgate, Halifax.

Accepted tenders.

S. Mitchell, mason, &c.
J. Marshall, slater, &c.

HASWELL.

For erection of a cart shed.

Phelp & Bird	£410 0 0
M. RAMSHAW, Haswell (<i>accepted</i>)	404 10 0

HEWORTH.

For erection of a caretaker's house, Felling Shore school. Mr. H. SMITH, architect, Felling.

J. McGowan, Felling £236 0 0

HEYWOOD.

For painting the municipal buildings. Mr. JAMES DIGGLE, engineer.

R. TAYLOR, Manchester Street (*accepted*).

KEIGHLEY.

For erection of residence and stabling, Hollins Lane. Mr. JAS. LEDINGHAM, architect, District Bank Chambers, Bradford.

Accepted tenders.

T. Moore, mason.
Foster & Fortune, joiner.
W. Bottomley, plumber.
T. Nelson, slater.
Emmott Bros., plasterer.
R. Lonsdale, painter.

KENT.

For erection of a fire-brigade station and stables at West Street, Bromley.

General Builders, Limited	£1,100 0 0
H. Chapman	1,012 0 0
W. Irwin	937 0 0
F. P. Duthoit	885 0 0
T. D. GRATY, East Street, Bromley (<i>accepted</i>)	855 0 0

KIRKBY LONSDALE.

For alterations and additions to the Royal Hotel. Mr. JOHN KASSELL, architect, Kirkby Lonsdale.

Accepted tenders.

W. Bayliff, mason, bricklayer, slater and plasterer	£1,006 2 3
W. Bayliff, joiner and carpenter	370 0 0
A. Moorhouse, ironfounder, plumber and painter	278 15 0
Architect's estimate	1,670 0 0

LLANDAFF.

For widening and reconstructing Vishwell Road, Wenvoe. Mr. JAMES HOLDEN, surveyor, Queen's Chambers, Cardiff.

J. WOOD, Whitechurch, Glam. (*accepted*) £134 7 4

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LEEDS.

For erection of two houses at Burley, Leeds. Mr. FRED. MITCHELL, architect, 71 Albion Street, Leeds.

Accepted tenders.

C. Lucas & Sons, brick and masonwork	£280	0	0
W. Wray, joiner	100	0	0
J. Stead, plumber	44	15	0
J. W. Watson, plasterer	26	10	0
J. Robinson, painter	16	0	0
T. E. Heavyside, slater	14	0	0

For alterations at St. George's Vaults, George Street. Mr. FRED. MITCHELL, architect, 71 Albion Street, Leeds.

Accepted tenders.

A. Braithwaite, joiner	£145	0	0
J. H. Appleby, brickwork	105	0	0
E. Tattersall, plumber	64	9	0
T. Moore, plasterer	31	10	0

LONDON.

For addition, alteration and decorative work to 10 Upper Brook Street. Mr. PHILIP TODD, architect, 27 Half Moon Street, W.

Lascalles	£3,728	0	0
F. Porter & Co.	3,525	0	0
Kelland	3,180	0	0
Edwards & Medway	3,120	0	0
Gregory	2,720	0	0
Buckeridge	2,629	0	0

For work required in the High Street, for the South Hornsey Urban District Council. Mr. M. W. JAMESON, C.E., surveyor.

W. Wadey	£1,950	0	0
W. GRIFFITHS (accepted)	1,909	0	0
Acme Wood Flooring Co.	1,875	0	0

For construction of a 15-inch pipe-sewer on the Telford Park Estate, Streatham. Mr. F. H. HARVEY, surveyor.

H. BENTHAM & CO., Plumstead (accepted)	£420	0	0
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For alterations at the Angel and Crown, St. Martin's Lane, W.C. Mr. GEO. K. DEAKIN, architect, 110 Strand, W.C.

Edwards & Medway	£627	0	0
C. Hedges	565	13	0
Worsley & Co.	490	0	0
Sanders & Sons	485	10	0
R. Eddie	448	0	0

LONDON SCHOOL BOARD.

For erecting boys and girls' school to accommodate 528 children, manual and science rooms, drawing classroom, cookery and laundry centres, covered playground for boys' department, converting existing classrooms in old school into halls for all departments, and enclosing, draining and tar-paving the additional land, Monnow Road. (Second Competition.)

J. & M. Patrick	£16,066	0	0
G. E. Wallis & Sons	15,890	0	0
J. Longley & Co.	15,106	0	0
W. Scrivener & Co.	15,046	0	0
W. Downs	15,044	0	0
Stimpson & Co.	14,888	0	0
D. Charteris	14,786	0	0
Perry & Co.	14,640	0	0
F. & H. F. Higgs	14,632	0	0
Lathey Bros.	14,550	0	0
E. Lawrence & Sons	14,465	0	0
Holliday & Greenwood *	14,168	0	0

For erecting manual training centre for twenty boys, Ivydale Road.

E. P. Bulled & Co.	£706	0	0
W. V. Goad	679	0	0
J. Smith & Sons	659	0	0
J. F. Ford	634	10	0
H. Leney	608	15	7
J. Garrett & Son	599	0	0
W. Akers & Co.	556	10	0
J. & C. Bowyer*	516	0	0

For erecting manual training centre for twenty boys, Eglinton Road.

E. Proctor	£791	2	7
W. V. Goad	758	0	0
J. Garrett & Son	757	0	0
J. Kiddle & Son	741	16	6
Thomas & Edge	739	0	0
H. Leney	668	8	2
Holliday & Greenwood	635	0	0
J. & C. Bowyer*	613	0	0

* Recommended for acceptance.

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LONDON SCHOOL BOARD—continued.

For erecting manual training centre for forty boys, and enclosing, draining and tar-paving the additional land and forming opening in covered playground as access to additional land, Choumert Road.

J. & M. Patrick	£1,175	0	0
E. P. Bulled & Co.	1,159	0	0
W. V. Goad	1,143	0	0
W. Downs	1,055	0	0
J. F. Ford	1,043	0	0
J. Garrett & Son	1,007	0	0
W. Akers & Co.	973	0	0
H. Leney	971	5	8
J. Smith & Sons	958	0	0
Holliday & Greenwood	906	0	0
J. & C. Bowyer	894	0	0
E. Triggs*	834	0	0

For erecting boys' and girls' school, Cable Street; accommodation, 404. The plans include a special school for ninety children, manual training centre for forty boys, and cookery and laundry centres.

F. & F. J. Wood	£14,573	0	0
W. M. Dabbs	14,550	0	0
G. Munday & Sons	14,410	0	0
Perry & Co.	14,410	0	0
J. Longley & Co.	14,320	0	0
W. Shurmur	14,205	0	0
W. Gregar & Son	14,085	0	0
Holliday & Greenwood	14,059	0	0
F. & H. F. Higgs	14,035	0	0
D. Charteris	13,966	0	0
J. Shillitoe & Son	13,945	0	0
Treasure & Son	13,900	0	0
J. & M. Patrick	13,849	0	0
E. Lawrance & Sons*	13,608	0	0

For providing and fixing relief main and extra coils, Holmes Road.

H. C. Price Lea & Co.	£62	0	0
J. F. Clarke & Sons	52	0	0
Duffield & Co.*	48	12	0

* Recommended for acceptance.

LONDON SCHOOL BOARD—continued.

For repairs, &c., at No. 1 Argyle Street, Manchester Street Site.

G. Ball	£55	0	0
J. Morrison	41	0	0
G. Kemp	39	0	0
Marchant & Hirst	39	0	0
W. Margrie & Son (accepted)	34	10	6

NORFOLK.

For erection of new baths, water-closets, sinks, &c., at the union house, Great Snoring. Messrs. EDWD. BOARDMAN & SON, architects, Queen Street, Norwich.

W. R. Codman	£619	17	6
T. H. Blyth	523	11	0
W. Priest	507	18	8
C. Tuthill	494	14	0
J. Needs	440	0	0
C. T. BAKER, Holt (accepted)	439	14	0

PAISLEY.

For erection of electricity works, for the Corporation.

Accepted tenders.

G. Primrose, excavator, bricklayer and mason	£7,888	18	5
G. & T. Houston, carpenter and joiner	1,156	13	4
Hanna, Donald & Wilson, iron and steel	541	9	10
W. Allison, plumber	360	10	6
A. Maxwell, plasterer	332	5	5
J. Jeffrey & Co., slater	320	17	3
G. G. Kirk, glazier	247	7	0
Hanna, Donald & Wilson, crane gantry	145	0	0
" " feed tank	77	0	0

ROMFORD.

For alterations to shop at 4 Woodbine Terrace, Victoria Road, Romford. Mr. GEO. K. DEAKIN, architect, 110 Strand, W.C.

J. Baker & Sons	£425	0	0
J. Hammond & Son	211	0	0
DOWSING & DAVIS (accepted)	150	0	0

ROYSTON.

For erection of a head master's house, adjoining Board school, Senior Lane. Mr. JOSEPH OLROYD, architect, Royston.

A. Taylor	£546	0	0
C. & E. Cutto Bros.	516	10	0
F. T. SALMON, Brierley, near Barnsley (accepted)	482	2	9
J. J. Hargreave	480	0	0

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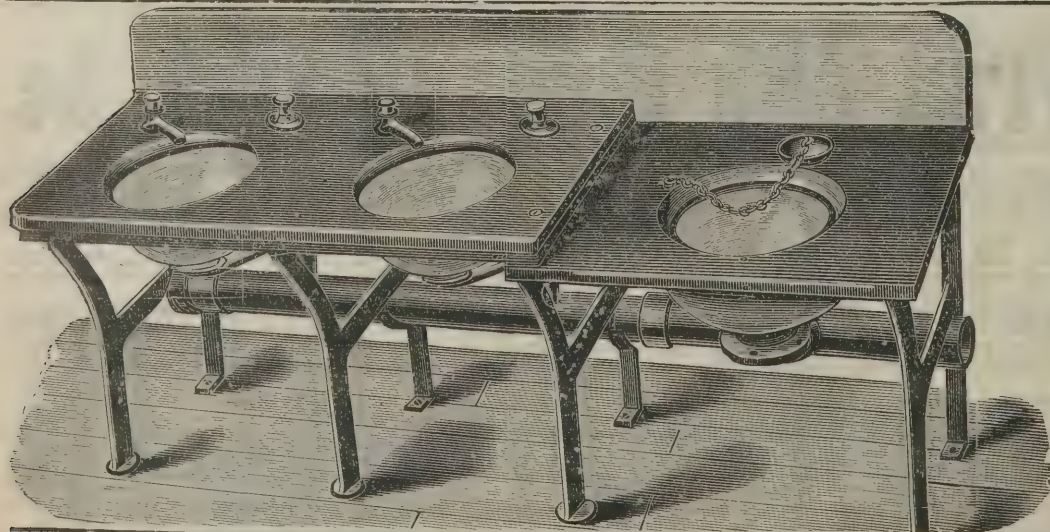
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STOWE.

For erection of small farmhouse, Lea Heath, Stowe. Mr. W. H. WALLEY, architect, Queen Street, Burslem.			
C. J. Nevitt	£380	0	0
I. Ward & Son	377	0	0
G. H. Smith	346	16	0
J. S. Burton	333	10	0

Note.—No tender accepted at present.

STRATFORD.

For rebuilding the Steamship publichouse, Howard's Road. Mr. W. M. BRUTTON, architect, Trafalgar House, Green Street, Trafalgar Square, W.C.

Structural.

Burman & Son	£3,111	0	0
H. L. Holloway	3,086	0	0
R. E. Clarke	3,085	0	0
W. Smith	3,021	0	0
Whitehead & Co.	2,899	0	0
Godson & Son	2,898	0	0
Pritchard & Renwick	2,838	0	0
Dearing & Son	2,825	0	0
COURTENAY & FAIRBAIRN (accepted)	2,733	0	0

Fittings.

COURTENAY & FAIRBAIRN (accepted)	315	0	0
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Pewtering.

Buckley & Beach	103	0	0
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J. WARNE & CO. (accepted)	99	0	0
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Gasfittings.

W. Winn	193	6	10
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BUCKLEY & BEACH (accepted)	183	10	0
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For alterations and fittings at the Canteen Tavern public-house, Vicarage Lane, Stratford, E., for Mr. A. Foden. Mr. FRED. A. ASHTON, architect, 177 Romford Road, Stratford.

W. Watson	£923	0	0
J. & H. Cocks	873	0	0
W. J. Maddison	870	0	0
C. North	830	0	0
A. E. SYMES (accepted)	790	0	0

For painting-work, &c., at the Prince of Wales. Messrs. C. FOULSHAM & HERBERT RICHES, architects, 3 Crooked Lane, King William Street, E.C., and Bromley-by-Bow, E.

W. G. Brown	£199	15	0
T. Osborn & Sons	174	0	0
J. T. Robey	149	13	0
A. W. DERBY (accepted)	131	12	0

SUTTON BRIDGE.

For supply of gas-fittings, and for fixing same in new Odd-fellows' Hall.

Stevens & Sons	£30	0	0
W. Hayes	21	5	6
J. Miller & Co.	21	0	0
H. WENN, Bridge Road, Sutton Bridge (accepted)	21	0	0

WALES.

For alterations and improvements to the Cymmer Board schools, Porth. Mr. JACOB REES, architect, Hillside Cottages, Pentre.

ENOCH BROS., Cymmer, Porth (accepted)	£425	0	0
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WELLINGBOROUGH.

For painting and colouring at workhouse. Messrs. SHARMAN & ARCHER, architects, Wellingborough.

Richards & Sons	£228	0	0
T. E. Sharp	154	12	0
W. Stevens	150	0	0
H. R. GENT, Wellingborough (accepted)	124	0	0

WILLESDEN GREEN.

For execution of certain road-making and paving works in Churchill Road. Mr. O. CLAUDE ROBSON, engineer.

Killingback & Co.	£1,165	0	0
Nowell & Co.	1,136	0	0
H. Crouch	1,123	0	0
W. Griffith	1,120	0	0
C. Ford	1,095	0	0
T. Adams	1,075	0	0
Neave & Son	1,031	0	0
R. BALLARD, LIMITED, Child's Hill, Hendon, N.W. (accepted)	963	0	0

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THE new Law Library, Liverpool, is being warmed and ventilated by means of Shorland's patent Manchester stoves, Manchester grates and exhaust roof ventilators, by Messrs. E. H. Shorland & Brother, of Manchester.

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ROYAL COUNTY THEATRE, KINGSTON-ON-THAMES.

VICTORIA STONE COMPANY.

ON Wednesday last the directors of the Victoria Stone Company entertained a number of the leading architects and scientific men at the Victorian Exhibition. An excellent lunch was served in the dining-room adjoining the Ducal Hall. After the usual loyal toasts, several of the architects present rose and gave testimony to the value of the Victoria stone as a building material. One of the speakers stated that he had used it on a building nearly thirty years ago, and that when he had last seen it (two or three years since) the arrises were as sharp as when the stone was fixed, although it had stood exposure to frost and snow for at least a quarter of a century.

Several speakers referred to the great progress that had been made during the last two or three years in the architectural stone-work supplied by the company, and congratulated them on the success of the architectural department under the able management of Mr. Charles Smith.

The company's exhibit, for which they have been awarded the Victoria era gold medal, was greatly admired.

At the Victoria Era Exhibition, Earl's Court (Ducal Hall), Messrs. W. Woollams & Co., 110 High Street, Marylebone, have an exhibit of wall-papers, dating from the first year of the Queen's reign to the present time, of special interest to architects, and have a man at work demonstrating the process of hand-printing. The jurors have just awarded them a gold medal.

THE Reading new art gallery, which has been erected in close proximity to the Municipal Buildings, was opened on the 19th inst.

ELECTRIC NOTES.

MONTROSE Town Council have resolved to apply to Parliament for a provisional order to introduce electric lighting for public purposes and house-lighting in the burgh.

THE electrical committee of Glasgow Corporation have accepted the resignation of Mr. Arnott, the electrical engineer. It was resolved to recommend the Council to advertise for an electrical engineer to take charge of and give advice on all electrical matters under the Corporation, including both electric lighting and motive power.

ANOTHER breakdown in the electric lighting of Dover took place on Sunday evening, which is a curious coincidence, as the previous difficulty also occurred on a Sunday. The failure appears to be due on this occasion to an accident in connection with the water-supply at the works, rendering it impossible to fill the boilers. The greatest inconvenience resulted, especially in some of the churches. After some time a hose-pipe was attached to a hydrant near the works, and the boilers being filled by this means the lights were got into working order.

A LIGHTHOUSE at Penmarch, in Brittany, was opened on the 17th inst. The electric lamp will be visible in fine weather at a distance of 62 miles and in foggy weather at a distance of 24 miles. It will far exceed in brilliancy any other lighthouse lamp. The lighthouse has been erected in compliance with the will of the Marquise de Blocqueville, daughter of Marshal Davoust, who bequeathed the sum of 12,000*l.* for the purpose.

VARIETIES.

THE Eccles Town Council have notified the Local Government Board of their intention to borrow 4,928*l.* for works of sewerage and storm-water drainage in the borough.

ST. AUGUSTINE'S Roman Catholic Church, Solihull, was reopened on Sunday last.

THE new public school of Errol was opened on Monday, the 18th inst., with considerable ceremony, by Sir William Ogilvy Dalgleish, Bart.

A MEMORIAL church which has just been erected within the grounds of the Crichton Royal Institution, Dumfries, was formally opened on the 15th inst.

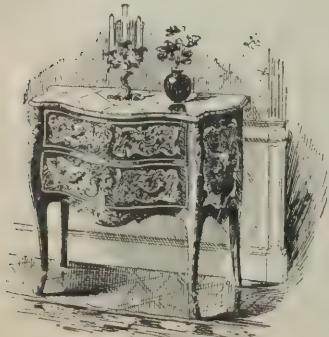
THE first section of the new Catholic College at Blairs, near Aberdeen, has now been completed at a cost of 8,000*l.*, and was formally opened on the 13th inst.

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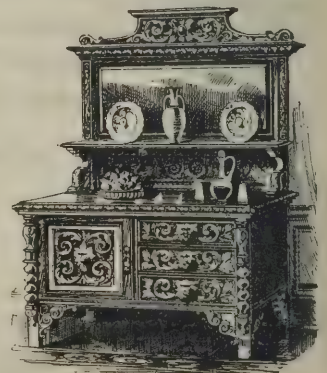
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ALL CARPETS MADE UP FREE OF CHARGE.

THE Duke of Cambridge visited Bath on Monday last for the purpose of opening the new pump room and laying the foundation-stone of the Victoria Art Gallery. Mr. Bryden is the architect of both these buildings.

AT Robinson's Opera House, in Cincinnati, three of the audience were killed and a dozen injured beyond hope of recovery by the fall of a portion of the ceiling and framework of the dome.

THE Earl of Crewe opened a new technical institute and also a sanatorium at Crewe, and the Town Council conferred upon his lordship the freedom of the borough. The buildings have been erected at a cost of nearly 20,000*l*.

THE Broadway Theatre at Deptford is nearly finished. The builders are now completing the tower, with its copper dome, and the interior of the building has been handed over to the decorators.

It has been decided that the clock tower which has been erected at Carter's Green, West Bromwich, as a permanent memorial of the public services of Alderman R. Farley shall be opened on the 27th inst. by the mayor, Councillor C. Akrill.

A NEW junior mixed school in connection with the Portman Place Board School, Globe Road, Mile End, was opened on the 18th inst. The new building will provide accommodation for over 400 children. The cost of the school worked out at about 24*l*. 6*s*. per head.

THE spinning mill of the New Hall Mill Company, Limited, in Elm Street, Burnley, was destroyed by fire on Wednesday morning. A fireman named Nuttall was killed by a fall of roof. The damage to the building and its contents is estimated at between 50,000*l*. and 60,000*l*.

DEVIZES CASTLE, the seat of Sir Charles Rich, which for centuries formed part of the dowry of the queens of England, and around which cluster so many memories rich in interest to historians and antiquaries, has just been disposed of by Messrs. Knight, Frank & Rutley, of the Conduit Street Auction Galleries.

WHILE a tall chimney was being taken down at Bevan's chain works, Dukinfield, the steeplejack, John Ward, called for his labourer, William Armitage, to get away, as the mass of brickwork was falling. He ran in the wrong direction and was buried beneath the debris, which came with a tremendous crash. He was killed instantly.

THE formal opening of new municipal public baths, erected at a cost of 5,000*l*., took place at Kingston-on-Thames, on the 18th inst. The new building comprises a swimming-bath of

the ordinary dimensions, supplied with tepid water during the winter months, and in addition has hot and cold slipper-baths and laundry conveniences.

A *propos* of our reference in last week's issue to Messrs. Spence's new premises, Messrs. Flint Bros. inform us that "the architects, Professor Banister Fletcher and Mr. Banister F. Fletcher, have entrusted the whole of the stonework to them, and that Ketton Stone, from Messrs. Molesworth & Co.'s quarries, and for which they are sole London agents, is being used entirely for this frontage."

A FATAL accident occurred on the 15th inst. at the Soho Ironworks, Bolton. A large crane was in process of being removed from the machine shop, when by some means it overbalanced and fell upon a labourer named Frederick Topping, twenty-seven years of age. The unfortunate man was completely crushed beneath the machine.

YORK HOUSE, the historical residence left to the Comte de Paris by the late Duc d'Aumale, came near destruction by fire a day or two since, owing to the overheating of a furnace flue. The damage caused by the fire was fortunately not great, but the new decorations in course of execution in readiness for the reception of the Comte and Comtesse were for the most part destroyed by the water.

AT the weekly meeting of the Salford Board of Guardians, Mr. S. Hill presiding, the clerk (Mr. E. Townson) said he found that 100,000*l*. for the proposed new workhouse could be obtained on loan at 3 per cent. Thirty years would be allowed for repayment, which would mean a charge of 2*d*. in the pound on the rates for fifteen years and 1*d*. for the remainder of the term. The Guardians have already decided to build a new workhouse, and Mr. Thompson now said he would like the question to be deferred until after the next election of guardians. The Chairman pointed out that notice must be given of a motion to rescind the resolution already adopted.

ST. ALBAN'S CHURCH, Birmingham, has been greatly improved by the erection of a handsome chancel screen, which has been erected by Messrs. White & Sons, of Oxford Street, London, from the designs of Mr. J. L. Pearson, R.A. This screen, which was dedicated on the 26th ult., consists of five arches resting upon a chastely designed and executed chancel wall. The central gate is surmounted by a large light iron cross. The ornamentation throughout is in wrought-iron ribbon scroll. An artistic feature of the new screen lies in the great variety of design displayed in the almost innumerable scroll terminals, no two of which appear to be alike.

SANITARY CONGRESS, LEEDS, SEPTEMBER, 1897.

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BUILDING AND BUILDERS.

THE memorial-stone of a new Constitutional Club has been laid at Hawick by the Countess of Dalkeith.

THE Princess Christian visited on Wednesday last the neighbourhood of Bryanstone Square for the purpose of laying the foundation-stone of a new hall and institute in connection with St. Mary's Church.

THE School Board of Paisley have accepted the design of Mr. John Hutchison, architect, Paisley and Glasgow, for a new two-storey school at Shortroods, in the Mossvale district, the estimated cost of which is 13,354*l*.

THE dedication-stone of St. Cuthbert's, Millwall, was laid on the 15th inst. by Lady Margaret Charteris, who has presented the land in Cahir Street on which the building is being erected. Adjoining the church, which will be erected in the district formed out of the parish of Christ Church, Poplar, will be a club-house and schoolrooms.

THE plans for the new Coronet Theatre, Notting Hill Gate, are completed and will be before the London County Council next week. The building, which will have a continuous frontage of 130 feet to the High Street, will be constructed entirely in white stone. The style is Louis XVI., and the building will be a handsome addition to the High Street. The theatre will be opened early in September 1898.

THE foundation-stone has been laid of a new church club and school rooms for the district of St. Cuthbert's, Millwall, situate at the corner of West Ferry Road and Cahir Street. The church, when completed, will consist of a chapel on the first floor capable of holding over 200 persons, and the ground floor will be fitted up with club and school rooms. The cost will be 3,000*l*.

THE plans of the proposed new station at Berwick have been forwarded from Edinburgh to Berwick for the inspection of the station authorities and for suggestions as to any alterations that may seem desirable. The plans provide for a new station. The cost is estimated at about 50,000*l*. There are to be three platforms fully 200 feet long and 30 feet wide. All the buildings now standing will be utilised and the present passenger station will become the east platform. The extension of the station will be on the west and north sides.

THE foundation-stone of a new church at Chapel Allerton, Leeds, has been laid. Though there is no authentic record of the fact, it is thought that on the site of the existing church

there stood, in the thirteenth century, a chapel which was attached to Kirkstall Abbey. Mr. G. F. Bodley has prepared the plans for the new building. They are on the lines of the Decorated Gothic period of the fourteenth century. Accommodation is to be provided for 800 people. The contractors are Messrs. Stephens, Bastow & Co., Bristol. The estimated cost is 16,000*l*.

A NEW Board school in Harehills Road, Roundhay, Leeds, which will be known as the Gipton School, was opened on the 14th inst. The building stands on a site measuring 7,000 square yards, and has a frontage to the main road of 290 feet. There are two departments—infants and mixed. Accommodation is provided for 1,600 scholars, exclusive of special accommodation for cookery and manual instruction and two large central halls. The infants' department is on the ground floor and consists of a large central hall and eight classrooms, two of which have been specially arranged for babies. The mixed department is on the upper floor, where the accommodation consists of a central hall and eighteen classrooms. The interior is bright and cheerful, all the rooms being well lighted. The exterior is quite imposing. The elevation is in the Elizabethan style, with two central gables in front. The cost of the building, including fittings, has been 17,000*l*., to which 2,100*l*., the cost of the site, has to be added. Mr. W. S. Braithwaite is the architect.

A NEW Theatre of Varieties is about to be erected at Bradford. The site is that of the Alexandra Hall, stabling and vacant land adjoining, in Horton Lane, containing an area of 4,400 yards. Mr. W. G. R. Sprague has the plans in hand. The building is to be of concrete and steel, and therefore fire-proof. The auditorium will accommodate 3,000 persons, and modern improvements, such as electric lighting and low-pressure hot-water heating, will be introduced. An imposing front will be given to the structure, and one feature of this will be a colonnade on the ground level. The entrance to the theatre will be through lobbies opening into a vestibule, or crush-room, 45 feet square, the roof of which will be carried by twelve marble columns with decorated caps. The vestibule, by two short flights of white marble steps, or slopes, will give access to the grand circle, boxes and fauteuils. The theatre will be decorated in the Arabesque style, and 2,000 16 candle-power electric lamps will illuminate the interior. Spacious saloons, retiring-rooms and lounges are to be provided for each section of the auditorium. The house will be built on what is known as the two-tier system, viz. fauteuils, stalls and pit on the ground

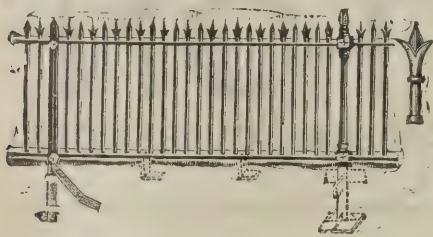
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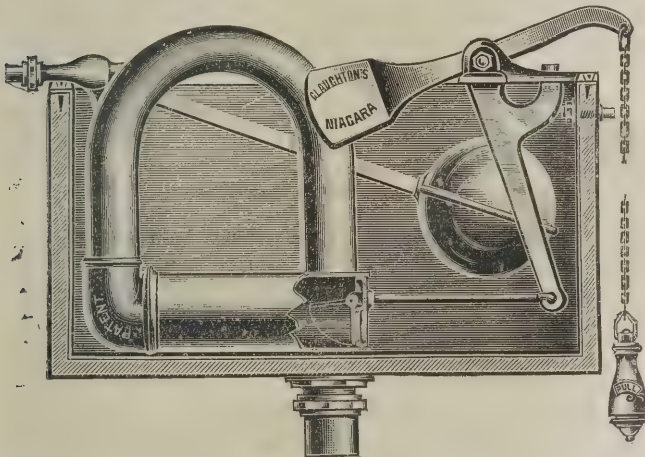
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floor; grand circle and boxes on the first tier; balcony and gallery on the second tier. Every seat will have a clear and uninterrupted view of the stage. At the rear of the stage will be the dressing-rooms.

A NEW FLUSHING CISTERN.

MESSRS. CLAUGHTON BROS., Limited, of Bramley, Leeds, are on the point of introducing to the trade a patent syphon-flushing cistern, advance specimens of which were shown at the Health Exhibition, Leeds, and with which they were successful in gaining the bronze medal of the Sanitary Institute, the highest and only award for water-waste preventers at the Leeds Exhibition.



The cistern, named "Cloughton's Niagara," is fitted with a horizontal brass cylinder of drawn tube and brass syphon bend, in fact, all the fittings below the water-line are of brass.

A piston or plunger having a flap-valve works in the cylinder. This plunger, when operated by the lever, acts as a solid piston and charges the syphon. After the first pull the water continues to flow through the flap whether the chain is released or not, and as soon as the chain is released the weighted lever draws back the plunger into position ready for the next flush. The

plunger is worked by the ordinary lever and pull, but by a special contrivance the bracket or lever support is made reversible, and is also constructed to allow the lever with the plunger and fittings to be almost instantly withdrawn. It will thus be seen that either left or right hand cisterns can be made with the same fittings, and that the internal and most important parts are easily removable.

Among the advantages of this cistern may be mentioned: easy action; quick and powerful flush; it will flush with less than one gallon of water; all fittings are reversible and interchangeable; almost silent both in operating and discharging; it cannot be made to syphon continuously, thus being a perfect water-waste preventer. The advantages of having a drawn brass cylinder of perfectly smooth bore and all fittings of brass below the water line are obvious. The cistern will be made in wood, lead lined, all seams being burned by a special process; also in cast-iron, either painted or galvanized.

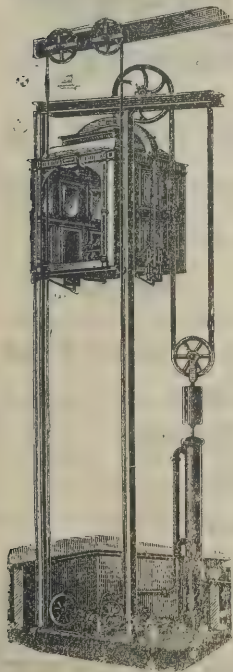
INSTITUTE OF IRON AND STEEL WORKS MANAGERS.

THE opening meeting of the session of this Association was held on the 16th inst. at the Institute, Dudley. Mr. J. W. Hall (newly-elected president) alluded to the recent loss the Institute had sustained by the death of Mr. Thomas Morris, of Warrington. He remarked that Mr. Morris, who was born at Bilston, and had been at Warrington since 1864, had always taken a great interest in that institute, and had contributed several valuable papers to the proceedings. He moved a vote of condolence with the relatives. Mr. M. Millard seconded, remarking that he had Mr. Morris's consent to nominate him as vice-president that night, and the motion was carried.

The Chairman proposed that Mr. La-Neve Foster be elected vice-president of the Institute, to fill the vacancy caused by the resignation of Mr. W. G. McMillan, who, he stated, had been appointed librarian to the Institute of Electrical Engineers. Mr. Turner seconded the proposition, which was adopted.

The President then delivered his inaugural address. He remarked that the Victorian era has been essentially the era of applied science. Its most remarkable feature had been the extraordinary advance made in the material well-being of the people, more especially in that of our labouring population, by the employment of machinery, which had rendered possible the

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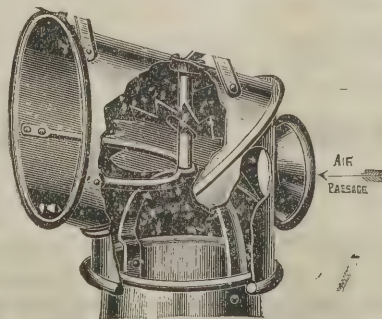
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production and distribution of the necessities and most of the luxuries of life at prices so remarkably low, combined with the simultaneous payment to the workers of wages so much higher than the world had ever seen before, as would have appeared only two centuries ago wild and visionary in the extreme had anyone ventured to propose them. The advance made in the present century, and more particularly during the present reign, in the comfort of our people since the modern system of applying machinery had had full play, indicated that our hope of material prosperity in the future lay in still further development along the same path which had proved so conspicuously successful in the past, and taught us that if we were to hope to maintain our present scale of living it could only be by offering for sale to the inhabitants of the world articles produced by mechanical means at a price and of a quality which would induce them to purchase because they could not produce them so well and cheaply themselves, and to do this we must increase by every possible means the efficiency of our tools and of the men who employ them. Our competitors abroad fully realised this fact, and were doing all they could to increase their manufacturing powers. Had they any doubt as to the influence of machinery on the well-being of the people they had only to look around them. What were the trades in which wages were lowest? Why, precisely those in which machinery had not yet come to the relief of the worker, and where everything must be produced by manual toil. They heard much idle boasting that England's position amongst the manufacturing nations of the world was due to the fact that her inhabitants were essentially a constructive race, and the skill of her people as handicraftsmen unapproachable; but a very little sober examination of the history of our trade would show that our manufacturing supremacy was a matter of recent growth, due more to a combination of fortuitous circumstances than to any exceptional ability of our own as mechanics. Privileged or monopolised trade was no longer possible; there was now no aristocracy in production, no trading in an old name for any length of time, and those in the best position to know told them that the value of what was known as the "goodwill" of a business, once so valuable an asset, had now almost disappeared. The foreigner had ceased in many cases to produce mere copies of English tools; he was perfecting new types, often of very great merit, and was securing orders on their real intrinsic value. To supply the best article at the lowest possible price was the one qualification for success in the markets of the world to-day, as it always had been, and on this alone could we rely

for our trade. Circumstances had favoured England above every country for the last three generations, but it was the maddest infatuation to imagine that we were superior to all competition from abroad, and savoured of the self-sufficient complacency of the "celestial" Chinese, who, despising the "foreign devils" and all their works, still remained blind, in spite of the many rude lessons he had had of the efficacy of the methods and appliances of the "outer barbarian." Were we going to be similarly blind until we were rudely awakened by finding that the trade so lavishly thrown into our hands by fortunate circumstances had once more passed to its original owners because we failed to recognise the importance of adopting the best possible tools, and our workmen the absolute necessity of making the best possible use of them?

Mr. M. Millard, in proposing a vote of thanks to Mr. Hall for his address, remarked that it was an undoubted fact throughout the world that where iron and steel were used freely there was freedom, comfort, enlightenment and education, and that where they were not known there was darkness, morally and socially, and brutality.

Mr. Tucker seconded the motion, which was supported by Messrs. Edwards and H. Parry, and carried unanimously, Mr. Hall briefly responding.

THE COUNTY COUNCIL WORKS DEPARTMENT.

THE finance committee of the London County Council, to whom, since the abolition of the works committee, the duty has been delegated of controlling the finances of the Works Department, have just issued a report which contains a statement showing (1) the estimated and actual cost of works executed during the half-year ended March 31, 1897, and (2) the totals of the actual cost and of the final estimates, or the amount of the schedule value, of all the works executed by the Works Department since its creation. In all thirteen estimated works have been completed and reported during the half-year. The total of the original estimate for these works was 23,525 $\frac{1}{2}$ l., the final estimate being 24,099 $\frac{1}{2}$ l., and the actual cost 25,563 $\frac{1}{2}$ l., showing a balance of cost above estimate of 1,463 $\frac{1}{2}$ l. The loss on the half-year has been solely occasioned by the work on the extension of the Wandle branch sewer, for which the final estimate was 9,665 $\frac{1}{2}$ l., and the actual cost has been 12,011 $\frac{1}{2}$ l., or a balance of cost above estimate of 2,006 $\frac{1}{2}$ l. There is a slight excess in cost over estimate in two or three items, but an

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PRICE LIST AND ESTIMATES ON APPLICATION.

analysis of the table shows that there has been considerable saving on some of the works. This has been the case particularly in the work done for the housing of the working-classes committee. The central laundry in the Boundary Street area, which was estimated to cost 6,532*l.*, has been constructed for 6,103*l.*, showing a saving of 429*l.*, whilst on the construction of a sewer on the same estate, estimated to cost 1,454*l.*, a saving of over 300*l.* has been effected. Small works executed for the fire brigade committee also show satisfactory results.

The table detailing the cost of jobbing works carried out during the half-year by the department for the different committees of the Council gives the schedule value of the works as 16,758*l.*, and the actual cost as 15,869*l.*, showing a balance of cost below schedule value of 889*l.* The value of the jobbing work done for the bridges committee was put at 2,443*l.*, and the actual cost was 2,115*l.*; for the fire brigade committee 2,877*l.*, and the actual cost 2,772*l.*; for the main drainage committee 6,670*l.*, and the actual cost 6,300*l.*; and for the highway committee 1,354*l.*, and the actual cost 1,284*l.*

An interesting statement follows, showing the totals of the actual cost and of the final estimates, or the amount of the schedule value, of all works executed by the Works Department since its creation. This shows that up to March 31 of this year the final estimate for all the estimated works carried out by the department was 459,772*l.*, and the actual cost 452,837*l.*, making a balance of cost above estimate of 3,125*l.* The schedule value of jobbing works executed from April 1895, when the system of a schedule of prices was first tried, to March 31, 1897, was 56,176*l.*, and the actual cost 52,260*l.*, showing a balance of cost below schedule value of 3,915*l.*

BUILDING IN ROME.

THE British Consul at Rome in his last report says:—No important public works have been executed in my district within the last two or three years, and I can only record some slow progress towards the completion of the following works or buildings formerly undertaken:—

National monument to Victor Emanuel on the north side of the Capitol. The large Policlinic Hospital outside the old city walls between Porta Pia and Porta S. Lorenzo. The banking of the river in continuation of the side walls from the Ponte Margherita upwards.

It has, however, been officially announced that in a short

time some important works will be undertaken in Rome, and I presume that in connection therewith articles of British manufacture will be employed, though in a small measure, considering that the works will mainly consist of masonry. I allude to the following:—(a) The completion of the side walls of the river embankment for the portion which remains to be built west of Ponte Elio (St. Angelo Bridge), and the demolition of the mad-house and of a portion of the St. Spirito Hospital; (b) continuation of the large collecting sewers right and left of the river; (c) the new quay on the river at the spot called Porto di Ripagrande. The estimate for the above works (a) (b) (c) amounts to 400,000*l.* (d) Completion of the Policlinic Hospital at a cost of 60,000*l.*; (e) continuation of the large building in the Prati di Castello for the Courts of Law (Palazzo di Giustizia) with an outlay of 360,000*l.* All the above works (a) to (e) will be paid for by the Government.

I should also mention a new hall to be built for the House of Deputies. The scheme of an entire new building for both Houses of Parliament having for the present been left in abeyance, it has been decided to build a new hall for the sittings of the House of Deputies on a site adjoining the Palazzo di Monteritorio where the House is at present located, doing away with the temporary construction which now occupies the quadrangle of that palace. The estimate for building the new hall and necessary adaptations of the main building amounts to 80,000*l.*

The financial resources of the municipality are not such as to allow them to undertake any large scheme in the way of public works, still that body has resolved to build a new bridge across the Tiber, which will be called Ponte Cavour, and is to replace the temporary iron construction, Ponte di Ripetta. In spite of the opening of the Ponte Umberto the above-named bridge continues to be the principal thoroughfare between the new quarter of Prati di Castello and the central part of the town. The new bridge will be built of masonry and stone at a cost of 52,000*l.*

A scheme has been for some time afloat, and it seemed to meet with great favour even in official quarters, of building a new harbour at Ostia to be connected with Rome by means of a railway. The Government having examined the scheme under the various nautical, commercial and financial aspects, the advantage of carrying it out appeared very doubtful, both as to its practical usefulness and probable financial results. The scheme will, therefore, undergo further consideration.

An interesting work to record is the new outlet for Lake



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Trasimeno near Perugia, which was much wanted, both in point of the healthiness of the locality infected by malaria owing to floods and stagnant water, and in point of cultivation of the borders of the lake. The outlet was completed in September, 1896.

AMERICAN v. GLASGOW TENDERS.

A MEETING of the Edinburgh and District Water Trust was held on the 14th inst. The works committee reported that at a meeting on October 1 seven tenders had been received and opened for providing 1,000 tons of dry sand cast-iron pipes from 4 to 10 inches in diameter, at present required by the Trust, that the committee remitted the tenders to the engineer to examine and check, and that as the pipes were urgently needed they instructed the clerk "to accept the tender of Messrs. MacLaren & Co., Glasgow, amounting to 5,287*l.* 11*s.*, if found to be correct, this being the most suitable offer."

Mr. Archibald, in proposing the approval of the report, said there were one or two matters in it which might be the better of some explanation. In the first place they would see that the committee instructed the acceptance of a Glasgow firm's tender as being the most suitable, though, as a matter of fact, it was not the lowest. They had tenders from different parties in Edinburgh and Glasgow, but the point to which he wanted to call special attention was that they had a tender from a Philadelphia firm amounting to 4,790*l.*, which was about 47*l.* below the one of which they recommended the acceptance. The reason the committee decided to accept MacLaren & Co.'s offer in preference to that of the Philadelphia firm were, first, that for this particular class of pipes the trustees were in a hurry and could not wait until the American firm could forward them; and in the second place, that they did not feel inclined at this stage to put their money into America without further consideration. The rate per ton of the Philadelphia firm was, on the average, 96*s.*, while the rate per ton of Messrs. MacLaren & Co. was as nearly as possible 10*s.* per ton higher. It was right, he thought, that it should be publicly known that they had tenders from America for pipes equally good and which it might be even more economical to lay than their own, because while their own pipes were 9 feet in length those offered by the American firm were 12 feet. (The Lord Provost:—"What about the carriage?") They were all to be delivered in Edin-

burgh. Had it not been for the fact that they were pressed, it was very probable the committee would have recommended the acceptance of the American tender.

Replying to Councillor Cranston, Mr. Archibald said the tenders were exceedingly close, one being 5,242*l.*, another 5,262*l.*, a third 5,349*l.*, a fourth 5,319*l.*, while MacLaren's was 5,287*l.*

PROTECTION FOR RIVER BANKS.

AN Italian engineer, Mr. Giovanni Villa, has devised a plan for the protection of river banks. It consists of a mantle of bricks set in a sloping position against the bank. The bricks may be of any size or shape, as convenience may suggest. These are bound together by a galvanised wire, an eighth of an inch thick. The wire runs through two or three holes in the brick, as required, and is fastened in the clay bank by means of anchor blocks, which are embedded several feet into soil. The bricks are threaded together and fastened so securely at intervals that they form a complete mantle protecting the bank. The bed of a river can be effectually covered by this method, and it is said that the works can be done as easily and cheaply under water as on dry land. The inventor has also constructed a machine which is capable of laying 165 yards of this mantle each day. One of the first applications of this invention in this country was at Hale Haven creek on the Thames last April, and experts who saw the work have praised it highly.

A party of Liverpool gentlemen recently journeyed to Heswall to inspect a piece of similar work which is in course of construction on the property of the Heswall Hall Estate Syndicate. Owners of land along the Wirral side of the estuary of the Dee have suffered great losses from time to time in consequence of the erosion of the banks. This syndicate, whose land runs down to the water's edge, resolved to check the further encroachment of the sea, and entered into a contract with the Villa Patent Mantle Syndicate for the laying of about 180 yards of the mantle. The foundation of the base of the mantle is laid in a concrete toe a few feet under the surface of the shore, and it rises to a height of 26 feet. The surface is perfectly smooth, and it is claimed that in the course of time as the little interstices between the tiles, which are rabbeted together, become overgrown with weeds and deposits from the sea, a band will be formed which will serve to render the mantle quite solid and durable.

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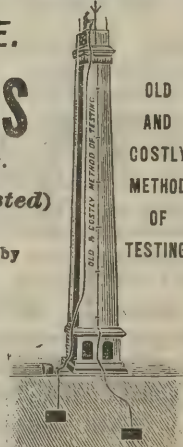
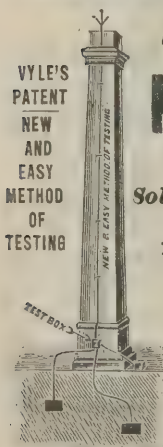
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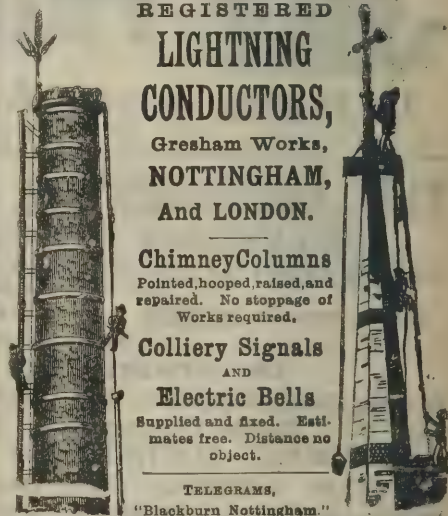
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EXAMINATIONS IN BUILDING CONSTRUCTION.

THE following syllabus of the subjects relating to building construction in which students of the classes of the Science and Art Department will be examined appears in the new edition of the "Directory":—

A larger number of questions will be set in the examination papers for the elementary and advanced stages than the candidate will be allowed to attempt, so that he will to a certain extent, be able to show his knowledge in such branches as he may, from circumstances, have paid special attention to.

First Stage or Elementary Course.

It is assumed that the student has already mastered the use of the following drawing instruments:—Rulers, ordinary and parallel; ruling pen; compasses, with pen and pencil bowsweeps, as well as the construction and use of simple scales, such as 1, 2, 3, or more feet to the inch, showing inches; or such as $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{5}{8}$, or other fraction of full size, or of any given scale or drawing; also the meaning of such terms as plan, elevation (front, back or side), section, sectional elevation.

He should understand the object of bond in brickwork, *i.e.* English bond, Flemish bond or English bond with Flemish facing, or how it is attained in walls up to three bricks thick in the following instances, *viz.* footings with offsets, angles of buildings, connection of external and internal walls, window and door openings with reveals and square jambs, external gauged arches (camber, segmental and semicircular), internal discharging arches over lintels and inverted arches.

He should know where to put wood bricks or plugging and their use, the construction and uses of brick corbelling, and the construction of trimmer arches in fireplaces.

He should be able to give sections and elevations to scale of the following kinds of mason's work, *viz.* uncoursed and coursed rubble, block in course and ashlar, with their bond and the proper dimensions of the stones as to height, width of bed and length, and of the following dressings, *viz.* window sills, window and door jambs, plain window and door heads, door steps, string-courses, quoins, copings, common cornices, blocking courses, and of the following methods of connecting stones, *viz.* by cramps, dowels, joggles and lead plugs.

He should be able to show how to join timbers by halving, lapping, notching, cogging, scarfing, fishing, and mortise and tenon; as applied to wall-plates, roof-timbers, floors, ceilings and partitions.

He should be able to draw from given dimensions, couple, collar and kingpost roofs, showing the details of the framing and of the ironwork.

He should be able to draw from given dimensions, single, double and framed floors, with or without ceilings beneath them; showing modes of supporting, stiffening and framing the timbers, trimming round hearths and wells of stairs; also floor coverings of boards or battens, rebated and filleted, ploughed and tongued, and laid folding, with straight or broken joints, bevelled or square heading joints.

He should be able to draw in elevation from given dimensions a framed partition with door openings.

He should be able to draw in elevation and give vertical and horizontal sections of solid door-frames and window-frames.

He should be able to describe by drawings beadings of different kinds, dove-tailing, cross-grooving, rebating, plough-grooving, chamfering, rounded nosing and housing.

He should be able to draw in elevation and give vertical and horizontal sections of the following doors, *viz.* ledged, ledged and braced, framed and braced, panelled, and the mode of putting them together, position of hinges and furniture, as well as to describe by drawing the following terms as applied to panelled doors, *viz.* square and flat, bead butt, bead flush, moulded, all on one or both sides.

He should be able to draw in elevation and to give vertical and horizontal sections of the following window-sashes and frames, *viz.* single or double hung sashes with square, bevelled or moulded bars, and cased frames; casement sashes hung to solid frames, with method of hanging and securing in each case.

He should be able to show in elevation and section the leadwork connected with chimneys, ridges, hips, valleys, gutters and lead-flats.

He should be able to give an elevation and section of the slating of a roof laid with duchess or countess slates on boards or battens.

He should be acquainted with the proper cross section for cast-iron beams for use in floor girders or bressummers, or as cantilevers, and be able to draw such a section in its right proportions from given dimensions of flanges.

He should be able to draw in elevation from given dimensions and skeleton diagrams, ordinary iron roofs up to 40 feet span, showing the sections of different parts and methods of connecting them.

Second Stage or Advanced Course.

In addition to the subjects enumerated for the elementary course—in all of which questions of a more complicated nature

may be set, combining work by the different trades—the knowledge of the students will be tested under the following heads, *viz.* :—

1. Freehand sketches explanatory of any details of construction, such as the joints of iron and wooden structures and other parts requiring illustration on an enlarged scale. These sketches may be roughly drawn, provided they are clear and capable of being readily understood.

2. The nature of the stresses to which the different parts of simple structures are subjected, as follows:—

In the case of beams, either fixed at one or both ends, or supported or continuous, the student should know which parts of the beam are in compression and which in tension.

He should be acquainted with the best forms for struts, ties and beams, such as floor joists exposed to transverse stress.

He should know the difference in the strength of a girder carrying a given load at its centre or uniformly distributed.

In the ordinary kinds of wooden or iron roof trusses and framed structures of a similar description he should be able to distinguish members in compression from those in tension.

He should be able in the case of a concentrated or uniform load or any part of a beam supported at both ends, to ascertain the proportion of the load transmitted to each point of support.

3. The nature, application and characteristic peculiarities of the following materials in ordinary use, for building purposes, *viz.* :—

Bricks of different kinds in common use, York, Portland, Caen and Bath stones (or stones of a similar description), granite, pure lime, hydraulic lime, Portland and Roman cement, mortars, concretes, grout, asphalt, timber of different kinds in common use, cast and wrought-iron, lead.

4. Constructive details as follows:—

The ordinary methods of timbering excavations, such as for foundations to walls or for laying-down sewers; the erection of bricklayer's and mason's scaffolding, the construction of travellers, the use of piles in foundations, hoop-iron bond in brickwork, diagonal and herring-bone courses in brickwork, damp-proof courses, bond timber in walls and the objections to it.

He should know how bricks are laid in hollow walls, window or door openings with splayed jambs, flues, chimneys, fireplaces and arches up to about 20 feet span; how mortar-joints are finished off, and the thickness usually allowed to them; why bricks and stones ought to be wetted before being laid.

He should be acquainted with the construction of brick ashlar walls, rubble ashlar walls, stone stairs, wooden stairs (both dog-legged and open newel), skylights, fireproof floors (such as brick arches supported on rolled or cast-iron girders, Fox and Barrett's, and Dennett's patent concrete floors), circular and egg-shaped drains, roofs of iron or wood for spans up to 60 feet; the fixing of architraves, linings and skirtings to walls, shutters to windows, lath, plaster and battening to walls, roof coverings of tiles and zinc, slate ridges and hips.

Written answers will be required to some of the questions.

Examination for Honours.

There will be two separate examinations—a written paper and a design—and no candidate can obtain honours who is not successful in both examinations.

The candidate will be called upon to answer in writing—illustrated by sketches, either freehand or to scale, as directed—questions on all the subjects previously enumerated for the elementary and advanced courses.

He must possess a more complete knowledge of building materials, their application, strength, and how to judge of their quality; and in the case of iron, of the processes of manufacture, and the points to be attended to in order to insure sound castings and good rivetting.

He must be able to solve simple problems in the theory of construction, and to determine the safe dimensions of iron or wooden beams subjected to dead loads.

In ordinary roof trusses and framed structures of a similar description, he must be able to trace the stresses brought into action by the loads, from the points of application to the points of support, as well as to determine the nature and amount of the stresses on the different members of the truss, and consequently the quantity of material required in each part.

In ordinary walls and retaining walls he must be able to ascertain the conditions necessary to stability, neglecting the strength of the mortar.

Those candidates who answer the questions in the written paper in a sufficiently satisfactory way will be permitted to enter for a practical examination which will be held at South Kensington. This examination will be held on one day. The time allowed for work will be seven hours—three hours in the morning and four hours in the afternoon. Candidates will be required to design some small building or portion of a building, including plan, section and elevation. The examination in Honours is not divided into two parts.

When candidates are directed to attend the examination they will be made acquainted with the nature of the building they will be called upon to design.

Candidates must themselves provide drawing instruments, T-squares and all other necessities, except drawing-paper and drawing-boards, which will be supplied by the Department.

EXTENSIONS OF LIVERPOOL DOCKS.

THE works committee of the Liverpool Docks and Harbour Board report:—

The committee having had under consideration for some time past the question of improving certain of the existing docks on the Liverpool side of the river with the view to provide increased accommodation for vessels of the largest class now frequenting the port, and bearing in mind the tendency to increase in the dimensions of vessels, and having had before them plans and reports from the engineer on the subject, it was resolved to recommend that the schemes for dock improvements, comprising the works set forth below, be generally approved, subject to such modification of details as may hereafter be thought proper, the total estimated cost of the works in question being 3,316,000*l*.

Works at the South End.

1. The construction of four branch docks, two on the west side of the Queen's Dock and two on the west side of the Wapping Dock, flanked with double-storey sheds and suitable roadways, including the deepening of the two last-named docks and the widening of the passage between them and alterations to the river wall from the Coburg Dock to the Anderton basin.

2. The construction of a graving dock, 630 feet in length, on the site of the present Queen's Half-tide Dock.

3. The widening and deepening of the north and south passages of, and the forming of a deep cut across the Coburg Dock.

4. The straightening of the north quay of the Coburg Dock and the construction of a shed thereon.

5. The construction of a new double entrance from the river to the Brunswick Dock at its south-west corner, the deepening of that dock, and the underpinning of the walls of the same and the lowering of the foreshore at the said entrance.

6. The construction of a new graving dock, 620 feet in length, on the site of the existing Brunswick Graving Docks.

7. The widening, lengthening and deepening of the Union Dock.

Works at the North End.

1. The construction of a branch dock on part of the site of the Sandon Graving Docks, and leading out of the east quay of the Huskisson Dock, flanked with double-storey sheds.

2. The construction of a graving dock, 1,000 feet in length, and having an entrance 50 feet in width, leading eastward from the north-east corner of the half-tide dock now in course of construction.

3. The formation of part of the existing Sandon Dock into a branch dock leading out of and of the same depth as the half-tide dock, and having a double-storey shed on its north quay.

4. The underpinning of the walls of the eastern part of the Huskisson Branch Dock No. 2, and those of the Huskisson Branch Dock No. 1, and the deepening of those docks.

It was also resolved to recommend that the parliamentary committee be authorised to take steps in the coming session of Parliament to obtain the necessary powers for the execution of the above-mentioned works, with such modification as may hereafter appear desirable, and provide for the carrying out of the works estimated by certain resolutions of the Board, and also for obtaining the necessary borrowing powers for the cost of the same, and the following, namely:—Modifications, conditions and exceptional contingencies in connection with the new works authorised under the Mersey Dock Act, 1891, estimate 817,000*l*.; construction of the new tobacco warehouse at the Stanley Dock, 300,000*l*.

The *Liverpool Courier*, in an article on the proposals, says:—The scheme may for popular purposes be divided into four main features. Take first of all the question of graving dock accommodation, which has been a prolific source of discontent to shipowners. What is the use, it has been asked quite recently, of building vessels of the largest type if coincidentally you do not afford them adequate graving dock accommodation? The Dock Board proposes to supply an answer to the question in an eminently practical way. At the south end two new graving docks, one 630 feet and the other 620 feet long, and both 80 feet wide, are to be constructed in lieu of the present obsolete and small graving docks—the Queen's and the Brunswick. At the north end a graving dock 1,000 feet long and 90 feet wide is to be built, in addition to the new dock 900 feet long which is now undergoing construction. These will displace the Sandon Graving Docks, which cannot take a vessel of more than 475 feet. Surely the dry dock problem will be regarded as satisfactorily solved when this aspect of the scheme comes into full operation. Just as complete and far-reaching is the attempt to grapple with the

difficulty of shed accommodation. At the north end the scheme will provide 3,560 lineal feet space of double-storey sheds 95 feet wide. This will be an entirely new addition to existing facilities. The south end will be supplied with 6,660 lineal feet of double-storey sheds each 95 feet wide. In the latter instance the fresh accommodation will only put out of commission a comparatively useless shed on the west side of the Queen's Dock, an old shed on the west side of the King's Dock, and a short length of shed between the King's and the Wapping Docks.

It is also impossible to note without a feeling of keen satisfaction that the passages are all 100 feet wide. Remembering the enormous advances we have made upon the ideas of our forefathers, it would, of course, be ridiculous to profess to read the future with absolute certainty, but as far as human probability, conjoined with eminent abilities and widespread experience, are able to indicate, these passages will meet the fullest requirements of the future. As the *Lucania* is only 65 feet wide, one would imagine that the Dock Board are not likely for generations to come to find 100 feet passages inadequate. The entrances are also to be sufficiently deepened. Some may be inclined to cavil that the deepening process has not been carried a trifle further. As a matter of practical expediency, the Board have to look not to Liverpool alone, but to other ports with which trade is carried on. As long as our entrances are as deep as those of the ports visited by the steamers trading with Liverpool, we are quite abreast of the requirements of the day. It would be an absurd waste of expenditure to deepen to an extent which is not likely to be needed. In these four essential matters of graving dock and shed accommodation and the width and depth of entrances, the Liverpool dock system ought to be the finest in the United Kingdom eight or ten years hence, and it is thoroughly reassuring to have such a bright prospect in view when we recall the activity and enterprise which are being shown by Bristol, Hull, and other rival ports in their endeavour to divert trade from Liverpool to their own centres.

A number of causes have combined to force this important project upon the attention of the works committee. One of these is the proved impossibility of dealing effectively with the influx of trade caused by a heavy cotton crop. At such a time of pressure the immense volume of cotton imports has been a never-ending source of trouble and anxiety. Nearly a million bales of cotton are landed every year in tramp steamers at the south end, and the docks and quays committee have been placed at their wits' end in their efforts to find room for the vessels. At the north end the Board have been confronted with the fact that all the regular liners are loudly crying out for more space. Almost a million of bales of cotton are landed each year by liners at the north end. Supplementary to these figures we find about 330,000 bales of cotton landed in liners at the south end, and about 450,000 bales conveyed by tramps to the north end. It is indeed during the prevalence of the cotton season that the Board always experience the greatest difficulty in coping with the situation. It is calculated by the most expert authorities that the additional accommodation provided by this new scheme will be more than sufficient to meet any emergency created by the heaviest cotton crop ever experienced in the history of the port.

Side by side with the enormous difficulty of handling the cotton crop, the one consideration which has led the works committee to adopt their present proposals is the ever-increasing size of merchant vessels. We are alluding now not merely to passenger steamers, but also to cargo boats. They are growing alike in length and capacity so rapidly that our present docks and sheds, with the exception of the very newest, cannot afford them accommodation. The advantage of the present scheme is that it opens the southern system to a length of 980 feet, whereas these docks are now restricted to about 530 feet, so far as the Harrington and Toxteth are concerned, while further north the extreme limit is about 440 feet. At the north end one great merit of the new plan is that out of the deep water entrance, 20 feet below old dock sill, it provides accommodation up to 980 feet. If we compare this state of things with the Thames, for example, we have no need to feel the slightest apprehension. Probably 500 feet is the utmost limit that a ship could safely navigate that river in its present state owing to the curves in the river.

The project is unquestionably a courageous attempt to deal upon permanent lines with a grave problem affecting the whole future of Liverpool as a first-class seaport. That it will receive the stamp of the Board's approval is already practically settled, and its progenitors will doubtless await with keen interest the verdict to be pronounced upon it by those outside the immediate circle of the Dock Board who are vitally associated with the commercial and shipping pre-eminence of Liverpool. The Chairman intimated that a convenient time will be set apart for the inspection of the plans by those interested in the matter. These latter would naturally prefer to enjoy the boons which the scheme will confer without suffering any of its corresponding financial burdens, but as they cannot have the one without the

other they may be disposed to submit gracefully to its penalties in acknowledgement of the benefits which they may fairly hope to derive from it.

The *Manchester Guardian* says:—The policy of making docks capable of holding the largest ships afloat is probably a wise policy for a port like Liverpool, but we cannot quite agree as to the non-speculative character of the scheme. The largest ship in the world is 694 feet long, a ship of 704 feet long is being built, and the longest cargo steamer afloat measures 600 feet. Building docks to hold "any number of ships 800 feet long," and some 980 feet long, when there are only three or four ships in existence which exceed 600 feet, seems to us to be speculation in the developments of shipbuilding. Such speculation is not necessarily foolish; in fact, Liverpool would not have suffered so much from competition if there had been a little more looking ahead ten or twenty years ago. But, for reasons which are perhaps not far to seek, the stately conservatism of the Dock Board has given place to an almost feverish anxiety to be in the van of progress, even, it seems, to anticipate the requirements of commerce.

THE BRITISH STEEL INDUSTRY.

ONE of the few gleams of sunshine that have appeared of late in the industrial horizon is afforded by the publication of the returns of the output of steel in this country during the first six months of the current year. These returns, as collected from manufacturers by the British Iron Trade Association, show, says a correspondent of the *Times*, that the total output of both Bessemer and open-hearth steel for the six months has amounted to 2,350,927 tons, which is at the rate of 4,701,854 tons per annum. This is by far the largest quantity of steel that has ever been produced in our own or any other European country during a similar period, although in the United States more than 6,000,000 tons of steel have been produced in twelve months. As compared with the first six months of 1896, the total increase of output of both descriptions of steel has been 381,616 tons, which is at the rate of 763,232 tons per annum. Of the total increase stated, 289,979 tons appertain to open hearth and 91,637 tons to Bessemer steel. Indeed, by far the most interesting feature of the statistics is the fact that they demonstrate the growing importance of open hearth and the diminishing relative value of Bessemer steel.

The Bessemer process, as is generally known, had a ten years' start of the open-hearth system, for which we are indebted to the late Sir William Siemens. During that period the Bessemer process had become firmly established as the process *par excellence* for the production of cheap steel, so that when the rival system entered the field it had to fight hard for its position. In 1877 the make of Bessemer steel had reached 750,000 tons, while the make of open-hearth steel was not more than one-fifth of that quantity. In 1894 both processes were running, for the first time, a neck-to-neck race, and to-day the open-hearth system has completely asserted its supremacy, the quantity produced in the first half of the current year being nearly 40 per cent. in excess of the output of Bessemer material. The natural cause and consequence of this condition of affairs may be traced in the extraordinarily rapid development of the open-hearth steel industry in the principal industrial centres of the country. This branch, originally established in South Wales, and afterwards begun in Scotland, is now carried on in Sheffield, Leeds, the Midlands, North Wales, Cheshire, Lancashire, Durham, Cleveland and other localities. The chief centres of production are Scotland and Cleveland, which have been running a close race for several years past, with the lead at present in favour of Cleveland. But the trade has witnessed remarkable expansion in other districts as well.

It would naturally be expected that the large and rapid growth of the steel trade would be a function of the corresponding decline of the old finished or wrought-iron manufacture, with which South Wales, South Staffordshire, Shropshire, Sussex and West Yorkshire have been identified for generations, and of which we find large and ample evidence in the gateways, railings and other old iron structures met with at every step of our wanderings in London and elsewhere. The old finished iron trade, however, still survives, and in some districts, notably in Scotland, is as vigorous and important as ever. It is otherwise in Cleveland, South Wales, and to a large extent in the Midlands, where steel has rapidly been displacing iron within recent years, and still continues to do so. But steel has found fields of its own entirely outside of those held by the rival material whose position it has so largely usurped. Perhaps the best evidence of this is furnished by the fact that our total make of finished material for the current year will be in the neighbourhood of six million tons, whereas some twenty years ago it did not exceed one-half of that quantity. This great development has been brought about chiefly by the extension of industrial requirements

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generally, but also, in no small degree, by the great excellence of quality and the cheapening of cost. Within that period prices have fluctuated so largely that in one case within the knowledge of the writer steel rails were being supplied by the same firm at the same time to one customer for 11*l.* and to another for 4*l.* 15*s.* per ton, the first price representing an earlier contract of three years' standing. The cost of steel has been reduced by fully one-half within a comparatively few years. Both Bessemer and open-hearth steel ingots can now be purchased for between 3*l.* and 4*l.* per ton, and practically at the same prices. One of the main sources of the improvement in the steel trade has been the greatly increased demands for shipbuilding material. The tonnage of shipbuilding constructed in the United Kingdom is now nearly 1,500,000 tons, or about twice as much as it was twenty years ago. Not only so, but within the same period we have largely supplied the shipbuilding material of other countries, including Germany, by a large export business. It is true that continental countries have recently made special efforts to secure to themselves the supply of all their home materials of construction, and some of them have been increasingly successful in this direction, but Great Britain still remains as much as ever the leading country for shipbuilding iron and steel, as well as for the industries in which these materials are so largely employed.

It is only a few years since the price of ship-plates, made by the open-hearth process, was 10*l.* to 12*l.* per ton. For the last two years the price has fluctuated between 5*l.* and 6*l.*, and yet some firms have made at least as large profits at the lower price as were possible at the higher. This result has been accomplished mainly by economies in production, of which the output of a larger yield from a given plant by better methods of handling the material has not been the least notable. Larger furnaces have also been responsible for a good deal. Twenty years ago we had few furnaces of more than ten tons capacity. To-day we have many furnaces of 40 to 50 tons. An output of 12,000 tons per furnace per annum is not now uncommon where an output of 5,000 tons would have been deemed remarkable in 1877. In other respects, and not least so in providing heavier and more powerful machinery for rolling steel plates of the largest size, as well as many other shapes, the conditions have been greatly altered. Nor need we hesitate to feel satisfied with the fact that, whatever may be our position in other branches of manufacture, we are far ahead of any other country both in the practice and in the production of our open-hearth plants. It is to this fact, perhaps, as much as to the

long and well-deserved reputation of our shipbuilders, that we owe the present unique position of our shipbuilding industry.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

22657. Henry Justus Eck and Harold King-Smith, for "An improved switch for large numbers of electric circuits."

22662. Benjamin Harlow, for "Sewage filtering screen or tank for clarifying sewage and reducing the refuse."

22664. John Peers, for "An improved ventilator."

22683. Rudolph Hauptmann, for "Improvements in processes for the manufacture of and undercutting tiles, bricks and other articles."

22684. Thomas Dalton, for "Improvements in presses for the manufacture of and undercutting of tiles, bricks and other articles."

22692. Jane Susan Jephson, for "Improvements in means for ventilating churches and the like buildings or halls."

22706. William James Vincent, for "Improvements in ladders."

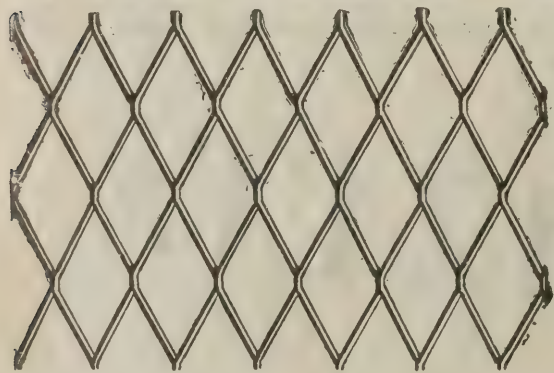
22798. Gerhard Vehrenhamp and Heinrich Saltzwedel, for "A new and improved construction of brick."

22805. August Carlewitz, for "Improvements in the manufacture of cornices and other articles of plaster and the like which have surface ornamentation in relief."

22828. Albert Henry Terrie, for "A perpetual motor."

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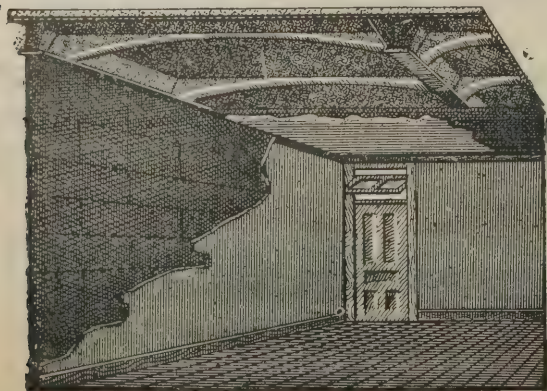
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EDITORIAL NOTICES.

The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.

Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

**** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

For Advertisement Scale, see page xiii.

COMPETITIONS OPEN.

BYFLEET.—Nov. 13.—The committee of the proposed village hall for Byfleet invite competitive plans for a village hall and working-men's club, to be erected at a cost not exceeding 1,500l. A premium of 25 guineas will be awarded. Mr. F. C. Stoop, hon. sec., Albany House, Byfleet, Surrey.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500l., 300l. and 200l. respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

DORKING.—Dec. 15.—Competitive designs and plan, with descriptive report thereon and approximate estimates, are invited for erection of infirmary upon workhouse grounds. Mr. George Scales, 35 High Street, Dorking.

SOMERSET.—Nov. 30.—The Council invite competitive plans for large hall, with cloakrooms and retiring-rooms over present post office, market house and fire-engine house communicating with the town hall, and for conversion of market house, &c., on ground-floor. Premiums of 25l., 15l. and 10l. will be awarded. Mr. Regd. L. Foster, town clerk, 1 Cathedral Green, Wells.

SOUTHEND-ON-SEA.—Nov. 20.—Plans invited for new church. Rev. E. E. Kimber, St. Albans, Avenue Terrace, Southend-on-Sea.

COMPETITION DECIDED.

BLAENAU FESTINIOG, NORTH WALES.—In an open competition for the new County Police Buildings the design of Mr. T. Taliesin Rees, A.R.I.B.A., of Birkenhead, has been selected. The accommodation had to include charge-room, cells, magistrates'-room, court-room, solicitors'-room, witnesses'-room, superintendent's office, &c., together with residence for inspector. There were eighteen sets of plans sent in.

CONTRACTS OPEN.

BARNES.—Nov. 3.—For erection of six shops and dwelling-houses on the Elm Grove Estate, Rocks Lane. Messrs. F. & W. Stocker, surveyors, 90 and 91 Queen Street, Cheap-side, E.C.

BEDFORD.—Nov. 5.—For erection of a post-office. Messrs. Widnell & Trollope, 13 Parliament Street, S.W.

BELFAST.—For erection of four houses, two shops and two stables in Bread Street and Fourth Street, Connswater. Mr. H. H. M'Kenna, 51 Ann Street, Belfast.

BELFAST.—Nov. 4.—For extension and new façade to the church, also constructing galleries, &c. Messrs. J. J. Phillips & Son, architects, 61 Royal Avenue, Belfast.

BIDEFORD.—Nov. 1.—For alterations and additions to the Kingsley Hotel. Mr. R. T. Hookway, architect, 12 Bridgeland Street, Bideford.

BIRMINGHAM.—Nov. 6.—For cottages and stabling at Edwardes Street. The City Surveyor, Council House, Birmingham.

BRADFORD.—Nov. 1.—For erection of a terrace of six houses at Undercliff. Messrs. Empsall & Clarkson, architects, 7 The Exchange.

BRADFORD.—Nov. 1.—For erection of a pair of semi-detached villas in Heaton Grove, Frizinghall. Messrs. Isitt, Adkin & Hill, architects, Prudential Buildings, Bradford.

BRIGHTON.—Nov. 2.—For erection of a block of buildings for the accommodation of children, adjoining infirmaries, Brighton Workhouse. Mr. H. S. Reed, architect, Parochial Offices, Prince's Street, Brighton.

CARLISLE.—Nov. 1.—For additional accommodation for prisoners awaiting trial at the Crown Courts. Mr. Geo. Dale Oliver, county architect, 5 Lowther Street, Carlisle.

CASTLEFORD.—Nov. 4.—For alteration to market front, Carlton Street. Mr. Wm. Green, surveyor.

CHELMSFORD.—Nov. 1.—For erection of an external iron staircase at workhouse and for making alterations to the boys' schoolroom. Mr. F. Chancellor, architect, Chelmsford.

CHELSEA.—Nov. 2.—For erection of meat store and larder at infirmary, Cale Street. Messrs. Lansdell & Harrison, architects, 12 Compton Terrace, Highbury, N.

DROITWICH.—Nov. 2.—For passenger station, for the Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station, London.

DURHAM.—Nov. 1.—For erection of a caretaker's house and alterations to Felling school. Mr. H. Miller, Board Offices, Felling.

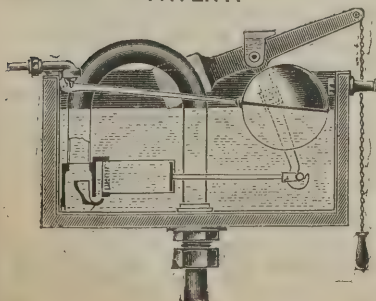
EASTRINGTON.—Nov. 2.—For erection of a classroom at the Eastington Board school. Mr. Wm. Johnson, architect, Howden.

ELGIN.—Nov. 4.—For erection of excise officer's house and duty-free warehouse at Glenfarclas Distillery, Strathspey. Mr. Charles C. Doig, architect, Elgin.

ESSEX.—Nov. 1.—For erection of a mixed school for 150 children, and teacher's residence, with offices, fencing, &c., at South Hornchurch. Mr. E. M. Whittaker, architect, 1 Gresham Buildings, Basinghall Street, E.C.

ARCHITECTS PLEASE NOTE.

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FARNHAM.—Nov. 3.—For erection of the Farnham Joint Isolation Hospital, with the necessary work, drainage and other matters connected therewith. Mr. Sydney Stapley, architect, West Street, Farnham.

GEDNEY.—Nov. 11.—For erection of an infants' school at Gedney Drove End. Mr. William Jarvis, architect, King's Lynn.

GOSPORT.—Nov. 1.—For erection of the Old Northumberland public-house in High Street. Mr. Alfred H. Bone, architect, Cambridge Junction, Portsmouth.

HASWELL.—Nov. 6.—For alterations to Haswell school. Mr. Robert Hogg, Fatten Pasture, Murton, *via* Sunderland.

HOMERTON.—Nov. 10.—For altering and repairing the houses 26 to 60 (inclusive), Sidney Road. Mr. Frank R. Coles, clerk, Homerton, N.E.

HORNSEY.—Nov. 15.—For erection of buildings for a central library. Mr. E. J. Lovegrove, surveyor, Southwood Lane, Highgate, N.

HUDDERSFIELD.—Nov. 5.—For erection of stabling and outbuildings and the formation of a bowling-green at the Griffin Inn, Crosland Moor. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.

HUDDERSFIELD.—Nov. 3.—For erection of two houses in Salford, Lockwood. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.

HULL.—Nov. 3.—For additions and alterations to the administrative block of the city asylum. Mr. A. E. White, city engineer, Town Hall, Hull.

HULL.—Nov. 3.—For pulling-down existing buildings and erecting kitchen, stores, &c., at the workhouse, Beverley Road, Mr. T. Beecroft Atkinson, architect, 11 Trinity House Lane, Hull.

IPSWICH.—Nov. 8.—For alterations and additions to the Boys' Middle School. Mr. J. S. Corder, architect, Wimbourne House, Ipswich.

IRELAND.—Nov. 1.—For erection of water-closets in the workhouse infirmary. Mr. Geo. M'Laughlin, clerk, Board Room, Workhouse.

IRELAND.—Nov. 6.—For erection of villa residence in Fermoy, co. Cork. Mr. James F. M'Mullen, architect, 30 South Mall, Cork.

IRELAND.—Nov. 1.—For repairs to Manorhamilton Court-house. Mr. E. O. N. Clarke, county surveyor, Carrick-on-Shannon.

LANCHESTER.—Nov. 3.—For erection of fitters' shop at workhouse. Mr. Geo. Thos. Wilson, architect, 121 Durham Road, Blackhill.

LIMERICK.—Nov. 5.—For tiling of the front kitchen of the library. Mr. W. E. Corbett, surveyor, 28 Glentworth Street.

LYDFORD.—Nov. 5.—For erection of two detached villas and stables. Messrs. Wiblin & De Boinville, architects, 96 Old Town Street, Plymouth.

MARYPORT.—Nov. 5.—For alteration and addition to the Wesleyan chapel and schoolroom. Mr. C. Eaglesfield, architect, Maryport.

MARYPORT.—Nov. 9.—For enlargement and alterations at the Glasson Board schools. Mr. C. Eaglesfield, architect, Maryport.

MORECAMBE.—Nov. 6.—For erection of a police station, dwelling-houses, offices, &c. Mr. Henry Littler, architect, 21 Pitt Street, Preston.

MOSSLEY.—For erection of two cottages, Stockport Road. Mr. Charles T. Taylor, architect, 10 Clegg Street, Oldham.

NORFOLK.—For erection of a reading-room at Lingwood. Mr. John Broom, Lingwood.

PLYMOUTH.—Nov. 15.—For erection of poultry, fruit, vegetable and fish market. Messrs. King & Lister, architects, 8 Princess Square, Plymouth.

PONTEFRAC.—Dec. 4.—For erection of an infectious disease hospital. Messrs. Tennant & Bagley, architects Pontefract.

PONTYPRIDD.—Nov. 6.—For additions to the White Hart Hotel. Mr. Arthur O. Evans, architect, Pontypridd.

POPLAR.—Nov. 11.—For works at Poplar baths and wash-houses, East India Dock Road. Messrs. Clarkson, architects, 136 High Street, Poplar, E.

RAMSEY.—Nov. 1.—For erection of stabling at Three Horseshoes Hotel. Mr. James Ruddle, architect, Boroughbury, Peterborough.

ROTHERHAM.—Nov. 6.—For rebuilding the parish church at Swinton. Mr. E. Isle Hubbard, architect, Moorgate Street, Rotherham.

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SHEFFIELD.—Nov. 4.—For additions to the laundry at the infectious diseases hospital at Grenoside. Mr. G. A. Wilde, architect, Bank Street, Sheffield.

SHEFFIELD.—Nov. 9.—For erection of stables, loose-boxes, cartsheds, foremen's houses, offices, boundary wall, &c. on a site between Charlotte Road and the Olive Grove Football Ground. Mr. Charles F. Wike, surveyor, Town Hall, Sheffield.

SLIGO.—Nov. 1.—For repairs to sheds on east side of Corn Market Yard. Mr. Daniel Macgill, Town Hall, Sligo.

SLIGO.—For completion of the Dominican Church. The Priory, Walker's Row, Sligo.

SOUTHBOROUGH.—Nov. 11.—For erection of a meter and governor house at the new gasworks, on the Liptraps Park Estate, High Brooms. Mr. Corber Woodall, Palace Chambers, Bridge Street, Westminster, S.W.

TRURO.—Nov. 3.—For erection of malting and other premises at Walsingham Place. Mr. Wm. Swift, architect, 23 Lemon Street, Truro.

ULVERSTON.—Nov. 9.—For alterations and additions to the female sick ward of the workhouse. Mr. Chas. W. Dean, clerk, Ulverston.

WALES.—For taking-down house known as Courty Gollen mansion, Glanrwyney, near Crickhowell, and for taking over and completely removing the whole of the old materials and rubbish, restoring the ground surface where disturbed and leaving site neat and orderly. Mr. Irvine Blennerhassett, estate agent, Standard Street, Crickhowell.

WALES.—Nov. 2.—For enlargement of Gorseion Board school. Mr. J. B. Morgan, architect, Llanelly.

WALES.—Nov. 20.—For erection at Coelbren of school buildings, with cloak-rooms, &c., and boundary walls. Mr. Richard Morgan, Coelbren House, Onllwyn, Neath.

WALES.—Nov. 3.—For extension of Trerobart infant school—accommodation for thirty infants—for the Llanwonno School Board. Mr. A. O. Evans, architect, Post Office Chambers, Pontypridd.

WALES.—Nov. 1.—For erection of new offices at Barry Dock. Secretary, Barry Railway Company, Barry Dock.

WINCHFIELD.—Nov. 5.—For erection of a cottage home at the Union House. Mr. F. S. Chandler, clerk, Oldham.

TENDERS.

ABERAVON.

For erection of eleven houses and offices. Messrs. THOMAS & JAMES, architects, Port Talbot.

J. Davies	£1,675 0 0
C. & F. Gaen	1,395 0 0
S. Rees & Co.	1,395 0 0
J. Nicholas	1,368 0 0
J. REES, Sandfields, Aberavon (accepted).	1,365 0 0

BALHAM.

For repairs to Nutfield House, Balham. Mr. St. PIERRE HARRIS, architect, &c., 8 Ironmonger Lane, E.C.

SOMERFORD & SON (accepted). £134 0 0

No competition.

BARKING.

For erection of public baths, East Street.

C. Ford	£9,490 0 0
G. Sharp	7,813 0 0
F. J. Coxhead	7,686 0 0

BARROW-IN-FURNESS.

For painting the outside wood and iron-work of the Higher Grade School, Barrow Island School, and Roose School.

Accepted tenders.

Barrow Island School.

S. S. Adams	£23 16 0
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Higher Grade School.

S. S. Adams	22 10 0
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Roose School.

W. Ramsey	12 17 6
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BECKENHAM.

For making-up Kent House Road. Mr. J. A. ANGELL, surveyor.

J. Jackson	£2,822 0 0
Fry Bros.	2,016 17 10
J. Mowlem & Co.	1,928 0 0
E. Iles	1,905 0 0
S. Hudson, Streatham Hill Station, S.W.*	1,857 9 1
Lawrence & Thacker	1,570 14 9

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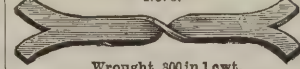
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Bexley, Kent. Mr. ST. PIERRE HARRIS, architect,
8 Ironmonger Lane, E.C., and Orpington.
R. Butler £1,040 0 0
F. Wood 1,027 0 0
T. Knight 989 0 0
A. E. Elms 895 16 10
J. Lonsdale 833 0 0
STEBBINGS & PANNETT (accepted) 748 0 0

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For erection of new epileptic accommodation at the workhouse
infirmary. Mr. W. H. WARD, architect, Paradise Street,
Birmingham. Quantities by Messrs. HARRIS & HARRIS,
Birmingham.
W. S. Seemark £2,885 0 0
H. Vickers 2,828 0 0
R. Hughes 2,811 0 0
W. Hopkins 2,770 0 0
W. Bloore 2,760 0 0
W. & J. Webb 2,691 0 0
W. J. Whittall & Son 2,670 0 0
G. Goodwin 2,633 0 0
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J. Freeman & Son 2,617 10 0
W. Robinson 2,613 0 0
F. Nicholls 2,560 0 0
J. Atkinson 2,485 0 0
Smith & Pitts 2,390 0 0
R. FENWICK, 40 William Edward Street (ac-
cepted) 2,383 6 2

BRADFORD.

For erection of a small storehouse and urinals at Tong
Cemetery, Dudley Hill.

Accepted tenders.

J. Schofield & Sons, mason.
W. Smithies, slater.
Bellfield & Son, joiner.
J. Booth & Son, plumber.

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For erection of nineteen houses in Cornwall Road. Messrs.
MILNES & FRANCE, architects, Bradford.

Accepted tenders.

W. R. Booth, Clayton, near Bradford, mason.
Briggs Bros., Bradford, joiner.
T. Hill & Sons, Bradford, plumber.
T. Nelson, Bradford, slater.
B. Dixon & Co., Bradford, plasterer.
J. Arundel, Bradford, painter.

BRENTWOOD.

For sewerage works.
W. H. SAUNDERS & Co., Southampton (ac-
cepted) £4,899 0 0

BRIDLINGTON QUAY.

For erection of a villa residence. Mr. JOHN M. DOSSER,
architect, 2 Manor Street, Hull.
J. Rennard £1,177 18 9
F. Hall 1,028 0 0
T. Goates 973 0 0
F. BLACKBURN & SON, Victoria Road, Bridling-
ton Quay (accepted) 946 0 0

BRIGHTON.

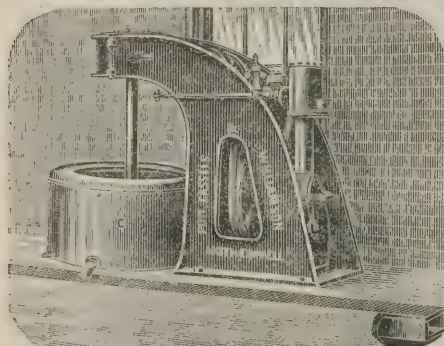
For work to be done in installing the electric light into the
administrative building at the new sanatorium.
Hawkes & Walton £225 15 6
Page & Miles 198 0 0
P. Coote 194 0 0
Reed & Son 186 0 0
T. KING, Brighton (accepted) 170 0 0

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For painting the Victoria Bridge.
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For erection of a small detached house at Chelsfield, Kent, for
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E. Fuller & Son, Walthamstow 710 0 0
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F. W. Sedwick 98 0 0
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Smith & Sons 88 0 0
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T. Rowbotham 9,022 0 0
E. Orton 8,850 0 0
A. A. Wincott 8,675 0 0
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J. Corvett 7,575 0 0
C. GARLICK, Far Gosford Street (accepted) 7,400 0 0

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For alterations to business premises, 32 Marlborough Street. Mr. H. G. LUFF, architect, 64 Chapel Street, Devonport.
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J. Healy & Son 975 0 0
J. Jenkin & Son 973 14 6
P. BLOWEY, Plymouth (accepted) 895 0 0

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J. Wardlaw	248	11	0
T. Gatiss	229	9	10
G. Robson	215	12	0
E. T. Mannors	215	0	0
J. Thompson	195	18	9
W. Craig	191	3	10
D. Champney	179	10	6
G. H. BELL, Bishop Auckland (accepted)	158	12	6

MANCHESTER.

For erection of Conservative Club at Heaton Park. Mr. PERCY D. LODGE, architect, 5 Cross Street, Manchester. Quantities by the architect.

W. Briggs	£1,294	0	0
G. & J. Barker	1,222	0	0
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For erection of county police buildings at Blaenau Festiniog. Mr. J. MORRIS JONES, surveyor, Trawsfynydd. T. T. REES, 32 Hamilton Street, Birkenhead (accepted) about £1,800.

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W. Duthoit	260	0	0
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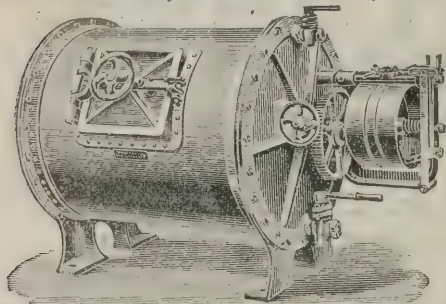
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J. Robson	132	14	3
J. Thompson	128	14	0
B. Babe	127	5	8
M. D. Young	122	11	0
W. Sproat	119	17	7
A. Tench	115	2	10
J. Nevir	110	0	0
W. Cumming	108	0	0
W. CRAIG, Gateshead (accepted)	105	14	10

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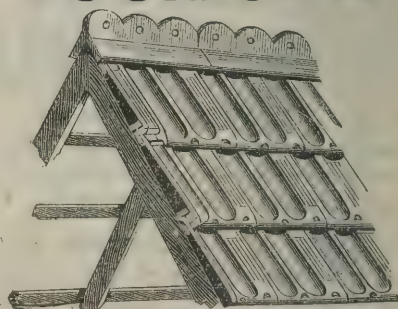
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STOCKTON.

For plastering-work of two cottages.
T. WIDDOP, Parliament Street (*accepted*) . . . £15 0 0

SWANLEY.

For erection of a block of six houses, Swanley, Kent. Mr.
ST. PIERRE HARRIS, architect, 8 Ironmonger Lane, E.C.
and Orpington.
J. Lonsdale £1,374 0 0
STEBBINGS & PANNETT (*accepted*) . . . 1,362 0 0

TAMERTON FFOLIOT.

For the construction of works for the water supply of Warleigh
Estate. Mr. R. HANSFORD WORTH, engineer, Plymouth.
C. L. Duke £1,367 0 0
J. Shaddock 1,324 0 0
F. C. Ambrose 1,258 0 0
J. Davy 1,212 0 0
E. Duke 1,097 0 0
J. Fisher 1,070 0 0
Hawking & Best 947 0 0
A. THOMAS, Bodmin (*accepted*) . . . 819 0 0
R. T. Hortop (*withdrawn*) 624 0 0
Engineer's estimate 910 0 0

THE FORELAND.

For erection of a lighthouse at The Foreland in the Bristol
Channel.
JONES BROS., Lynton (*accepted*)

TONYPANDY.

For additions and alterations to Compton shops. Messrs.
GRIFFITHS & JONES, architects, Tonypandy and
Pontypridd.
J. JAMES & SON, Penygraig, Rhondda (*accepted*).
For erection of shop and additions. Messrs. GRIFFITHS &
JONES, architects, Tonypandy and Pontypridd.
D. EVANS, SONS & Co., Penygraig (*accepted*).

THRAPSTON.

For paving, metalling, channelling and making-good of Halford
Street, Thrapston. Mr. GEO. SIDDONS, surveyor.
Wilmott £400 0 0
Freeman & Son 369 0 0
A. TRAYNER, Islip, Thrapston (*accepted*) . . 275 0 0

WHITECHAPEL.

For alterations and remodelling bars of the Blind Beggar
public-house, 173 Whitechapel Road, E., for Mr. Charles
Martin. Mr. ERNEST H. ABBOTT, architect, 6 Warwick
Court, High Holborn, W.C. Quantities by Mr. ALFRED
JOHNSON, surveyor, 50 Imperial Buildings, Ludgate
Circus, E.C.
Dabbs £2,285 0 0
Fordham 2,271 0 0
Harper 2,267 0 0
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A. E. Symes 1,998 0 0
T. Russell 1,973 0 0
T. W. Smith & Son 1,933 0 0

THE new centenary buildings erected in connection with the
Wesleyan church at Melton Mowbray are now open. A consider-
able amount of property in the neighbourhood of the chapel was
purchased a year ago, and upon a portion of the space which
this occupied has been erected a suite of rooms, including a
spacious lecture-hall and a number of classrooms. The total
expenses in connection with the extension scheme will be about
2,500*l*.

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TRADE NOTES.

THE North Riding Infirmary, Middlesbrough, is being warmed and ventilated by means of Shorland's patent Manchester stoves, with ornamental tiled sides.

MESSRS. OETZMANN, of 62-79 Hampstead Road, N.W., ask us to mention that they are offering at reductions of from 30 to 60 per cent. every class of furniture and equipment, including carpets, curtains, silver, electro-plate, china and glass. They have bought the entire stock of Mr. John Crossley, of Newark and London, amounting to close upon 10,000l., and are also including the whole of their own attractive stock, as they are on the eve of making large additions to their premises and wish to avoid damage.

A HANDSOME oak reredos has just been erected in the parish church of Kirkheaton, near Huddersfield. It is given in commemoration of the completion of the sixtieth year of Queen Victoria's reign, and in remembrance of William Edwards Hirst, of Lascelles Hall, by members of his family. The work was entrusted to Messrs. Jones & Willis, of Birmingham, London and Liverpool.

A NEW material, to which the name "Phrahzit" has been given, is now being introduced to the notice of architects, and will more than repay the time devoted to becoming acquainted with its special qualities and varied uses. Its primary use is for covering floors, walls, ceilings, roofs, &c., and rendering them fireproof; and that it effects this is proved by the samples we have seen after being subjected to a temperature of 1,000 degrees, and which are uninjured and retain their original colours, although the cement with which they are backed is reduced to carbon. It has, however, other features equally interesting to our readers, being sound-proof, a result that has hitherto only been obtainable by the introduction of expensive materials. It is also waterproof, and can be washed without retaining any moisture, preventing rotting; is a non-conductor of heat, and is not affected by heat or frost, and being of a plastic substance it does not crack. "Phrahzit" is a material composed principally of wood-pulp chemically treated, which accounts for its extreme lightness, a desideratum in any material used for building purposes. It is used either dry or wet, in the former manner for floors, and after being laid is rendered a solid piece by means of moisture, and in the latter for walls, ceilings, &c., being applied in a similar manner to plaster. It thus forms a solid surface. It can also be supplied as tiles or mosaics, or

moulded and shaped into any design for ceiling or wall decoration, pilasters, balustrades and other forms of architectural decoration. It is produced in any colour and pattern in imitation of costly marble or parquetry. We have said sufficient to show that, as the patentee claims, it is sanitary, light, fireproof, &c. Further particulars can be obtained from Mr. Joseph T. Szek, of 63 and 64 Chancery Lane, W.C.

ELECTRIC NOTES.

ARRANGEMENTS are now being completed whereby the corridors and offices occupied by the officials of the Crown Office and the Associate's Department at the Royal Courts of Justice will in future be supplied with electric light from an outside electric-lighting company instead of from the inside source as at present.

THE use of the "X" rays has had a curious result in Paris. A painting, as to the authorship of which there was some doubt, was "radiographed," whereupon the great artist's name (Albert Dürer) was discovered beneath the accumulated dirt of many years, thus establishing the authenticity of the picture.

AT a special meeting of the Hamilton Town Council it was resolved to apply to the Board of Trade for a provisional order, under the Electric Lighting Act, 1882, to authorise them to supply electricity for public and private purposes within the municipal bounds of the burgh.

THERE has been inaugurated in the city of Malaga another development of English capital in Spain, by the opening of an electricity supply works there, erected to the plans of Mr. Robert Hammond, of London, for a group of London capitalists. The works and plant were duly blessed by the Provincial of the Jesuits, Very Rev. Father Sensano, in the presence of Mr. Robert C. Wyatt, the chairman of the company. The plant, by Fowlers of Leeds, ran through its first night's service with a smoothness that astonished those not accustomed to the solidity of English work. The electric light is an immense boon in so hot a climate, and there are already 600 customers wired.

THE *Melbourne Argus* of September 20 says:—According to the evidence of Mr. H. W. Jenvey, the electrical inspector of the Post and Telegraph Department, the recent fatality to a boy who climbed a pole at Malvern and laid hold of an electric-light wire was due to a defective insulator fastening. Mr.

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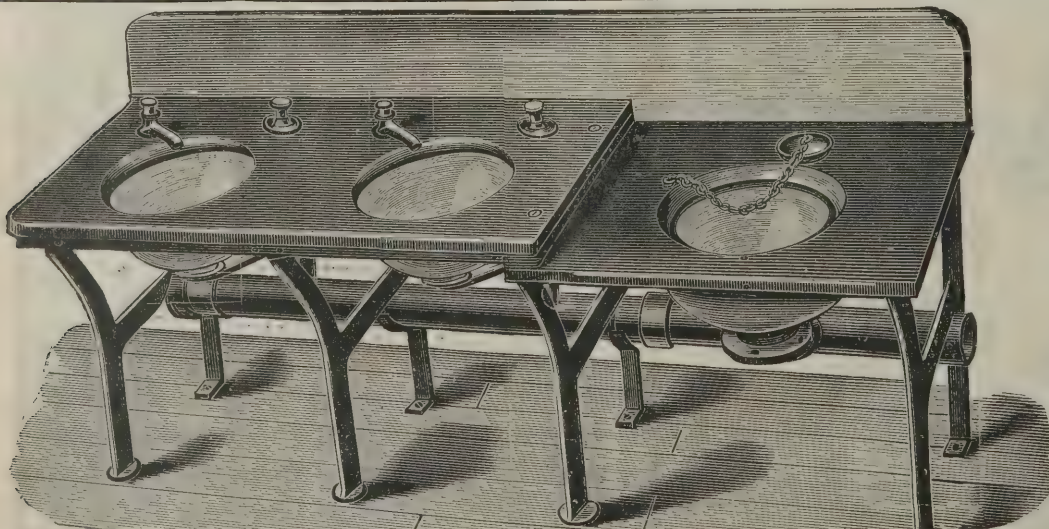
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Jenvey has now been called upon for an official report on the matter. This will be forwarded to the Crown Law Department, with a view of considering whether proceedings should be taken against the New Australian Electric-Lighting Company under the Electric Light and Power Act.

AN accident of a very unusual nature occurred in Edinburgh a day or two since. The electric light is being introduced into a shop in Georgie Road, and in order to make the connection with the mains running beneath the pavement there, the workmen had to break the earthenware ways. In the course of the operations the men on more than one occasion used a lighted lamp. At first nothing occurred to lead to suspicion that there was danger in so doing, but they were surprised to find at a later stage that some gas in the ways had become ignited. Carried along the earthenware tubing the flame soon reached a "box" in the street where the gas had evidently gathered, and with a loud bang the cover of the "box" was blown into the air, and in falling severely injured a little girl.

AN inquiry was held by Major-General H. D. Crozier, R.E., in Bradford, on the 26th inst., into the application of the Local Government Board for sanction to borrow 50,000*l.* for the purpose of extending the machinery, plant, mains, and effecting improvements in connection with their electricity works. This will bring the Corporation's borrowing powers on their electricity works up to 120,000*l.*, and they asked for sixty years in which to repay the amount applied for. The inspector, however, pointed out that twenty-five years was the period now usually allowed. The town clerk (Mr. George McGuire) explained the accounts, and afterwards the inspector proceeded to view the works.

BUILDING AND BUILDERS.

A NEW town hall is to be built at Belfast at a cost of 155,000*l.*

AT a meeting of the Kingston-on-Thames Jubilee Hospital committee on Monday night, the 25th inst., a tender was accepted for the erection of the building at a cost of 3,580*l.* It was decided that the foundation-stone should be laid by the Mayor on November 6.

THE foundation-stone has been laid of the new St. Paul's Episcopal church in Springwell Avenue, Airdrie. The church, which is being built of red stone from Bothwell Park quarries, is from designs by Mr. H. D. Walton, Glasgow. It is being

seated for 200 worshippers and will cost 1,300*l.* The building is in the Early Decorated style of Gothic architecture.

THE foundation-stone of St. Matthew's Episcopal church, Possilpark, was laid on Saturday afternoon. The new church, which is situated in Ardoch Street, is from designs by Mr. H. D. Walton, architect, Glasgow, the style being the Late Decorated Gothic. The front block has a frontage to Ardoch Street of 60 feet, and consists of two large rooms, capable of being thrown into one, on the ground floor, with an upper hall, chancel and vestries above. Two large entrance porches and lobbies will give access to the church, which will fill the rest of the site eastwards. The front wall will be of red stone, the interior walls being faced with brick, and the hall will have an open timber roof. The church, which will consist of nave and aisles, organ chamber, vestries and chancel, will be seated for about 500. The total cost will be about 3,000*l.*

VARIETIES.

THE trustees of the Friendly Societies' Home have appointed Mr. A. Saxon Snell, F.R.I.B.A., architect for the erection of a home at Herne Bay for fifty patients.

THE Mayor of Gloucester laid the foundation-stone of the administrative block of the new infectious hospital on the Vineyard Estate at Over on the 21st inst.

WORKMEN are now busy demolishing the northern side of Parliament Street, and the widening of the already handsome thoroughfare will soon be an accomplished fact.

THE Bishop of Lincoln has opened a new building at Spalding, designated the Church Cote, which has been erected for the use of local church organisations. The cost was over 550*l.*

A NEW schoolroom, which has cost 5,000*l.*, was opened on Friday last at Ellesmere College, which flourishing branch of the Woodard schools was established in 1884.

ONE of the largest churches in Santa Rosa, a city in Sonoma county, Cal., of about 7,000 inhabitants, was, says an American paper, entirely built, including inside finish in wood instead of plaster, from a single redwood tree; and, in addition to building the church, over 60,000 shingles were taken from the same tree.

A MEMORIAL consisting of a bust and an allegorical figure of Guy de Maupassant, by the sculptor M. Raoul Verlet,

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SURREY COUNTY HALL, SURBITON.

has been erected in the Parc Monceau, Paris. The spot is chosen in pathetic remembrance of a passage in one of the writer's novels, in which this verdant, leafy Parisian resort was described.

THE Conference convened by the Municipal Officers' Association will hold an adjourned meeting in London on Thursday, November 4, to consider what action it will take with regard to reintroducing a Superannuation Bill in the next session of Parliament. Mr. C. J. F. Carnell, 33 Paulet Road, Camberwell, is hon. secretary to the Conference.

A FIRE of disastrous proportions occurred at Glasgow on Tuesday morning. In an alley between York Street and James Watt Street, in the midst of a locality given over almost wholly to bonded stores of spirits, tea, tobacco and other Customed goods, a large block of warehouses was totally destroyed, while several others were partially burned, and damage caused to the amount of about 50,000*l*.

THE Grammar School at Normanton, which dates back to the reign of Elizabeth, having been rebuilt, was formally opened by the Earl of Crewe. The building is situated in Church Lane. Built of brick with stone dressings, it has an attractive exterior. It provides accommodation for eighty students. Around it is an extensive playground.

THE Brewers' Exhibition opens at the Royal Agricultural Hall, Islington, to-morrow, October 30. This exhibition has, during its nineteen years' existence, done much to benefit the important trades whose interests it represents, besides being a source of attraction and information to the general public. The malting barley competition, which has been the means of spurring on the farmer to obtain better seed and devote more care to barley cultivation, will again form one of the leading features of the exhibition, and in spite of the difficulties of the

season that growers have had to contend with, the entries bid fair to reach the total of last year.

THE new and handsome club premises, erected in Norfolk Street by the Liberals of the Leeds South Ward, South Leeds, at a cost of between 3,000*l*. and 4,000*l*., were opened on the 23rd inst. The building is two storeys high and is constructed of red brick with stone dressings. On the ground-floor is the club, where are a large billiard-room, containing three tables, a recreation-room, a reading-room, a central hall, in which the bar is located, and several other smaller apartments. On the second floor is a large assembly-room, lighted principally by a Tudor window, which takes up the greater part of one end of the hall.

THE church of St. Laurence, Tidmarsh, which has recently undergone a thorough restoration from Mr. Oldrid Scott's plans, ably carried out by Messrs. Boxall & Son, of Pangbourne, was reopened on the 19th inst. Two frescoes of saints were discovered in a window on the north side, which have added greatly to the interest of this ancient little church, which possesses a very rich Norman doorway, a beautiful old font and a polygonal apse. The remarkably pretty steeple of oak shingles bears the gridiron as a vane. The cost of the restoration is estimated at 900*l*.

A NEW day and Sunday school for the parish of St. Stephen's Rashcliffe, Huddersfield, was opened on Saturday, the 23rd inst. The building, for which Mr. J. Berry, Huddersfield, was the architect, is light and airy, and comprises central hall, two classrooms and infants'-room, the whole providing accommodation for 185 children, whilst by movable partitions at the extreme ends of the central hall the classroom accommodation may be increased. The tenders for the work amounted to 1,510*l*.

THE church of St. Paul, Northwich, owing to the ravages of salt subsidence and the fears entertained of further sinking, has been closed to the public. In August a portion of the sanctuary floor collapsed. Since then service has been regularly held in the church, but an architect has condemned the building, fresh cracks having developed in many parts of the structure. It has been found that the chancel is built upon arches which are regarded as insecure, and it has therefore been deemed advisable to suspend all gatherings in the church. The roof, the main walls and the porch have suffered severely, and entire reconstruction is imperative.

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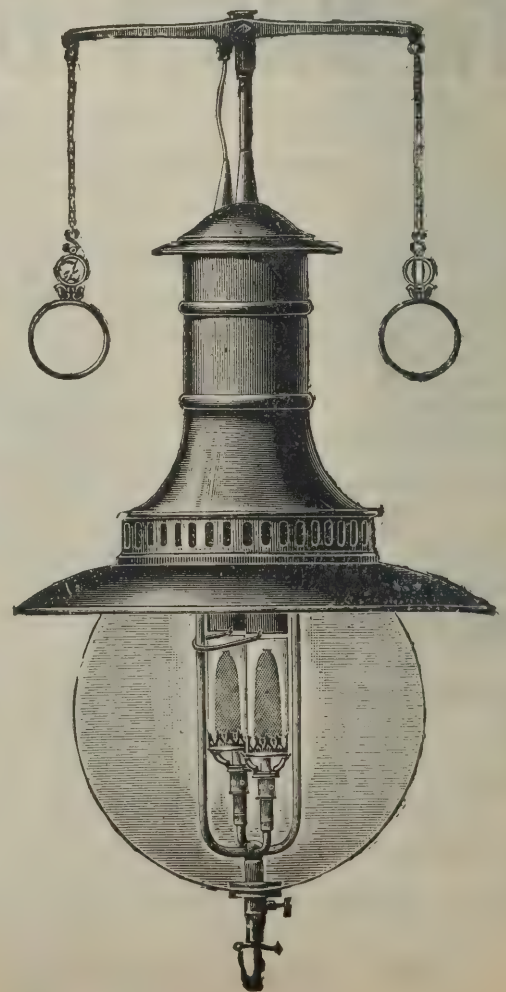
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A HANDSOME and artistic reredos has been added to the decorations of St. Matthew's Church, Sinclair Road, Kensington. The new adornment is from designs by Mr. Litchfield, of the Sinclair Galleries, and is constructed of stone in the Gothic manner, leaving a space to be filled by an old painting by Nicholas Droost, which the designer has been fortunate enough to secure for the purpose. On either side to the north and south are oak panels in the same Gothic style, while the chancel walls, which were previously of plain brick, have been carefully coated with a green in harmony with the rest.

THE new hall at the Maltland, Inverary, in which castle gatherings will be held, has now been completed, and Her Majesty's Diamond Jubilee rejoicings, which had been deferred at Inverary Castle for lack of adequate accommodation, will be held there. The building is 120 feet long by 40 feet wide and 45 feet high, with a raised dais at the west end, and a gallery at the opposite end, which will be used as a tea-room. There are three doors in front and one in rear, with five large windows on one side and seven on the other. The illuminating power at night is derived from eight large incandescent Swan lamps of 150 candle-power each. The cloak-rooms and lavatories are beneath the gallery, and are fitted up with small incandescent lamps. The work was under the direct supervision of Mr. Wyllie, chamberlain of Argyll. Kitchen and supper-rooms have been erected in rear of the main building.

ON Sunday morning fire was discovered to have broken out on the farmhouse of Fassifern, about 12 miles from Fort William. The outbreak, which occurred in the kitchen, is believed to have been caused by a chimney catching fire and igniting some old joists which protruded into the flue. In a very short time the whole of the kitchen was a-blaze, and all efforts to extinguish the flames proved futile. The workmen at present engaged at the construction of the Mallaig railway rendered valuable assistance, and when it was seen that the kitchen could not be saved a number of men got on to the top of the house and with hatchets and crowbars managed to sever the burning part from the house proper. The day, fortunately, was quite calm, or in all likelihood the whole steading and offices would have been consumed. As it was, the kitchen was completely gutted and its contents destroyed. The damage, which will amount to several hundred pounds, is covered by insurance. Although now a farmhouse, Fassifern was at one time the home of a branch of the Camerons of Lochiel, and Prince Charlie is said to have slept there during the rebellion of '45.

THE colossal monument to the Tsar Alexander II., which is being erected in the Kremlin, is rapidly approaching completion. The statue, nearly 16 feet high, is the work of the Russian Academician Opekouchine, from the design of M. Joukovesky. It stands on a huge block of Finland granite, weighing about 23 tons, and is surmounted by a cupola or canopy of the same material, save that the pyramidal roof, reaching 100 feet into the air, consists of gilt-bronze plates, the pattern showing out upon a background of black enamel. Round the canopy run arched galleries decorated with mosaics representing the thirty-three Sovereigns of Russia. Gilt bronze is freely used in the external ornamentation, and seen from a distance the whole structure suggests the idea of a fabric of gold. When finished the total cost will exceed a million and a half of roubles.

TENDERS for the erection of the new buildings for the Glasgow School of Art have been accepted. The plans, which are by Messrs. Honeyman & Keppie, are of a very complete description, and embrace all recent ideas and improvements. The site has a frontage to Renfrew Street, between Dalhousie Street on the east and Scott Street on the west, with a length of 250 feet to Renfrew Street, and a depth of 77 feet, and the building will face north and be of three floors. The foundations of the whole structure will be laid at the beginning, but only a portion of the building will be undertaken in the meantime, namely, the part which commences at the eastern boundary in Dalhousie Street, and runs west to the western wall of the main entrance in Renfrew Street. This section includes the western walls of the museum and main staircase. The cost of this portion is estimated at a little over 18,000*l.*, and the area covered will be about 1,200 square yards.

THE Darnley Fever Hospital, which is now completed and ready for the reception of patients, is situated on the main road between Nitshill and Thornliebank at a point at which that road is joined by roads from Pollokshaws and Barrhead, and it is distant about half a mile from Nitshill railway station. The hospital is situated as nearly as possible in the centre of the district from which its patients will be derived. Accommodation is provided for forty-two adult patients. A large proportion of the patients, however, will be children, so that the hospital may be set down as equal to the accommodation of about sixty patients. The cost of the hospital has been something under 15,000*l.*, which on the nominal accommodation of forty-two beds works out at 357*l.* per bed.

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BANSTEAD ASYLUM (L.C.C.),
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PIONEER CLUB,

TUNBRIDGE WELLS GOLF CLUB,
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A CONCRETE ARCH.*

DEER PARK is the name applied at the present time to an enclosure of some 400 acres on the east bank of the Big Vermillion River, about 4 miles from its junction with the Illinois River. The place is one of historic interest, and derives its name from the main canyon within its enclosures, the name having been applied to this gorge by the early settlers, and possibly the Indians, who, history tells us, used it for entrapping deer.

Deer Park is now the property of Mr. F. W. Matthiessen, of La Salle, who has expended a large amount of time and money in making it a more attractive spot and in rendering its beauties more accessible to visitors. To this end an extensive system of drives has been constructed, and it was for the purpose of centrally connecting the drives on the east and west side of the canyon that the structure which forms the subject of this paper was designed.

The main canyon above referred to is an immense gorge carved out of the St. Peter sandstone. It extends from the east bank of the river in a north-easterly direction in a somewhat circuitous route, until it has attained a lineal length of something more than a mile. For the first 2,000 feet from the river the side walls are for the most part vertical or overhanging, and rise from 60 to 80 feet above the bottom of the canyon, and vary from 60 to 100 feet apart. The bottom rises some 10 feet in this distance, and at this point rises 55 feet, thus producing a beautiful waterfall. Fifty-five feet beyond the fall the arch is located. The walls here are about 30 feet apart, rise vertically some 30 feet and then slope back at an angle of about 45 degs., and are composed of St. Peter sandstone worn irregular and hardened by exposure.

Preliminary to the construction proper, the sloping sides were prepared by dressing into planes approximately at right angles to the line of thrust. This afforded an excellent natural skewback for the springs of the arch, which were located 33 feet above the bottom, and their position such as to require a span of a little over 40 feet.

The dimensions of the arch are as follows:—Span, 40 feet; rise, 8 feet; curve, circular arch; width, out to out, 16 feet; thickness of ring at crown, 26 inches; at spring, 32 inches; wings, 7 feet long; spandrel walls and wing walls,

16 inches thick inside coping, vertical on outer faces, and battered 3 inches per foot on inner faces; coping, 22 inches wide and 6 inches thick, extending out on each side of walls 3 inches.

To form a platform from which to erect the centres, poles were cut long enough to reach across the canyon, just below the springs. These were put in and covered with plank. The ribs for the centres were eleven in number, each composed of 2 by 14 plank, 10 feet long, sawed on one edge to the proper curve, ends cut radially, and bolted together so as to break joints. Half-inch bolts, with a wrought washer, were used. The pieces were also spiked together. The ribs were built at one side, and then set in place from the platform.

The bearings for the ribs were made by setting a 2 by 12 plank in proper position on each side, and filling in behind with concrete. On one side, however, this plank was set so as to afford about 5-inch spaces for wedges, to facilitate removing the centres after completing the work. These wedges were made of 3 by 12 plank, cut 12 inches long, and sawed diagonally so as to make wedges $2\frac{1}{2}$ by 12 at one end and $\frac{1}{2}$ by 12 at the other. The bearing faces were planed. They were made of hard pine and used in pairs, set between the bearing plank and a plank spiked to the ends of the ribs, a pair being placed at the foot of each rib.

The ribs having been set in place, the exterior ones flush with the sides of the arch, viz. 16 feet out to out, they were crowned with 1 by 6 common fencing, nailed on with ten-penny wire nails. On each side of the centre and nailed to the extreme ribs, boxing was constructed of 1 by 10 dressed boards, nailed to 2 by 4 uprights, the latter tied across about the top of the arch. Two portable partitions were made to use on top of the centre. These were made of 2-inch plank, 16 feet long, carrying a bracket at each end, made of 2 by 4 stuff. These partitions were set $2\frac{1}{2}$ feet from each skewback, thus forming an enclosed space for the first block of concrete. A platform 10 by 16 feet was constructed on each side of the canyon for mixing the cement.

The first block of concrete was now put in in 6-inch layers the full thickness of the ring, when the force was transferred to the opposite side and that end started. By the time the second block was in place the first had sufficiently set to allow the moving of the partition forward $2\frac{1}{2}$ feet for the next block. Thus the work was carried on, alternating from side to side until the completion of the ring. The brackets were so attached to the partition that they could be spiked to the

* A paper read by Mr. C. H. Nicolet, and published from the Proceedings of the Illinois Society of Surveyors and Engineers.

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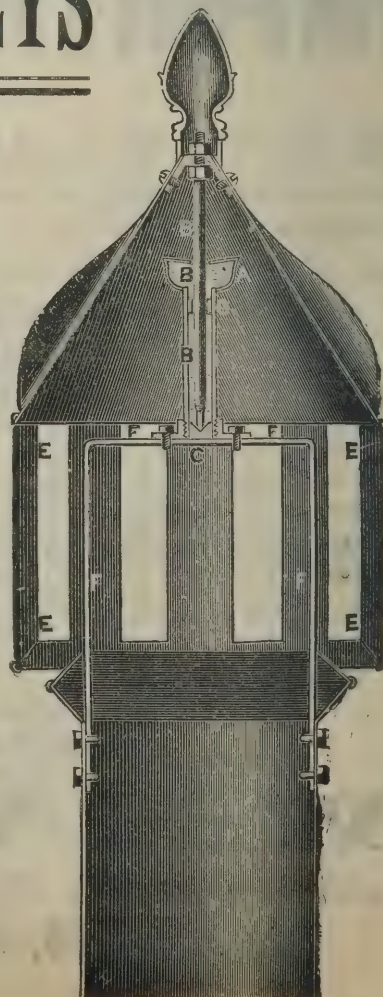
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centre for each new position and having the force normal to the intrados.

Upon the completion of the ring the boxing for the spandrel walls was built and the construction of the walls carried on, the material being deposited in layers 6 to 8 inches thick. The boxing was made by a carpenter of 1-inch boards, dressed on one side, nailed to 2 by 4 uprights, and so constructed as to meet the conditions of pressure and give the form desired in the finished work. The materials used were as follows:—

Sand.—Ordinary river sand, of fair quality for the kind, taken from the bed of the river and unwashed.

Gravel.—Ordinary river gravel, varying in size from a pea to pieces 3 inches in diameter, and well rounded. It was taken from the bank or dry bed of the river, and well washed in the river water before taking to the site. It will be seen that the sand and gravel were not all that could be desired in such work. The gravel was especially unsatisfactory, but it was believed that by taking care to cleanse well and thoroughly mixing and tamping good results would follow. This was possible, as the work was carried on by day labour under a trusted foreman.

Cement.—Portland, brands Offenbach & Pommerscher (Stettin) in the ring and coping and letica in the walls. The proportions used were as follows:—Portland cement concrete 1 cement, 3 sand, 5 gravel; for the letica cement concrete, 1:2:4. The materials were incorporated by first mixing the cement and sand dry, tempering thoroughly with a limited amount of water and spreading. The gravel was then added in a layer on top, and the whole then turned with shovels until fully mixed—usually accomplished in three turns. The mixing was done in batches of a size made by one borne of cement, and each batch was thoroughly tamped in 6-inch layers when put in.

The coping was surmounted by a railing made of two lines of 1½-inch wrought-iron pipe, with uprights of same pipe about 8 feet apart, set 1 foot into the concrete. The lower ends of the pipes were filled with cement as a precaution against collecting water and freezing. At the foot of each post was placed a large o.g. cast washer to give a more finished look.

This work was closed up November 15, 1894. Frosts had set in before the ring was completed. No precautions were taken to prevent the freezing of the concrete. No fears were entertained for the Portland cement work, but doubts were felt as to the outcome of the spandrel walls, as these had been made of natural cement. There were good reasons

for completing the concrete work, however, at that time, and it was done. Parts of the walls were subjected to severe frosts within a few hours after building.

The boxes, centres, &c., remained on the work through the winter, and were removed on the advent of settled weather in the spring. The Portland cement work was in remarkably good shape. The walls, however, showed the effects of the frost on the outside, and in places it was necessary to scrape off the injured material to a depth of 3 inches. This, however, was the exception, as ordinarily only a skin coating was injured and had to be removed. This done, all the surfaces were washed with a hose jet and a coating of Portland cement mortar pressed home over all of them, the surfaces that were scraped out having first been built out.

The wedges used under the centre were readily removed, easing each a little at a time.

A recent inspection of the work after two years shows no cracks or faults whatever nor any loosening or peeling off of the coating put on in the spring of 1895. At the time of completing the work measurements were taken across the roadway over the spring lines to known points on opposite copings. The spandrel walls are highest at these points. A recent test shows the same measurements, and from this it is inferred that the work in the walls is permanent, notwithstanding the unfavourable conditions at the time of their construction.

The filling over the arch to form a roadway was of gravel and soil, put on in the spring of 1895, and surfaced up to a depth of about 1 foot over the crown.

The form of centre used made a very stiff structure. Levels were taken with a view to detecting any possible rise of the crown as the haunches were built out, but no change of level could be detected.

THE BIRMINGHAM MEAT MARKET AND SLAUGHTER-HOUSES.

ON Wednesday the Lord Mayor of Birmingham opened the new market buildings, which in completeness are unique in this country. They were erected from the designs of Messrs. Essex, Nicol & Goodman, which were reproduced in *The Architect* at the time of selection.

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central building of the block running from Bradford Street to Cheapside, and separated on either side from the slaughtering establishments by a covered roadway for carts and waggons. The position and dimensions of the market hall, together with its roadways, are as decided by the committee in consultation with the consulting architect; both ends are out of square, one side being longer than another owing to the necessity for the twenty slaughter-houses on the one side being made as wide as possible. The difficulty of roofing so large a space with hipped ends has been got over by the introduction of a long column at both ends, which carries a lattice girder supporting the irregular rafters. The only objection to the arrangement is that externally the end of the building next Bradford Street is not parallel with the water tower, but practical and economical reasons have prevailed in this matter. The eaves of the roof project beyond the line of the wall to keep out the direct rays of the sun as much as possible; the roof lights are continuous, having also projecting eaves.

The hall, which is almost identical in proportions with the old retail market hall in High Street, is 365 feet long and 90 feet broad, the height of the side walls being 35 feet, and the height to the ridge 65 feet. It is fitted for hanging over 3,000 sides of beef in seventy-three market stands, and is divided by two longitudinal and three cross avenues.

This market is one of the first establishments where a complete system of overhead travelling rails has been carried out. The meat, on being hoisted to roller hook height, may remain suspended while being conveyed to and from the market. The meat may be taken to any of the seventy-three market spaces for sale, travelled to the covered roadways for carting away, or on to the lifts and taken down, still suspended, to the chill-rooms in the basement, from which it may subsequently be returned in the same way.

Considerable trouble has been taken by the committee and the architects to obtain the best system of travelling rails and switches, the ultimate decision lying between a foreign system of twin travelling rails with catch point switches and the usual single rail, fitted however with balanced rising lever bridge switches, manufactured by Messrs. Kesson & Campbell, of Glasgow; the latter system being chosen on account of its simplicity.

The market hall is fitted with 1,216 incandescent electric lamps of 32 and 25 candle-power, and 57 lamps of 50 candle-power.

The salesmen's offices are placed in the centre of the hall

over the stands, so as not to take up the floor space below, and are approached by two staircases, under which are the public scale offices.

Two hydraulic lifts in the centre of the hall communicate direct with the cold stores and chill-rooms, which have been constructed in the basement. The floor of the hall forming the basement ceiling is constructed of suspended concrete.

The buildings adjoining Sherlock Street East consist of superintendent of markets and meat inspector's offices, caretaker's house, mess-rooms, stable and van yard, and hide and fat stores. On entering by the cattle entrance in Sherlock Street East, immediately in front is a row of twenty slaughter-houses for wholesale salesmen. Each slaughter-house is fitted with the necessary apparatus for two sets of men to work at one time.

These twenty slaughter-houses are fitted with 119 incandescent electric lamps of 32 candle-power each, and 97 of 50 candle-power each. In the yard outside the slaughter-house doors are pens for animals about to be slaughtered. Lairage for about 200 beasts is provided over the slaughter-houses, and for about 500 sheep over the block of offices, &c., adjoining Sherlock Street East. Access to the lairage is obtained by a sloping way leading from the yard. This sloping way is divided into three parts, one up and one down, with a drover's passage between. At the Cheapside end of the yard a hydraulic lift is provided, to be used in connection with the lairage, for casualties or as may be required.

A general view of this range of buildings will illustrate a very important point, namely, the drainage. From the concrete floors of the lairs the drainage flows into open iron troughs running along the outside wall. From these it descends by iron shoots into shallow open channels in the pavement of the yard. The slaughter-house floors are arranged so that the swillings flow directly into open gutters and so into the channels outside. At the boundary wall a catchpit is provided. This has three levels, with meshed screens successively increasing in fineness, so that practically all solid matter is removed before the drainage reaches the sewer. Nowhere in the place is there any pipe connected with the public sewer. In fact, there is not a single pipe drain except in the basement, where, owing to the shallowness of the sewers in the neighbourhood, pumping is necessary. The solid refuse must necessarily be removed promptly by hand, since otherwise it will accumulate and form not only a nuisance, but an obstruction. To facilitate the systematic cleansing of the floors and channels

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and the removal of refuse, a small trolley runs along rails in the yard adjoining the slaughter-houses.

Access to the basement is by a subway passing from the slaughter-house yard on the north side, and connected through with a roadway opening into Bradford Street and Cheapside on the south side of the site.

At the Bradford Street end of the basement and underneath the wholesale market hall is placed the electric light engine-house, containing three 85 B.H.P. Crossley gas-engines running at 200 revolutions per minute, and driving by means of belts three dynamos for generating electric energy at 200 volts pressure. There is space for a fourth engine and dynamo, which will shortly be required, as the market will be more fully occupied immediately after the opening than was originally anticipated.

The engines are started by means of compressed air, and the cooling water is circulated by electrically-driven pumps. The wiring throughout is on the concentric system, requiring no wooden casing; and being waterproof and safer than ordinary wiring laid in wooden casing, is particularly adapted for the purposes of this building. Storage batteries are provided for lighting certain portions of the building when the engines are not running. The total cost of the electric-light installation is about 10,500/. The work has been engineered by Messrs. Henry Lea & Thornbery, of Birmingham, the contractors being Messrs. Mavor & Coulson, Limited, of Glasgow.

The Linde British Refrigeration Company, Limited, having leased from the Corporation about two-thirds of the market hall basement, have fitted up, adjoining the electric light engine-room, an engine-room containing three gas engines, ammonia compressors, together with a dynamo for their own electric light and motors. The cold stores and chill-rooms have also been constructed by the Linde Company, and will accommodate about 25,000 carcasses of mutton and 300 sides of beef.

On the left side of the roadway leading from the basement to Cheapside is a continuous block of buildings placed along the southern boundary of the site. On the lower floor of this block, starting from Bradford Street end, is the boiler-house, containing two large Lancashire boilers for supplying hot water and steam for all purposes connected with the slaughtering of cattle and treatment of tripe, ropes, &c. Steam is conveyed to steam heaters situated in the various departments from which hot water is supplied through taps in each slaughter-house or other compartment. Steam is also conveyed to the scalding tubs in the pig slaughter-hall. Power is also obtained from

these boilers to work two small pumps connected with the drainage of the basement, which is below the level of the Bradford Street sewer. Adjoining the boiler-house is a small slaughter-house and a room for condemned meat.

On the ground floor, at the Cheapside end of this block, and immediately opposite the pig slaughter-hall, is a lairage capable of accommodating about 200 pigs. The first floor of this block of buildings is set apart for the treatment of tripe, ropes, blood, &c., and is connected with the yard opposite by two small bridges, and with the ground floor by a sloping way at the back.

On the south side of the Market Hall, and on the right-hand side at the top of the roadway leading from the basement to Cheapside is the pig slaughter-hall. This hall is 96 feet long by 40 feet broad. It is divided, so far as its roof is concerned, so as to collect the steam arising from the scalding tubs. Pens are provided outside the hall with special doors opening into small pens inside, immediately in front of which the scalding tubs, six in all, will be placed. The pigs will be scalded, scraped and dressed on one side of the hall, and the carcasses hung on the opposite side. The gearing and fittings are arranged for twelve sets of men to be working at one time. The slaughter-hall for beasts, sheep, calves, &c., is the continuation of the same line of buildings, completing the block from Cheapside to Bradford Street. The fittings are arranged at present for twenty-six sets of men, the slaughtering to take place on one side of the hall only. Should more accommodation be required the other side of the hall may also be fitted for slaughtering. A portion of this hall, at the Bradford Street end, will be partitioned off, fitted up and used as an offal market. These halls are constructed on the system principally adopted on the Continent, where slaughtering is generally carried on in large open halls. Over the large hall and approached by two sloping ways, one up and one down, from the yard at the rear, is lairage accommodation for about 200 beasts and 500 sheep, &c. Lavatories, &c., are placed in convenient positions in the yards at the rear of both blocks of slaughter-houses. At the Bradford Street end of the yard adjoining the slaughter-halls is the water tower. This contains at the top a tank 20 feet deep, holding about forty-five tons of water. About one day's supply of water will here be kept as a reserve. A large rainwater tank is also placed in the tower, and this with four other tanks placed in various positions on the site is intended to serve the double purpose of stopping the rush of stormwater from the roofs, so as not to overcharge the drains

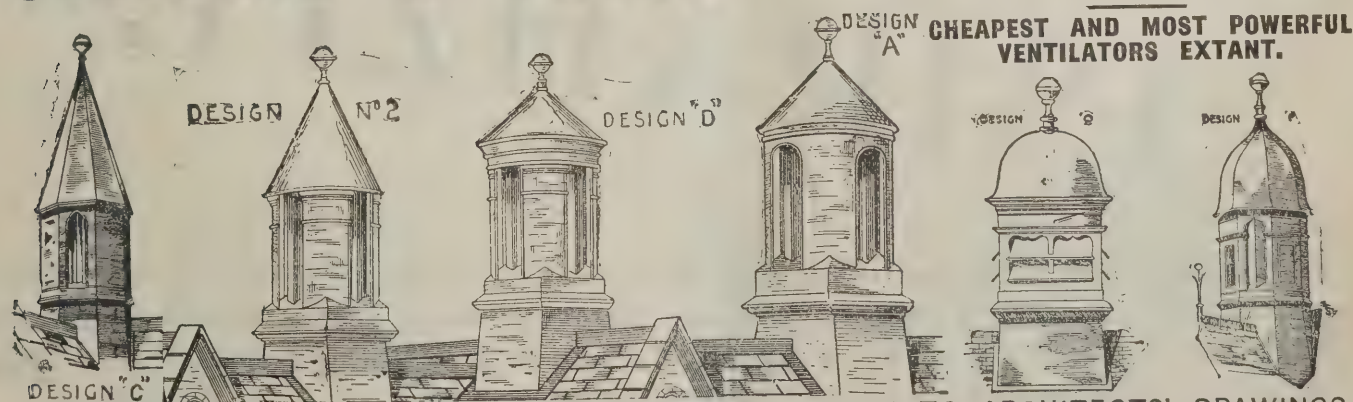
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The first act of the ceremony on Wednesday was the presentation by Mr. J. Coulson Nicol, under whose personal superintendence the buildings have been erected, to the Lord Mayor, on behalf of the architects (Messrs. Essex, Nicol & Goodman), of a handsome silver-gilt key, specially designed by them as a souvenir of the occasion.

CAMPSBOURNE SCHOOL, HORNSEY.

THIS new school, which was opened by Mr. H. C. Stephens, M.P., on the 23rd inst., has been built upon a site acquired some time since by the Hornsey School Board, which contains an area of 2 acres 1 rood, and which has the advantage of entrances from Boyton Road and Eastfield Road, with frontages to Newland Road on the north and to the proposed extension of Nightingale Lane on the west. With so large an area the question of the plan for a school to accommodate over 1,400 children at once arose, and under the advice of their architect the Board decided to erect the building in two blocks—one to contain a two-storey building for the girls and boys' department, and the other a single-storey building for the infants. This scheme was not adopted until it had been thoroughly thought out, and as the Board were advised that such buildings would be somewhat cheaper than a three-storey building, this plan was decided upon and the Education Department at once approved of the same.

Beyond the above two blocks a caretaker's house has been erected at the entrance from Boyton Road, and separate buildings have been built for manual instruction and for cookery teaching. Each of the three departments is provided with a separate hall for assembling and other purposes. The girls' department is situated on the ground floor of the two-storey building, and contains accommodation for 450 scholars in eight classrooms, which are grouped round the central hall. This hall is 86 feet long by 28 feet wide and 15 feet high in the clear, being well lighted from the ends as well as from borrowed lights from the classrooms. At the south end of the hall cloak-room accommodation is provided, and at the north end a head mistress's-room and lavatory.

The approach to the boys' department, which is situated on the first floor, is from the north end of the building by two fire-

proof staircases. This department is a duplicate of the girls' department and will contain the same number of scholars.

The roof to the large hall on the boys' floor has been constructed as an open timber roof, which gives the hall increased height and character. Assistant masters and mistress's rooms are provided on the mezzanine floor of this building, and caretaker's store-rooms.

The infants' block provides accommodation for 510 scholars in seven classrooms, and a large assembly hall measuring 50 feet by 25 feet is also provided for their use, with cloak-rooms and lavatories in convenient positions. On the level of the classrooms is a head-mistress's room, and on the mezzanine floor a cheerful room has been provided for the assistant mistresses. One of the features of this department is a baby's room fitted with circular galleries on the lines of a theatre, to facilitate the teaching of very young children. The manual instruction room contains accommodation for twenty-four scholars, and beyond ample space for the benches a gallery is provided for teaching purposes, with a cloak-room and wood-store adjacent.

The cookery kitchen contains accommodation for forty scholars at a time, and a scullery has been erected adjacent to the kitchen. Cloak-room accommodation is also provided for this building.

The whole of the classrooms throughout are heated with "Boyd's" patent hot air stoves, and the halls and corridors by a low-pressure hot-water apparatus worked by boilers situated in the basements of each block of buildings. All the classrooms are designed so as to be lighted from the left hand, and all have full provision for fresh air inlets and extract flues from each room. The buildings externally have been carried out in stock brickwork, with red brick dressings and red "material" finishings. Internally the walls are built to a dado height in brown salt-glazed dipped bricks, and above such dados are finished with buff Gamlingay bricks. The lighting has been supplied by gas, the "Clapton" lights being used throughout.

The drainage has been carried out on the most approved principles, from the architect's drawings, the closets and lavatories used being those manufactured by Messrs. Adams & Co., of Old Queen Street, Westminster.

The amount of the contract for the works was 20,467*l.*, including the whole of the accessory buildings and the playground walls and finishings, which works out at the reasonable cost of 14*l.* 10*s.* 3*d.* per scholar, and including the cost of the fine freehold site the sum is 15*l.* 18*s.* 8*d.* per scholar.

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Comparing this cost with that of recent School Board schools it will be seen that it is a low one, and justifies the advice given by the architect to the Board as to erecting the buildings on the principle he advised.

The whole of the works have been executed by Messrs. Kirk & Randall, of Woolwich, from designs prepared by Mr. Howard Chatfield Clarke, of 63 Bishopsgate Street Within, E.C., under whose personal direction the works have been carried out. The heating was supplied by Mr. W. J. Fox, of South Place, Finsbury, E.C. The lighting and the whole of the gas-fittings were carried out by Messrs. Strode & Co., of Osnaburgh Street, N.W., and the hot-air grates were supplied by Messrs. Hendry & Pattison, of Marlborough Mews, Oxford Street. Mr. W. White, the clerk of works to the Hornsey School Board, has very efficiently carried out the duties appertaining to his office.

THE NEW CHRIST'S HOSPITAL.

ON Saturday, October 23, the foundation-stone of the new buildings at Stammersham was laid by the Prince of Wales. The trowel employed was that with which the then Duke of York laid the foundation-stone of the new hall of Christ's Hospital on April 28, 1825. The site of the buildings is about two miles from Horsham. The land, which has an area of nearly 1,200 acres, belonged to the Aylesbury Dairy Company, who were glad to sell it for about 53,000*l.*, being some 20,000*l.* below the sum it cost the company. For school purposes 150 acres were assigned, two farms have been let, and the remainder will be cultivated under the direction of the agent. Roads have been formed and a station is to be erected.

Experts differ about the suitability for school buildings of a site which consists of such deep clay as is found at Stammersham. Mr. J. W. Penfold, the surveyor appointed by the Charity Commissioners to inspect the property previous to its purchase, reported under date of May 30, 1892, that:—"Geologically it stands in the Wealden clay, but hereabout it has been partly denuded, and the result is that the arable land is a fairly light soil, working with a pair-horse plough." The late Ewan Christian in his report dated May 27, 1892, says:—"After a complete survey of the area comprised within its boundaries, I have no hesitation in saying that it is admirably adapted for the purposes in view. It is remarkably open, and while possessed of considerable beauty of position in respect of more

distant views of the Surrey Hills in one direction and the Sussex Downs in another, there is over the whole a general brightness from an uninterrupted expanse of sky, and a freshness of air from the vicinity of the sea which cannot be otherwise than favourable to healthfulness. Agreeable undulations of surface and good plantations of trees also combine in giving excellent positions for buildings, with great advantages in respect of aspects, and all requirements of pleasant and healthful residence." Mr. Rogers Field reported less favourably than the surveyor and the architect of the Charity Commissioners, and advised, on January 10, 1894, that a boring be sunk to ascertain the quality of the water in the "Tunbridge Wells Sand" lying beneath the estate, the supply from the then existing shallow wells being surface water and liable to contamination.

The school buildings are to be erected from plans by Mr. Aston Webb and Mr. Ingress Bell, which were obtained in competition. The construction of the new buildings is to be of the simplest character; red brick and stone are used for the walls, and red Broseley tiles for all roofs except the hall and chapel, which it is proposed to cover with Westmoreland slates. The whole scheme suggested by the Council has been carefully thought out by the architects in every particular, in the light of a personal knowledge of what has been hitherto done in designing public schools; and great care has been exercised in the matter of cost, there being no redundant ornamentation or embellishment involving periodical outlay. For financial reasons it has been found necessary to build at present for 600 instead of 820 boys. But the recent restoration of the Donation Governors' privileges has already attracted several new Governors, and will, it is hoped, induce many more gentlemen and ladies of means and benevolence to come forward, as of old, with the qualifying donations of 500*l.*; and when the valuable site in Newgate Street comes to be developed the Council trust that the sum realised will enable the buildings to be completed in accordance with the original designs, so that the numbers relieved by this noble charity may be restored to their former height.

There is to be a quadrangle, which will be larger than the great court of Trinity College, Cambridge. Cloisters will run along each side of the square, and the working portion of the school will be placed in the buildings on the several sides of the square. The dining-hall, to accommodate 800, will be on the north; the library, science and art schools, museums and laboratories will stand at the east; the chapel, with seats for 1,000, on the west; and on the south will be the school-hall and

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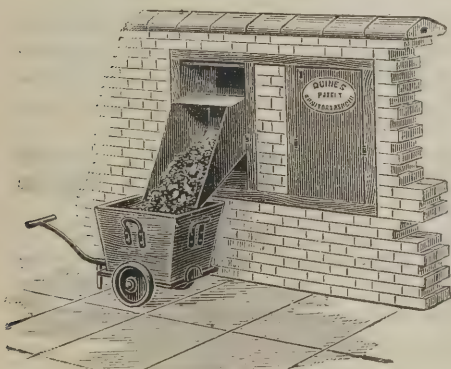
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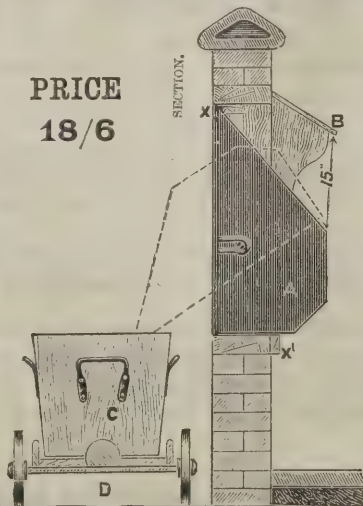
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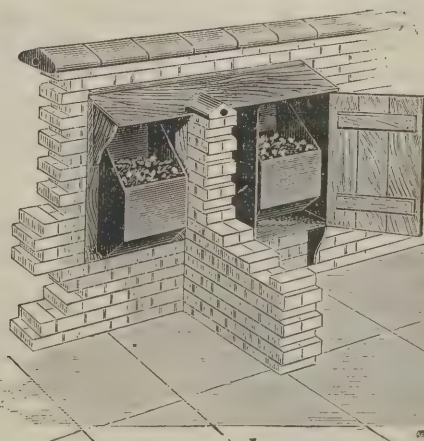
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classrooms; a music school and gymnasium will also form part of the scheme. The style is described as late Tudor or early Jacobean, with mullioned windows, and it has been sought to combine the freedom of Gothic with a limited use of detailed ornament of Italian character. In addition to the school buildings proper, six blocks are to be erected, each divided into two boarding-houses, and in each house fifty boys will reside. Though detached at the ground level, the blocks are connected by a subway, so that the staff from each may reach their dining-hall without traversing the boys' routes. These subways, which are ventilated and daylighted throughout, contain all the pipes, mains and electrical wires for facility of examination and repair. Provision is, of course, made for the addition of further houses. In so great a community it has not been forgotten that an infirmary and sanatorium may from time to time be wanted, and these have been placed at the eastern end of the range of house blocks.

It is claimed for these new buildings that they will be the first great public school in which the modern system of isolation will have been thoroughly carried out. Every room is to have a southern aspect, and the aim throughout has been to secure the greatest possible amount of sunlight and the freest circulation of fresh air. There are to be no dark corners, even in the corridors, and in addition to providing for the amplest access of light and air, it has been sought to avoid congestion of traffic. Servants' routes are separated from those used by the boys, and lateral doors will facilitate the exit from halls, schools and classrooms. The builders are Messrs. Longley, of Crawley, and the cost is estimated between 280,000*l.* and 300,000*l.*

SANITARY INSPECTORS' CONFERENCE.

ON Saturday last a Conference organised by the North-Western and Midland Sanitary Inspectors' Association was held in the Council Chamber, Birmingham. Nearly a hundred inspectors attended, among them being Messrs. W. Urquhart, Crewe (president of the Association); W. Wilkinson, Derby (president of the Derbyshire Association); and J. T. Cowderoy, Kidderminster (president of the Worcestershire Association).

Alderman Cook (chairman of the health committee) welcomed the visitors, and said he noticed in a circular which had been issued in connection with the Conference a statement that it was generally admitted that the present position of

sanitary inspectors was most unsatisfactory, and that urgent reforms were needed. He did not know what that meant; he did not think it applied to Birmingham. They were always very desirous to acknowledge that the work of a sanitary inspector was one of very great importance to the public health, and they wanted the men in that position to feel the responsibility and the importance and the dignity of their work. The staff of health officers in Birmingham comprised one chief inspector, nineteen assistants, four smoke inspectors, one lodging-house inspector, one inspector of canal boats, one milk-shop and dairies inspector, one workshop inspector, one inspector under the Food and Drugs Act, four clerks and four disinfectors. During the past year over 3,000 houses had been cleansed, purified and disinfected after cases of infectious disease, over 1,100 houses had been cleansed and whitewashed and above 1,400 repaired. Altogether the department had dealt with 20,000 nuisances. In Birmingham they had about 32,000 pan-closets, 40,300 water-closets and 5,000 ashpits, the latter of which they hoped would very soon disappear.

The President acknowledged the welcome tendered by the civic authorities, and expressed his admiration for Birmingham as being among the pioneers in sanitary work.

Mr. W. Wilkinson, chief sanitary inspector of Derby, introduced the first subject on the programme, which was whether sanitary inspectors ought to be under local or State control. The speaker was emphatically in favour of exchanging local control for State control, on the ground that the inspector should not be placed in the position of supervising his own masters. He said it had been his unfortunate position to have to take proceedings against members of his own sanitary committee, ex-mayors, aldermen and so forth, and he contended it was not fair to put a man in such a dilemma that he had to choose between shirking his duty and jeopardising his tenure of office. He knew of instances where officers had suffered the whole of their lives through the fearless discharge of their duties. Mr. Wilkinson asked the officers present who had had to take proceedings against members of their own sanitary authority to hold up their hands, and about a dozen hands were shown. Those who had not had occasion to take such proceedings were then asked to signify the same, and about an equal number responded. Mr. Wilkinson drew the conclusion that there were many present who would rather not answer the question.

Mr. W. H. Coney (Wednesbury) read a paper on anomalies of public health laws, and submitted suggestions for reforms

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therein. He advocated a consolidation of the existing Acts, the bestowal of greater freedom of action on sanitary inspectors, and the abolition of the permissive element in the law relating to nuisances, which he contended hampered the health officers and greatly lowered the efficacy of their work. He was in favour of the creation of a national board of health on similar lines to that formed in 1848, but possessing higher powers, its President to have a seat in the Cabinet. He also pleaded that there should be one name for "nuisance inspectors" and "health inspectors," viz. that all should be known as "sanitary officers," and that the possession of a certificate of competency in sanitary law and practice should be a condition of appointment. The superannuation of sanitary officers also received a prominent place in the programme of reform set out in the paper, and Mr. Coney concluded by moving a resolution in which his points were summed up.

This was seconded by Mr. John Hughes, and after a discussion, in which Messrs. Branson and Bland took part, it was put and carried.

Mr. J. Lowry (Seisdon) introduced a discussion as to the desirability of promoting a special Bill for the superannuation of sanitary inspectors. He criticised the Birmingham scheme of superannuation referred to by Alderman Cook at the opening of the proceedings, ridiculing the allowances offered as utterly inadequate.

Alderman Cook said Mr. Lowry had misconceived the position as he explained it. The Birmingham scheme applied to the whole of the officials and employés of the Corporation, even to the night-soil collector. He thought it was the most liberal scheme of superannuation he had ever heard of. As to the statements made by a previous speaker concerning the interference with the inspector's duties by interested property owners who were members of sanitary authorities, he thought if anything like that took place in Birmingham, public opinion and the feeling of members of the Council too would at once cause the offending member to be removed.

Mr. Wilkinson then moved:—"That this conference of sanitary inspectors is of opinion that the duties undertaken by inspectors are of such a dangerous, onerous and important character that, in the interests of the public health and justice to the officers and those dependent upon them, some provision should be made for superannuation under central or Government control, and that a special Act should be introduced at once to secure this."

Mr. Bland seconded.

A subsequent speaker stated that in discharging his duties he had contracted smallpox once and scarlet fever twice.

Dr. Hill, who was very cordially greeted, asked leave to say a few words. He declared his sympathy with the desire of sanitary inspectors to improve their position, but said he could not help thinking some of the views which had been expressed in the course of the discussion, and the claim to a special Bill, were a mistake. Why should the inspector of nuisances have an exceptional Bill all to himself? He talked of the labours he performed and the danger he incurred, but there were others who had to work hard, and who ran risks—medical officers, superintendents of hospitals, nurses—in fact, the inspector of nuisances ran very much less risk than many other people. Why were they not content to throw in their lot with other officials in demanding superannuation?

Mr. Cowderoy said that when medical officers of health met to discuss their own concerns as a class they sat with closed doors, and would not think of allowing a sanitary inspector to obtrude his opinions in their deliberations. As to the risks involved in their avocation, he had never heard of a case in which a medical officer of health died through following his duties, but he had heard of cases of sanitary inspectors meeting their death through having to remove smallpox patients to hospitals. He contended that there was a sound case for special treatment, and was satisfied their movement would receive a large amount of support in the House of Commons.

In the course of further discussion, it was stated that under a scheme which had been formulated sanitary officers would themselves largely contribute to the superannuation fund.

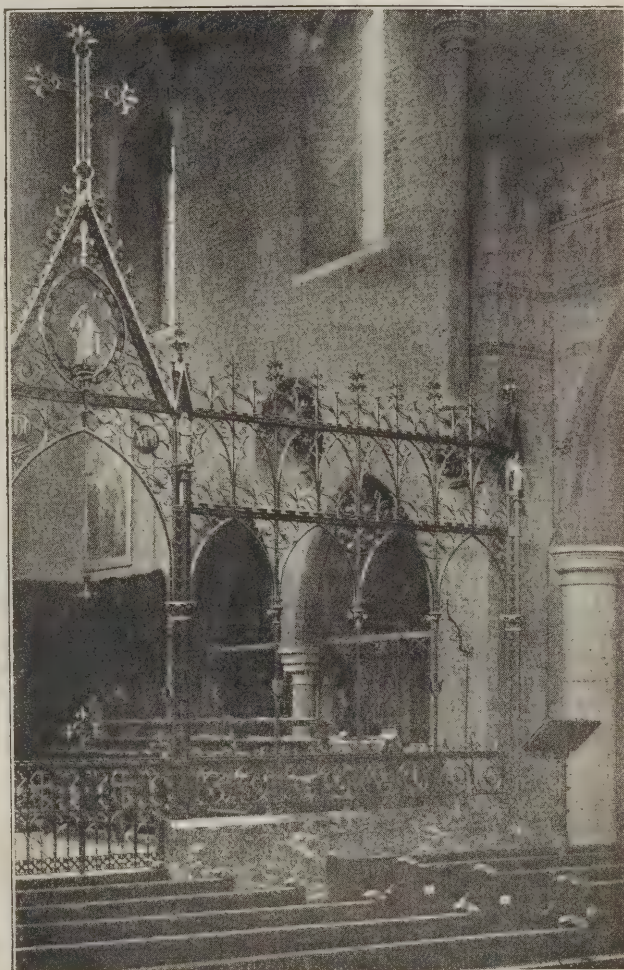
Mr. Wilkinson, in reply to Dr. Hill, said sanitary officers did all they could to advance the general officers' Bill promoted some time ago, but that having failed, they felt they were quite within their rights now in pressing their own special claims.

The resolution was then put and carried.

The Conference concluded with a discussion on the advisability of unity of action among sanitary inspectors and the most effective means of securing it, the subject being introduced by Mr. Bland.

ARTISTIC IRONWORK.

A VERY handsome addition has been made to Holy Trinity Church, Stroud Green, in the form of a wrought-iron chancel screen and gates; also screen and gates to side chapel. The style adopted is thirteenth-century. The main screen is 31 feet 6 inches wide and 24 feet high to top of central cross. It is divided into nine bays, each with Early English arches, to enable one to have a clear view of the chancel. The upper part, which suggests the form of the early rood-screens, is connected with some very elegant foliage and tracery. The main columns supporting central arch, and also the two end



ones, are made up of clusters of pillars filled in with foliated dog-tooth ornament; the caps of same are enriched with delicate and artistic hammered foliage, their columns being surmounted by canopies, in which are figures of St. Mary and St. John and two angels. The figure of Our Saviour is in a vesica over central arch, above which is a gable surmounted by a foliated Latin cross. The ironwork is finished black and picked out with gold; the figures are also gilt. The work has been executed in a most artistic manner by Messrs. Jones & Willis, of London, Birmingham and Liverpool.

THE RECONSTRUCTION OF BOMBAY.

A SANITARY enterprise on a vast scale is announced from Bombay. The Government has laid before the municipality, says the *Times*, a scheme for expending 50 million rupees on bringing up the house accommodation of the city to the standards demanded by the laws of health. This sum is apart from the outlay already devoted to waterworks and drainage—an expenditure enormous in the past and still going on to an extent that will exhaust even the liberal powers of borrowing granted by law to the capital of Western India. The Government is aware of this fact, and is prepared to make special provision not only for providing the funds, but also for the conduct of the new work. As Baron Haussmann reconstructed Paris from the point of political control, so Lord Sandhurst proposes to reconstruct Bombay from the point of view of sanitary safety.

In replying to a deputation of the Bombay Chamber of Commerce last February, his lordship referred to the urgent need for opening up the congested quarters of the city, for the removal of pestilential dwellings and for the prevention of over-

NEW public baths and washhouses were recently opened at Hutesontown, N.B. The building has cost about 5,000*l.*, and consists of fourteen hot baths—four for women and ten for men. There are thirty-four washing stalls in the washhouse, with a similar number of drying horses and three hydro-extractors.

crowding in the future. Three-quarters of the population of the city are said to be crammed together in "chawls" or rookeries, some of them five to seven storeys in height, and run up in defiance of every principle of hygiene. Long interior passages, or rather burrows, go from end to end of these buildings on each floor, giving access to the rooms, "for the most part small and wholly unventilated," in each one of which a whole family may live or die. The passages are quite dark, except where they open out on a gully, which serves as a sewage drain. Often they have no opening at either end, and the rooms may or may not have little windows. From 500 to 1,000 persons are sometimes squeezed into one of these pestiferous rabbit-warrens, a prey to infection themselves and a standing danger to the health of the city. We condense the above description from an account published at the beginning of this month. The truth is that the population of Bombay has rapidly outgrown the accommodation existing for it, and the problem before the Government is how to provide decent house-room for nearly half a million of people living as no human beings should live.

Lord Sandhurst's plan, whatever may be its financial results, is conceived on a scale commensurate with the evil to be dealt with. It first provides for opening out crowded localities by the construction of new streets and for the creating of new house areas by levelling up low-lying localities and by reclaiming considerable tracts from the tidal waters. Having thus secured new space, it next provides for covering it with tenements to be let at comparatively low rents and for improving the old unhealthy rabbit-warren in which 75 per cent. of the population is said to be now dwelling. More space and more air are the two main objects which it keeps constantly in view; and it has the merit of providing beforehand for the displacement of poorer inhabitants which any attempt to deal with their overcrowded barracks must at once involve. Fortunately there are tracts in and immediately around Bombay which admit of being utilised for the purpose. These tracts, some of them filthy swamps within tidal limits of the sea, have long been a source of danger to the health of the city. Lord Sandhurst proposes, among other works, to convert these low-lying hot-beds of disease into well-raised areas for human habitation.

Of the 50 million rupees which the scheme is estimated to cost, rather more than one-half will be devoted to cutting new streets through congested districts of the town, somewhat less than a third to reclamations or levelling, and the remainder to erecting tenements for the poor. The figures provisionally accepted by the Bombay Government in its resolution of September 29 are as follows:—

New streets opening out crowded localities .	Rs. 2,70,00,000
Reclamations	1,25,00,000
Chawls for the poor	83,00,000
Levelling and laying-out vacant lands	17,00,000
Total	Rs. 4,95,00,000

The expenditure of this large sum and the construction of the works might seem to fall to the Municipality of Bombay. But Lord Sandhurst, whilst acknowledging the good work done by that Corporation, sets forth weighty reasons which render it expedient that the present scheme should be carried out by a special machinery of its own. It may be questioned whether such a task comes within the range of duties contemplated by the Bombay Municipal Act. It cannot be questioned that its cost lies beyond the present financial resources of the Bombay Municipality, already pledged to sanitary works almost up to the extent of its borrowing powers.

Lord Sandhurst desires to create a board of trustees for the purpose on the general lines which have been found to work so well in the case of the Bombay Port Trust. The Municipal Corporation will be strongly represented on the board, but care will be taken to also secure the fair representation alike of the landed proprietors, of the general body of citizens, and of the Government, which will itself have a very large stake in the enterprise.

The Bombay Improvement Trust will be enabled to raise its capital at the low rate of interest which a Government enterprise in India can obtain. It will also start with a large area of Government land, transferred for the purposes of the scheme. The present value of these Government lands and of their reclamation rights is estimated at over 9½ million rupees, together with the municipal lands, valued at nearly 3 million rupees, making a total of 12½ millions of rupees' worth of land rendered available for the objects in view. The Government will, in fact, make over almost the whole of its landed property in Bombay to the Improvement Trust for the benefit of the citizens at a low rate of interest, calculated upon present values. During the first ten years the Government will charge nothing. "The Trust shall have the rents from the reclaimed areas for the first twenty years, and afterwards subject to a small charge on the market value, less the cost of reclamation." The capital will be raised gradually as required. The Government estimates that the scheme will not at any time involve an addition

to the municipal rates of more than 2 per cent. on the assessable value of properties, and it contains possibilities of becoming a source of financial strength in the future. The project must be primarily regarded, however, not from the point of view of contingent profits as a speculation, but with reference to immediate benefits which it will render to a great city that has outgrown its house-room. Among those benefits will be, not only more adequate accommodation for the overcrowded poor, but also new areas for the European and well-to-do native inhabitants, who at present pay fancy rents for the sites available for their dwellings.

THE CONDITION OF POONA.

THE Collector of Poona recently appointed Surgeon-Major Barry to investigate the sanitary condition of the city of Poona, and a very long report from that officer has now been published. It discloses an extraordinary condition of affairs. It opens by stating that under its present municipality the city has fallen "into the groove of chaos, of incompetence, inefficiency, waste, absence of check and wanton disregard of public obligations towards the poorer class of citizens." Dr. Barry deals with his subject under fourteen heads; but only very few of these can be mentioned here. The night soil has to be removed in carts through public thoroughfares over three miles from the city to the poudrette factory, and it is therefore "important that the carts should be in first-class working order, not liable to break down, outwardly clean and with valve fittings calculated to stop effluvia." Dr. Barry examined the carts in every single dépôt and called in the collector to witness the accuracy of his statements. He found that not one cart was in working order, and he mentions cases where full carts have broken down in the streets and been allowed to remain for days without removal. Owing to neglect in emptying cesspools and other neglects, which Dr. Barry mentions in detail, he describes Poona as lying on a bed of sewage; the surface gutters are a mere device to hide filth; rubbish is not removed, and it was a common occurrence to find the dustbins overflowing and surrounded by a rampart of filth which was not removed for four or five days together; the number of dustbins was not half what it should be; all the open places of the city were laid out in filth; the back lanes seem to have never been inspected. The wealthy quarters are nearly as bad as the poor ones. "A walk down Sadashiv Peth, our local Belgravia, is a liberal education in Oriental hygiene—light minus sweetness;" and he describes some of the abominations amongst which wealthy and influential natives seem content to live. He mentions that he has seen the city engineer's men seeking for an obstruction by digging up the public thoroughfares, and not merely failing to find the obstruction, but failing to hit on the drain at all. Indeed, both the health officer and the engineer of the municipality fare very badly at Dr. Barry's hands. He devotes a special section to the condition of a particular quarter, called the Maharwada, where thirty deaths from plague occurred in a group of fifty-four houses. The description of this quarter is revolting; the inhabitants told him that they had represented their state to the municipality, but without avail. Dr. Barry grows very indignant at the state of the Maharwada, and says:—"When I recall the unctuous upbraidings addressed to Government from time to time by the very men who are running this municipality, urging upon Government to have bowels of compassion for the poor, the picture of the Maharwada—the poor at their own doors—discloses the shameless cant and humbug of it all. The Brahmins of Poona have had for years an absolutely free hand. They manned the municipal service up to the hilt with their own caste, and the result is a pitifully incompetent executive. . . . If I have succeeded at all in engendering some conception of the conditions that have come under my eye, then it must be seen that the Poona municipality is a paper municipality, its work is paper work, its men are men of paper, except where they are men of talk. If I describe Poona as a blank in everything except a pay-sheet, I am not dropping into paradox, for the amount of performance is infinitesimal compared with what it costs to produce it. They can have no real wish to see good work done, for they are careful not to put good men to do it. To make a parade of activity they issue rules and orders and frame contracts to bedizen a report, and there they leave it." The answer of the municipality, which was adopted at a meeting at which only seven members were present, is also very lengthy, and is accompanied by a letter from two Mohammedan members, who express their concurrence in the main part of Dr. Barry's report, and advise the appointment of a European executive officer at the head of municipal affairs as in Bombay. Under many of the heads, and these the most material, the answer substantially admits the allegations and gives excuses for the horrible condition of things disclosed. There is no positive denial of any of the statements of fact above referred to; it is not admitted that the Maharwada is any worse than such quarters in other cities; it is a dark spot in Poona, no doubt,

but then Bombay has her dark spots and enough of them, and the cities of England have their dark spots. The answer, however, practically endorses all that Dr. Barry has written as to their two chief officers, and says that one of them has been reprimanded.

THE DANTZIG TIMBER TRADE.

ACCORDING to the report of the British Consul at Dantzig, a remarkable change is to be noticed during the last few years in the increasing demand in the provinces forming his consular district for articles made in Great Britain. This applies more especially to luxuries, which hitherto the German did without, or was satisfied with the inferior qualities produced in his own country. The shops give great prominence to goods manufactured in Great Britain, and the shopmen always carefully explain that they are of British make, and superior to similar goods made elsewhere. The British imports would be larger if a better system were adopted. "The contrast between the way the British merchant seeks new trade channels in Prussia and that of his foreign rival is so marked," says the Consul, "that I mention it in the hope that a change may soon come over my countrymen's mode of action. The British subject obtains from his Consul or from a directory, most probably out of date, a list of the local traders who deal in what he wants to sell. These he bombards with price lists in the English language, which they cannot read, and then he is astonished that they pay no attention to his communications. The foreign rival, on the contrary, sends a traveller here, speaking German fluently, who calls on these same traders with samples and explains to them how the goods can be forwarded to them with the least possible delay and expense, and extols his wares to such an extent that he seldom leaves without getting an order. The Dantzig consular district, which is about the size of Ireland, is so well worked by commercial travellers, one succeeding the other almost daily, that those who try to do business any other way are hopelessly out of it."

The prosperous condition of trade in 1896 all over the world was also felt in the wood trade of Dantzig. The stock remaining over from the preceding year was cleared off at remunerative prices, and altogether business in timber of all kinds was very satisfactory to all concerned.

The rafts of wood which were floated down the river Vistula to Dantzig in 1896 were 20 per cent. more in value and one-third greater in quantity than those brought down from the

forests in 1895. This increase is mainly in the low-priced qualities. Of fir sleepers alone 290,623 in number more reached here than in the preceding year. This accounts for three-fourths of the increase. Oak sleepers are not so much in request as formerly, the railways buying the cheaper fir sleepers in preference. Prices of other kinds of fir timber, such as baulks and battens, were unusually high, and a lively business was done for export.

The trade in oak, which some years ago was allowed to drift away from Dantzig to Stettin, is now reviving here, the facilities for floating wood down to this city being greater than to the Pomeranian port.

In Königsberg also the wood trade was favoured by an increase in industrial activity. Demand for sawn timber of all kinds remained good, and prices went up accordingly. The sawmills were well employed during the whole year, more particularly as the building activity was so great; the millowners went early, in contrast with former years, to Russia to purchase and secure the necessary lots as soon as possible, which induced the Russian owners to raise their prices by about 15 per cent. The tendency for hewn timber was firm during the whole year. The demand for fir sleepers worked for the British market remained active, and got still better in autumn. The stocks were, therefore, mostly cleared. Also on this sort of wood the Russian sellers had the larger profit, because as soon as the market showed a firmer tendency the new purchases commenced very early, and prices hereon were raised according to the smart demand. The trade in oak sleepers was again lifeless. Oak woods, planchettes, &c., which are sawn chiefly for export to France, only met with unsatisfactory prices. For this kind Königsberg gets every year less important, as the prices of purchase are too dear against the competition of Galicia. Beech and ash woods were shipped a little more than in the preceding year with profit. Also oak mining timber, which is imported from Russia, met with good demand for Rhenish Westphalian mining districts. It seems that this article will gain in time some importance for Königsberg. Business in fir mining-timber showed a firmer tendency than in the last year, whereas the demand for birch and alder props for England was exceedingly slack. The few sales that were closed brought the usual complaints of bad measure and quality from the buyers, causing losses to the sellers.

The Vice-Consul at Memel reports that upon the whole the results of last year's business in timber can be looked upon with satisfaction. Nearly every article yielded more or less

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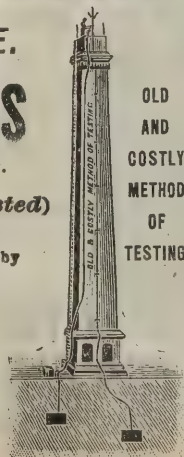
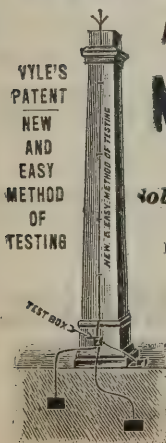
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profit, and the demand was brisk during the whole year. With exception of round timber, the supplies were larger than in the year preceding, and for the most part were sold already in spring. Generally prices have risen so that a reduction is to be expected. Of round timber the supplies did not suffice, and all the saw mills did not find full occupation. Owing to competition prices rose in autumn considerably. Business in sawn wood was very lively. Owing to the mild winter, shipments commenced very early, and were favoured during the whole summer by fine dry weather. The profits made, however, did not correspond with the whole situation of the business. The old stocks of former years were cleared off early, and did not take part in the increase of prices which took place in February, whilst the raw material experienced a rise which stood in no proportion to the prices paid for sawn wood. The new supplies of round timber did not suffice for the demand of our dealers, and therefore some mills did not find sufficient occupation.

SWEDISH GRANITE.

FROM the Norwegian frontier as far as the Gullmar Fjord there is an almost uninterrupted stretch of splendid granite. Its breadth averages about 3 miles, and all along the coast are good and safe harbours or anchorages where vessels may load under almost any circumstances, and as a rule without hindrance from ice in winter. Southward near Warberg and Halmstad, and farther on in the neighbourhood of Carlshamn and Carlsrona are fields of granite of noteworthy extent.

Quarrying has been carried on for many years though not on such a scale as of late. Germany and Denmark used to be the chief consumers, but since the industry has developed to one of importance, other markets have been found, and even from across the Atlantic orders have come in.

There is not very much polished granite exported or used within the country, the main production being supplied to buyers in a semi-rough state, and by them receiving the finish required. The granite of the different districts is suitable for all purposes, architectural and ornamental work as well as for purposes of street paving, dock and quay work. For strength and wear there is no kind to surpass that from the Lysekil district. The colours from the different districts are of great variety and beauty. There are excellent opportunities to British importers to obtain raw material at moderate price since vessels

carrying coal, salt, iron or coke out are always willing to accept a reasonable rate of freight home.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

23338. Walter Darby and Ion Darby, for "Improvements in or relating to circulating water-heaters for greenhouses or other purposes."

23361. William Phillips Thompson, for "Improvements in and relating to gas-engines."

23403. Vincent Hughes and Edward Donald Nicholson, for "Improvements in kilns for burning limestone and other materials."

23489. Chaimsonovitz Prosper Elieson, for "Improvements in electric storage cells."

23492. Augustin Spicer, for "Improvements in burglar alarms."

23554. Louis Emile Prat, for "Improved means for inducing draught in boiler furnaces, fireplaces and the like."

23564. Charles Philip Horton, for "Improvements in preventing sediment or mud-forming incrustation in the lower part of pendant tubes of steam or hot-water boilers."

23569. John Mackenzie, for "Improvements in the construction of windows."

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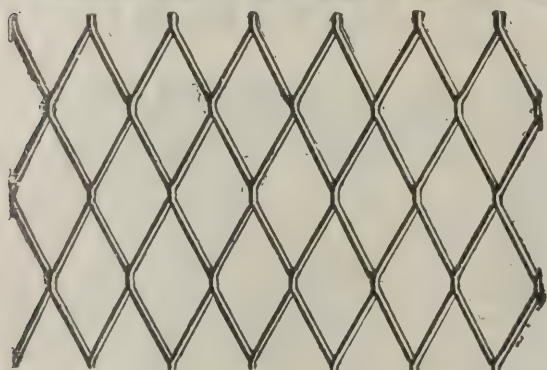
27784. Steed, junior, for "Cistern and like ball-taps."

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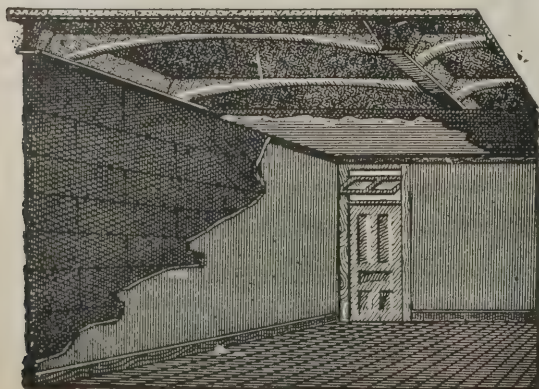
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Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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COMPETITIONS OPEN.

BELPER.—May 1, 1898.—The Belper Urban District Council offer premiums of 50 guineas and 25 guineas for the two best schemes of sewage disposal. Mr. Joseph Pym, Urban District Council Offices, Belper.

BOOTLE.—Dec. 31.—The Corporation invite competitive designs of a central fire station, firemen's dwellings and district police station. Mr. J. A. Crowther, borough engineer, Bootle.

BYFLEET.—Nov. 13.—The committee of the proposed village hall for Byfleet invite competitive plans for a village hall and working-men's club, to be erected at a cost not exceeding 1,500l. A premium of 25 guineas will be awarded. Mr. F. C. Stoop, hon. sec., Albany House, Byfleet, Surrey.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500l., 300l. and 200l. respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

DORKING.—Dec. 15.—Competitive designs and plan, with descriptive report thereon and approximate estimates, are invited for erection of infirmary upon workhouse grounds. Mr. George Scales, 35 High Street, Dorking.

SOMERSET.—Nov. 30.—The Council invite competitive plans for large hall, with cloakrooms and retiring-rooms over

present post office, market house and fire-engine house communicating with the town hall, and for conversion of market house, &c., on ground-floor. Premiums of 25l., 15l. and 10l. will be awarded. Mr. Regd. L. Foster, town clerk, 1 Cathedral Green, Wells.

SOUTHEND-ON-SEA.—Nov. 20.—Plans invited for new church. Rev. E. E. Kimber, St. Albans, Avenue Terrace, Southend-on-Sea.

CONTRACTS OPEN.

ACTON.—Nov. 16.—For erection of a fire-engine station in the High Street. Mr. D. J. Ebbetts, surveyor, 242 High Street, Acton.

ALNWICK.—Nov. 10.—For erection of a cart-shed in the Brewery Yard. Mr. Geo. Dunn, secretary, The Brewery, Dispensary Street, Alnwick.

BIRMINGHAM.—Nov. 9.—For erection of porches, dwarf wall, &c., and adapting the engineer's house into a porter's lodge at the workhouse, Sleaford. Mr. Edwin Docker, clerk.

BLACKBURN.—Nov. 10.—For alteration of shop premises in Sarah Ellen Street. Messrs. Simpson & Duckworth, architects, Richmond Chambers.

BROADWAY.—Nov. 8.—For erection of a stone fire-engine station. Mr. John Morris, clerk, The Green, Broadway.

CHRISTCHURCH.—Nov. 13.—For erection of a ward at workhouse, Fairmile Road. Mr. E. H. Burton, architect, Bournemouth.

CARLISLE.—Nov. 12.—For building two houses. Mr. Geo. Armstrong, architect, 75 Lowther Street, Carlisle.

CORK.—For iron roofing and other work at premises, Knapp's Square. Mr. Arthur Hill, architect, Cork.

CORK.—For erection of two semi-detached villas on the Douglas Road. Mr. D. J. Buckley, architect, 21 Adelaide Street, Cork.

FENWICK.—Nov. 16.—For alteration and repairs at old Wesleyan chapel, and its conversion into a parish room. Mr. Thos. Latham, chairman of parish meeting.

GEDNEY.—Nov. 11.—For erection of an infants' school at Gedney Drove End. Mr. William Jarvis, architect, King's Lynn.

GOLBORNE.—Nov. 10.—For beautifying Baptist chapel. Mr. Roger Yates, High Street, Golborne.

GREAT YARMOUTH.—For alterations and additions to the rectory and outbuildings, barn and stables, at Mautby. The Rev. J. N. Dredge, Mautby.

GREENWICH.—Nov. 10.—For erecting a dwarf wall and iron fencing in portions of South Street and Greenwich Road, Greenwich, and for other works in connection therewith. Mr. J. Sempcer, clerk.

HAILSHAM.—Nov. 9.—For erection of the central part of an isolation hospital, near workhouse. Mr. Edmund Catt, jun., Church Street, Willington, Eastbourne.

HALIFAX.—Nov. 12.—For erection of an engineers' tool-shop in Union Street South. Mr. Arthur George Dalzell, architect, 15 Commercial Street, Halifax.

HAMPTON COURT.—Nov. 15.—For pulling down part of a chapel and reconstructing same for coachhouse, stabling, &c. Mr. Harry Tagg, Thames Hotel, Hampton Court Bridge.

HAWES.—Nov. 13.—For erection of market hall. Mr. J. F. Kay, architect, 34 Prudential Buildings, Park Row, Leeds.

HOMERTON.—Nov. 10.—For altering and repairing the houses 26 to 60 (inclusive), Sidney Road. Mr. Frank R. Coles, clerk, Homerton, N.E.

HORNSEY.—Nov. 15.—For erection of buildings for a central library. Mr. E. J. Lovegrove, surveyor, Southwood Lane, Highgate, N.

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ILKLEY.—Nov. 9.—For erection of three houses at Skipton Road. Mr. Rhodes Calvert, architect, 4 Forster Square, Bradford.

IPSWICH.—Nov. 8.—For alterations and additions to the Boys' Middle School. Mr. J. S. Corder, architect, Wimbourne House, Ipswich.

IRELAND.—Nov. 25.—For erection of two one-storey cottages at Ballyhaise Station, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

KEIGHLEY.—Nov. 10.—For erection of store in Lawkholme Lane. Mr. John Haggas, architect, North Street, Keighley.

KESWICK.—For 122 yards of stone wall, 4½ feet high, including rough top. Red House, Keswick.

LANCASTER.—Nov. 15.—For alterations and additions to the girls' school, Middle Street. Messrs. Austin & Paley, architects, Lancaster.

LANCASTER.—Nov. 13.—For erection of boundary wall to Springfield Park in Ashton Road. Mr. T. Cann Hughes, town clerk, Town Hall, Lancaster.

LEEDS.—Nov. 12.—For erection of twelve houses and two shops at Whitecote, Bramley. Mr. J. P. Kay, architect, 34 Prudential Buildings, Park Row, Leeds.

LEEDS.—Nov. 18.—For heating infectious diseases hospital. City Engineer, Municipal Buildings, Leeds.

LEWISHAM.—Nov. 23.—For erection of a coroner's court and mortuaries in the Ladywell Road. Surveyor, Lewisham Town Hall, Catford, S.E.

LYNTON.—Nov. 15.—For erection of a cottage residence at New Mill. Mr. G. C. Smyth-Richards, surveyor, Barnstaple.

MARLBOROUGH.—Nov. 11.—For erection of county police-station. Mr. Charles S. Adye, county surveyor, County Offices, Trowbridge.

MARYPORT.—Nov. 9.—For enlargement and alterations at the Glasson Board schools. Mr. C. Eaglesfield, architect, Maryport.

NEATH.—Nov. 15.—For erection of the Smith's Arms Hotel, Neath Abbey. Mr. J. Cook Rees, architect, St. Thomas's Chambers, Church Place, Neath.

OSSETT.—Nov. 11.—For erection of a shop and warehouse. Messrs. John Kirk & Sons, architects and surveyors, Dewsbury.

PLYMOUTH.—Nov. 15.—For erection of poultry, fruit, vegetable and fish market. Messrs. King & Lister, architects, 8 Princess Square, Plymouth.

PONTEFRAC.—Dec. 4.—For erection of an infectious disease hospital. Messrs. Tennant & Bagley, architects Pontefract.

POPLAR.—Nov. 11.—For works at Poplar baths and wash-houses, East India Dock Road. Messrs. Clarkson, architects, 136 High Street, Poplar, E.

RAVENSTHORPE.—Nov. 10.—For pulling-down the cottages and wall at Fir Cottage, and building a new wall. Mr. Thomas Hemingway, Council Offices, Ravensthorpe.

ROCHDALE.—For erection of minister's house at Castlemere. Mr. T. Townend, jun., architect, District Bank Chambers, Rochdale.

SHEFFIELD.—Nov. 9.—For erection of stables, loose-boxes, cartsheds, foremen's houses, offices, boundary wall, &c. on a site between Charlotte Road and the Olive Grove Football Ground. Mr. Charles F. Wike, surveyor, Town Hall, Sheffield.

SOUTHBOROUGH.—Nov. 11.—For erection of a meter and governor house at the new gasworks, on the Liptraps Park Estate, High Brooms. Mr. Corbet Woodall, Palace Chambers, Bridge Street, Westminster, S.W.

STOCKBRIDGE.—Nov. 9.—For construction of a dwarf concrete wall, about 200 yards in length, near the Wagon and Horses Inn. Mr. W. J. Ayles, district surveyor, Broughton, Stockbridge.

STOCKWELL.—Nov. 18.—For reconstruction of certain flues and chimneys at the South-Western Hospital, Landor Road. Mr. T. W. Aldwinckle, architect, 1 Victoria Street, Westminster.

STOKE-UPON-TRENT.—Nov. 10.—For alterations at the workhouse. Mr. C. Lynam, architect, Stoke-upon-Trent.

STONEHAVEN.—Nov. 8.—For proposed Corporation lodging-house. Messrs. J. & J. A. Souttar, architects, 42 Union Street, Aberdeen.

SWINDON.—Nov. 13.—For erection of two pairs of semi-detached villas in Springfield Road. Mr. W. H. Read, architect and surveyor, Corn Exchange, Swindon.

THORNE.—Nov. 19.—For renovation of Thorne Wesleyan chapel. Mr. J. Wills, Derby.

TORQUAY.—Nov. 8.—For erection of buildings, construction of approach road, &c., on the site of refuse destructor, Upton. Mr. Henry A. Garrett, engineer, Town Hall, Torquay.

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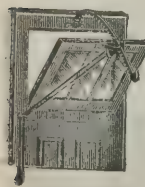


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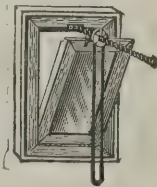
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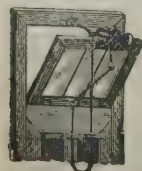
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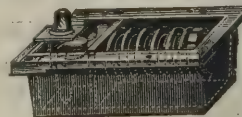
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ULVERSTON.—Nov. 9.—For alterations and additions to the female sick ward of the workhouse. Mr. Chas. W. Dean, clerk, Ulverston.

WALES.—Nov. 20.—For erection at Coelbren of school buildings, with cloak-rooms, &c., and boundary walls. Mr. Richard Morgan, Coelbren House, Onllwyn, Neath.

WALES.—Nov. 10.—For rebuilding Llanharan Arms, Tynewydd. Mr. A. O. Evans, architect, Pontypridd.

WALTON-LE-DALE.—Nov. 17.—For erection of engineers' cottages at sewage-disposal works, Carr Wood. Mr. F. E. Dixon, engineer, Bank Chambers, Fishergate, Preston.

WALTON-ON-NAZE.—For erection of two shops and dwelling-houses. Mr. Charles E. Butcher, architect, 3 Queen Street, Colchester.

WIMBLEDON.—Nov. 9.—For repairs to roofs and pointing brickwork at the pumping station, Durnsford Road. Mr. C. H. Cooper, Broadway, Wimbledon.

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For erection of a doctor's residence in Katherine Street. Messrs. JOHN EATON, SONS & CANTRELL, architects, Stamford Street, Ashton-under-Lyne.

T. DEAN, Ashton-under-Lyne (accepted) . . . £845 0 0

BARNES.

For erection of six shops and dwelling-houses on the Elm Grove Lane Estate, Barnes. Messrs. F. & W. STOCKER, architects, 90 Queen Street, E.C.

J. Watt, Catford . . . £6,125 0 0

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C. R. CARR, Chiswick (accepted) . . . 5,150 0 0

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For erection of farmhouse at Biddles, near Farnham Royal.

Mr. FRED. B. LEIGHTON, architect, Brighouse.

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For alterations, additions and painting at the sanitary hospital, Boscombe. Mr. F. W. LACEY, borough engineer.

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G. Humphreys . . . 5,987 0 0

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Hughes & Weeks . . . 1,865 0 0

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For alterations and additions to farm buildings at Torr Dean. Mr. W. M. TOLLIT, architect, Totnes.

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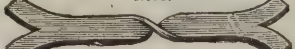
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J. Carr	19 10 0

CAMBERWELL

For erection of billiard-room at the Metropole, Camberwell Green, for Mr. W. J. Wright. Mr. ALBERT E. PRIDMORE, architect, 2 Broad Street Buildings, E.C.	
H. G. Boulter	£745 0 0
S. R. Lamble	723 0 0
W. Smith	663 0 0
H. King	650 0 0
Marchant & Hirst	618 0 0

CORK.

For extensions and alterations to the Munster Hotel, Coburg Street. Mr. SAMUEL F. HYNES, architect, 41 South Mall, Cork.	
D. DUGGAN, Phoenix Street (accepted).	

EAST PRESTON.

For erection of a board-room, offices and wards at the work-house. Mr. H. HOWARD, surveyor, Town Offices, Littlehampton.	
W. Wallis	£1,111 0 0
Linfield & Son	1,065 0 0
SMITH & WOOLVEN, Littlehampton (accepted)	857 0 0

ELM.

For erection of new Board schools, Elm, near Frome. Mr. E. H. LINGEN BARKER, architect.	
E. Walters	£885 0 0
Hodder & Sons	850 0 0
C. BARNES, Frome (accepted)	844 0 0
W. Tovey	833 11 0

ENFIELD.

For making-up the road known as Nag's Head Road, Ponder's End. Mr. R. COLLINS, surveyor.	
Williams	£3,260 0 0
Griffiths	2,850 0 0
Nicholls	2,799 0 0
Adams	2,789 0 0
Swaker	2,636 0 0
ANDERSON, Poplar (accepted)	2,544 0 0

GRAVESEND.

For alterations and additions to the Rose and Crown tavern, Windmill Street. Messrs. EEALE & MEYERS, architects.	
Quantities by Mr. H. DOW WHITE.	
Gregory & Co.	£4,275 0 0
Medason	4,065 0 0
Atherton	3,890 0 0
Walsh & Son	3,855 0 0
S. J. Jarrard & Son	3,528 0 0
J. M. Dering	3,463 0 0
W. H. Archer	3,328 0 0
W. Tuffee	3,270 0 0
MULTON & WALLIS (accepted)	3,247 0 0

HECKMONDWIKE.

For erection of board offices and caretaker's house in High Street. Mr. A. A. STOTT, architect, Heckmondwike.	
Accepted tenders.	
Blackburn & Hannam, excavator, bricklayer and mason.	
C. Appleyard, carpenter and joiner.	
E. Walker & Co., plumber and glazier.	
J. B. Greenwood, plasterer and concrete.	
J. M. Thornton, slater.	
R. Cordingley, painter.	
Total, about 900l.	

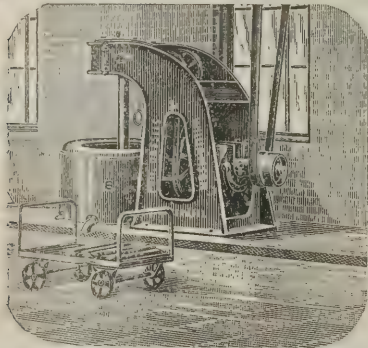
HOLBECK.

For erection of ten houses. Mr. FREDK. W. RHODES, architect, Upper Wortley, Leeds.	
J. ARMISTEAD, Woodhouse, Leeds (accepted)	£203 0 0

HORRABRIDGE

For alterations and additions to the Board School. Mr. WILLIAM SQUIRE, architect.	
G. Youldon	£396 14 0
S. Blowey	380 14 0
W. H. HIGMAN, Tavistock (accepted)	309 10 0

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HUDDERSFIELD.

For painting and colouring the union offices in Ramsden Street.

W. & P. HOLROYD, High Street (*accepted*) . £120 0 0

HULL.

For erection of an isolation hospital at the Royal Infirmary. Messrs. FREEMAN, SON & GASKELL, architects, Albert Chambers, 11 Carr Lane, Hull.

Accepted tenders.

Morrell & Sons, bricklayer.
A. Hewitt, stonemason and joiner.
T. Wilde & Sons, slater.
J. Morley, plumber, &c.
Codner & Sons, painter.
Total, £1,365 10s. 10d.

KEW.

For erection of a new temperate house in the Royal Gardens. MACKENZIE & MONCAR (*accepted*).

LANCASTER.

For fixing one Lancashire boiler at the electricity works, Marton Street Yard.

C. DENNIS, Bury (*accepted*).

For extension of stables and workshops at the Corporation Yard.

R. THOMPSON, Dalton Square (*accepted*).

LANDPORT.

For erection of two ward blocks at the Royal Portsmouth and Gosport Hospital. Messrs. YOUNG & HALL, architects, 17 Southampton Street, Bloomsbury, W.C. Quantities by Mr. CHARLES W. BALL, Southsea.

J. Crockerell	£20,300	0	0
H. Jones	20,170	0	0
J. Croad	19,875	0	0
W. R. Light & Son	19,500	0	0
W. W. Evans	19,450	0	0
W. Ward	19,425	0	0
J. H. Corke, Southsea*	19,298	0	0

* Accepted subject to deductions.

LONDON.

For construction of new sewers and other works, for the Westminster Vestry. Mr. G. R. W. WHEELER, surveyor.

W. H. Saunders & Co.	£10,666	0	0
T. Adams	8,043	0	0
Pedrette & Co.	6,550	0	0
C. W. Killingback & Co.	5,693	0	0
R. Jackson	4,816	0	0
J. H. NEAVE, Fulham (<i>accepted</i>)	4,688	0	0

For alterations, dilapidations and fittings at the Sussex Arms public-house, Upper North Street, Poplar, for the City of London Brewery Company, Limited. Mr. FRED. A. ASHTON, architect, 177 Romford Road, Stratford, E.

	Alterations, &c.	Fittings.	Total
A. E. Symes	£700	£225	£925
H. Wall & Co.	564	236	800
W. Harper	577	207	784
W. J. Maddison	540	230	770
J. & H. Cocks	535	224	759
R. E. Williams & Sons	534	215	749

LONDON SCHOOL BOARD.

For enlargement, Dalmain Road School.

J. Longley & Co.	£12,017	0	0
D. Charteris	11,970	0	0
F. & H. F. Higgs	11,906	0	0
Stimpson & Co.	11,317	0	0
E. Lawrance & Sons	11,040	0	0
S. Hart	10,929	0	0
J. Shillitoe & Son	10,783	0	0
Treasure & Son	10,735	0	0
J. & M. Patrick*	10,540	0	0

For drainage and sanitary work, Neckinger Road School.

J. Garrett & Son	£1,990	0	0
W. V. Goad	1,630	0	0
H. Leney	1,550	0	0
Lathey Bros.	1,493	0	0
W. Akers & Co.	1,435	0	0
Johnson & Co.	1,429	0	0
H. Somerford & Son	1,422	0	0
G. Parker	1,396	0	0
E. Triggs	1,393	0	0
H. & G. Mallett*	1,341	0	0

* Recommended for acceptance.

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LONDON SCHOOL BOARD—continued.

For removing three iron buildings, &c., from the Kennington Road site, and re-erecting them on the Mansfield Road site.

J. & M. Patrick	£1,400	0	0
Humphreys, Limited	1,037	0	0
D. Charteris	960	0	0
T. J. Hawkins	930	0	0
Croggon & Co., Limited	925	0	0
W. Harbrow	920	0	0
T. Cruwys	900	0	0
J. Mitson*	887	0	0

For overhauling heating apparatus and providing new boiler, Surrey Square School.

J. Fraser & Son	£190	0	0
J. Esson	165	0	0
Dargue, Griffiths & Co., Limited	105	12	0
W. G. Cannon & Sons	99	0	0
Whippell Bros. & Row	89	18	6
J. Wontner-Smith, Gray & Co.	77	8	9
Turner & Co.*	76	10	0

For supply of bentwood chairs, on a running contract, per 100.

Anderson Furniture Company, Limited	£17	10	0
Atkinson & Co.	16	10	0
Stanley Phillips & Co.	15	16	8
E. & O. Quitmann	15	8	4
H. S. Benjamin	15	4	2
Thonet Bros.	15	0	0
Bentwood Furniture Company, Limited*	15	0	0

* Recommended for acceptance.

Adapting portion of basement for timber store, Hugh Myddelton School.

J. Harvey	£136	0	0
W. Martin	133	10	0
Marchant & Hirst	109	0	0
G. Barker	103	0	0
Johnson & Co.	98	17	6
J. KIDDLE & SON (accepted)	92	0	0

MAIDSTONE.

For supply of steam disinfecting machine.

MANLOVE & CO. (accepted)	362	10	0
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MIDDLESBROUGH.

For erection of a shed at the workhouse. Messrs. R. LOFT-HOUSE & SONS, architects, Middlesbrough.

ALLISON BROS., Middlesbrough (accepted) £751 0 0

For erection of a children's hospital and porter's lodge at the Broomlands, Linthorpe. Messrs. R. LOFTHOUSE & SONS, architects, Middlesbrough. Quantities by Mr. H. T. NEILSON, Darlington.

M. Johnson	£4,717	0	0
Allison Bros.	4,500	0	0
T. Pearson	4,315	11	7
Hudson Bros.	4,309	0	0
Bastiman Bros.	4,278	13	0
D. Doughty	4,260	0	0
W. Prest	4,170	0	0
Bray Bros.	4,141	0	0
S. Coates	4,029	2	5
W. G. KING (accepted)	4,027	14	3

For pulling-down and removing the boxes, galleries, fittings, &c., in the Prince of Wales Theatre. Mr. W. G. ROBERTS, architect.

J. R. ALLAN, 57 Gilkes Street, Middlesbrough (accepted).

MITCHAM.

For building stores and boundary walls, near Chapel Road, for Mr. Wm. Hollis. Mr. A. J. PERRIAM, architect, 43 Cannon Street, E.C.

Bulled & Co.	£1,320	0	0
Lawrence	1,066	0	0
BULLOCK, Croydon (accepted)	974	0	0

PENRITH.

For erection of an oblique bridge across the Raven at Sickerhill, Renwick.

W. Dixon	£850	18	0
T. Telfer	789	15	6
A. Watson	772	9	10
W. J. Sewell	771	1	6
Lightburn & Sons	628	0	0
I. GILL, Ainstable, Kirkoswald (accepted)	503	2	9

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PONTEFRACT.

For erection of intended vagrant wards, laundry and machinery, temporary lunacy wards and other extensions and alterations at workhouse. Messrs. GREAVES & Co., architect, Corn Market, Pontefract.

Accepted tenders.

Contract No. 1.—New laundry.

Jackson Bros., Goole, mason, &c.	£1,620	0	0
T. Bradford & Co., Manchester, laundry machinery	927	0	0
Jackson Bros., ironfounder and smith	411	0	0
Jackson Bros., carpenter and joiner	311	0	0
Jackson Bros., slater	109	10	0
G. Thompson, Leeds, plumber	90	0	0
H. Butler & Sons, Pontefract, painting	61	5	6
A. Dougill & Co., Leeds, hot-water engineer	51	0	0
O. Lister, Ilkley, plastering, &c.	23	7	4

Contract No. 2.—New vagrant wards.

Jackson Bros., mason, &c.	1,754	10	0
Jackson Bros., carpenter and joiner	417	0	0
G. Thompson, plumber	313	0	0
J. King & Co., Liverpool, hot-water engineer	282	2	0
Jackson Bros., slater	119	8	0
O. Lister, plastering, &c.	88	13	8
Jackson Bros., painting	27	0	0
C. Auty & Son, Leeds, ironfounder and smith	21	14	9

Contract No. 3.—New lunacy wards.

Jackson Bros., mason, &c.	210	18	0
R. Dawson & Co., Stalybridge, hot-water engineer	147	0	0
Jackson Bros., carpenter and joiner	129	18	0
D. Gibson, Leeds, plumber	50	10	0
Jackson Bros., slater	24	4	0
O. Lister, plastering, &c.	14	10	6
H. Butler & Sons, painting	10	11	6

Contract No. 4.—Alterations to clerk's office.

Jackson Bros., mason, &c.	199	11	0
Jackson Bros., carpenter and joiner	125	0	0
G. Thompson, plumber	119	0	0
Jackson Bros., slater	19	3	6
Jackson Bros., painting	8	19	0
O. Lister, plastering, &c.	5	5	0
A. Auty & Son, ironfounder and smith	2	5	3

ROTTINGDEAN.

For erecting two houses. Mr. H. CURTIS CARD, surveyor, Lewes.

T. NYE, Brighton (accepted).

RUGBY.

For erection of branch stores at New Bilton. Mr. J. T. FRANKLIN, architect, 40 Bridget Street, Rugby.

Foster & Dicksee	£1,595	0	0
Harris	1,590	0	0
Satchell	1,480	0	0
Hollowell	1,462	12	0
Sturgess & Son	1,461	18	0
Hopkins	1,453	0	0
YOUNG (accepted)	1,440	0	0

SEAFORD.

For taking-down and rebuilding two houses in Church Street. Mr. H. CURTIS CARD, surveyor, Lewes.

C. MOOLING, Seaford (accepted).

For additions and alterations to a house at the Crouch. Mr. H. CURTIS CARD, architect, Lewes.

C. MOOLING (accepted).

For erecting St. Leonard's Church Institution. Mr. H. CURTIS CARD, architect, Lewes.

C. MOOLING (accepted).

STAFFORD.

For cleaning, distempering, painting, &c., the interior and exterior of the hospital at Tillington. Mr. W. BLACKSHAW, borough engineer and surveyor.

ADAMS & Co. (accepted) £19 15 6

STALYBRIDGE.

For erection of a Conservative club in Mottram Road. Messrs. JOHN EATON, SONS & CANTRELL, architects, Stamford Street, Ashton-under-Lyne.

GARSDALE, BARNES & Co., Stalybridge (accepted) £2,158 0 0

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The Lancet, January 12, 1867.

Also, Testimonials from Dr. Hassall, September 23, 1863; the late Dr. Letheby, February 15, 1865, and December 1873.

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TRADE NOTES.

THE new hospital, Bridport, is being warmed and ventilated by means of Shorland's patent Manchester stoves, with descending smoke flues.

THE Horsfall Furnace Syndicate, Limited, have been awarded, at the Brussels International Exhibition, a gold medal for patent refuse destructors, and a bronze medal for a patent smoke-consuming boiler furnace.

MESSRS. WILLIAM JOHNSON & SONS, Castleton Foundry, Armley, Leeds, have recently obtained from Messrs. F. L. Smidth & Co., of Copenhagen, the sole right in the British Isles for the manufacture of their patent tube mill, which has made such a revolution in the cement trade during the last two years. We understand the firm will be ready for placing these on the market by the new year.

THE November issue of *Advertising* is just to hand. It contains valuable information for all business men; advice as to when, where and how to advertise to the best advantage; articles that inspire the large man to do greater things, and the small man to achieve big things; in fact, it is a most encouraging and helpful journal to enterprising men. The subscription is 2s. 6d. per annum, post free. A sample copy will be sent free on application to J. H. Osborne, *Advertising*, 132 Fleet Street, London, E.C., if billhead or business card is enclosed.

A SYNDICATE is being formed in Dundee for the development of Annan's newly-invented anti-accident apparatus for the cleaning of windows from the inside. It is claimed for this invention that it is the simplest, cheapest and most effective appliance ever invented, that it requires no alterations on woodwork of existing or new windows, and, being detachable, one set of apparatus does for all the windows of a house. If all these claims are successfully vindicated in practical use, we shall no doubt hear more of the appliance before long.

BUILDING AND BUILDERS.

It has been decided to build a new chapel at Reddish at an estimated cost of about 550*l*.

THE ratepayers of Willesborough (Kent) have decided to provide a public water-supply for the town at an estimated cost of 10,000*l*.

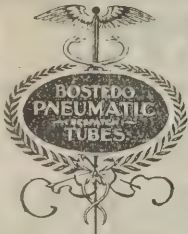
THE foundation-stone of the Convalescent Home of the East London Hospital for Children at Bognor was laid on the 28th ult. by the chairman of the board of management, Mr. H. W. Trinder. The building about to be erected will contain twenty-eight beds for convalescents, besides accommodation for the hospital staff and nurses and a playground for children.

IT is stated that after carefully surveying the ground during the past summer the London and North-Western Railway Company has decided to construct a tunnel through Shap Fells, the surmounting of which is the greatest obstacle to rapid transit between England and Scotland on this route. The tunnel, which will be about ten miles long, by far the longest in England, will start a little north of Tebay and emerge about Clifton.

AMONG the improvements shortly to be taken in hand by the naval authorities at Portsmouth is the construction of a swing bridge connecting the gunnery establishment at Whale Island with the mainland. At present the existing roadway is only passable at low water, and consequently much inconvenience arises. When the Lords of the Admiralty were at Portsmouth, the need for the alteration was pointed out to them, and their lordships concurred that the improvement was necessary. A sum of about 5,000*l*. will be provided for in the next naval estimates. The authorities have also in contemplation the construction of a road to connect Horsey Island with the mainland near Hilsea. This will involve a very much heavier expenditure than in the case of Whale Island, but it is stated the work will be commenced next summer.

THE third annual meeting of the Scottish Building Trades Federation was held on the 28th ult., in the Building Trades-Exchange, Glasgow, Mr. John Adam, builder, Glasgow, president, in the chair. A large number of representatives were present from all parts of the country. The report of the executive was submitted, from which it appeared that there were now thirty-two branches affiliated, embracing nearly all the principal towns throughout Scotland. On the motion of the chairman the report on the financial statement was adopted. The executive and office-bearers were elected for the ensuing year:—Mr. John S. Hay, builder, Dundee, president; Mr. James Leslie, builder, Aberdeen, and Mr. Thomas Kay, wright, Glasgow, vice-presidents, with an executive of thirty-six members. Mr. James L. Selkirk, C.A., was re-elected secretary and treasurer. Various important matters bearing on the

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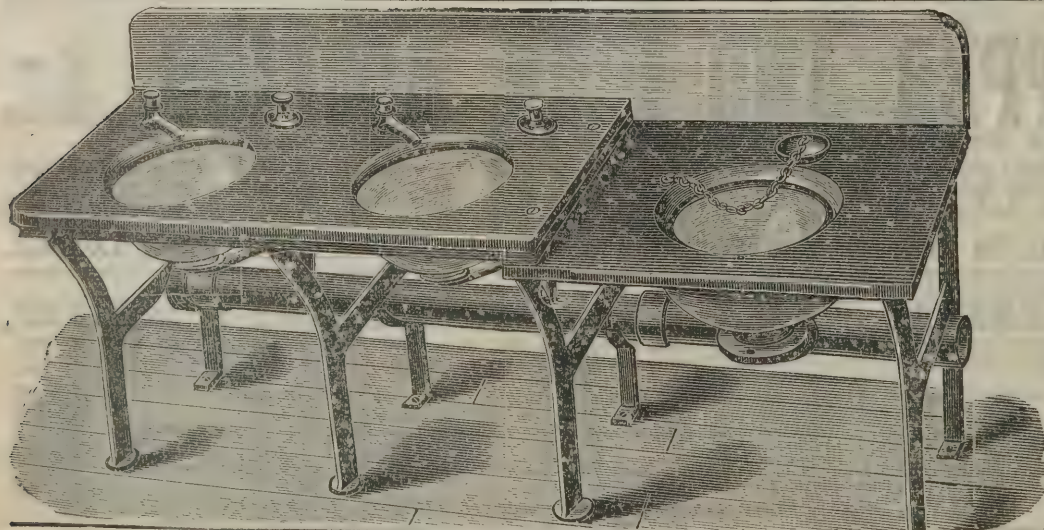
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progress of the federation were considered, including draft general conditions of contract, all of which were fully discussed, and some of which were remitted to the executive to carry out.

THE memorial-stone of the new Central Higher Grade School, which is being erected in Whitworth Street, Manchester, was laid on Tuesday last. The new school, the cost of which will be about 50,000*l.*, will consist of a basement, rising above the street level, and containing ample accommodation for the teaching of laundry and cookery work in connection with the day and evening departments. Separate dining-rooms are to be provided for boys and girls; there is to be a spacious gymnasium, and (at the rear) a large room for manual instruction in woodwork. On the ground-floor there will be accommodation for girls and on the floor above classrooms for boys. At the top of the building physical and chemical laboratories will be placed. In addition special accommodation will be provided for pupil teachers. Altogether the new building will accommodate over 1,400 scholars, and will almost adjoin the City Technical Schools, now in course of erection at an outlay of over 150,000*l.*

ELECTRIC NOTES.

MR. F. J. WARDEN-STEVENS, A.M.I.E.E., of Westminster, who was recently appointed the consulting engineer to the Dorking Council in connection with the electric lighting, has now completed his report on the scheme for supplying the district. The report which he was lately appointed to prepare for the Lewes Corporation on the lighting of the borough by electricity has been discussed in committee, and the Corporation have decided to act upon it and apply for a provisional order under the Electric Lighting Acts of 1882 and 1888.

OWING to a fire caused by the fusion of the wires at the Bolton Electricity Works on Tuesday evening, Bolton, so far as the electric lighting was concerned, was placed in darkness, the whole supply being cut off. The result proved very inconvenient, the streets, public buildings, hotels, tradesmen's establishments and the clubs being practically unlighted. No serious damage resulted from the fire, but considerable confusion was caused in the town.

THE highways and buildings committee of the Aston District Council report that they have retained the services of Mr. Vaudrey, electrical expert, to advise them in regard to this matter; that, acting in accordance with the regulations of the Board of Trade, which require the Council to select and

advertise the streets or roads they propose to electrically light within the next two years, an inspection of the district has been made, and the streets or roads they have selected to electrically light are as follows:—Aston Road, Lichfield Road, High Street, Birchfield Road, Lozells Road and Victoria Road.

THE ceremony of turning on the electric light in Cambuslang was performed on Friday last by Mr. A. Lindsay Miller, chairman of Cambuslang Gas Company. The installation was fitted up by Messrs. Hunter & Jack, Glasgow, and the power is supplied from Cambuslang Gasworks. The engine is 29½ horse-power, and is driven at a speed of 250 revolutions per minute, the dynamo being capable of giving 1,100 volts, but it will only be run at present to give 700 volts, which will be sufficient for the lamps erected in the main street. There was a great concourse of people in the streets, and the brilliancy of the lamps was much admired.

VARIETIES.

MR. FRANCIS WILLIAM BEDFORD, architect, has taken into partnership Mr. Sydney D. Kitson, M.A. The practice will be carried on under the style of Bedford & Kitson, at 12 East Parade, Leeds, and 8 Prince's Street, Westminster, S.W.

AT the monthly meeting of the Leeds Association of Engineers, the president (Mr. William Sheldon) in the chair, Mr. Alfred Towler, M.I.M.E., read a paper on "The Economic Development of the Steam Engine."

THE formal opening of the new Constitutional Club at Coalville took place on the 28th ult. The building, the foundation-stones of which were laid in January last, has a frontage to the High Street of the town of 50 feet. The cost has been about 2,200*l.*

THERE has been placed in the chancel of St. Philip's Church, Dorridge, a new communion table of oak. This has been purchased with the offertory on Jubilee Sunday. The sides of the table are inscribed:—"To the Glory of God" and "1837 V.R.I. 1897."

VAULTS are being prepared beneath the Roman Catholic Cathedral, now in course of construction in Westminster, for the reception of the bodies of Cardinal Wiseman and Cardinal Manning, which lie at present in St. Mary's Cemetery, Kensal Green. It is probable that all future cardinal archbishops of Westminster will also be interred in the cathedral.

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PRICE LIST AND ESTIMATES ON APPLICATION.

A SERIOUS affair has occurred in Partick, resulting in the partial flooding of the Glasgow district subway, and subjecting the city and suburbs to a water famine. The large main pipe which supplies Glasgow with its water burst in Dumbarton Road, Partick, with the result that the subway was flooded to the depth of several feet. The watermen were at once telephoned for and the supply cut off, the consequence being that the entire population of Partick, numbering 47,000, was left without water. The traffic in the subway was continued on Saturday, but the cars had to pass through about 3 feet of water in certain parts of the line.

THE Tivoli Restaurant, Strand, which for the last four or five years has been standing idle, having been acquired by a powerful syndicate, was placed in the capable hands of Mr. Ernest Rüntz, who has practically reconstructed it and converted it into a thoroughly first-class and up-to-date restaurant, which deserves well of the public. When we say that the decorations and furnishings are by Warings, Limited, Oxford Street, while the cares of the *cuisine* devolve upon M. Aubunel, of Monte Carlo fame, and that a capable orchestra is retained, our readers will understand that it is a place wherein to obtain a *recherché* meal with bright and elegant surroundings.

AT New Pellon, Halifax, the Liberal Club of the western division of Ovendon Ward have opened their new premises. The building is of a rather plain character, and the outer walls are of brick. On the ground floor is the billiard-room, allowing space for two tables, and on the first floor is the reading or assembly-room, furnishing accommodation for 400 persons. The total cost will be about 600*l*. The plans have been prepared by Mr. Medley Hall, architect, Northgate, Halifax.

RECENT excavations in the north upper transept of Lincoln Cathedral have brought to light, about 8 inches below the pavement, the north-east angle of a Norman chapel, or part of the north arm of Remigius's Cathedral. The axe marks on the ashlar-work and plinth are as fresh as when buried over 600 years ago. In the north end is the east jamb of a Norman recessed door, of two orders of bases. Further excavations are awaited with interest; if carried out the remaining jamb of the door would probably be brought to light or the position of the transept of the Norman cathedral fixed.

THE new drill hall of the Barnsley volunteers at Eastgate, which has been completed nearly twelve months, has been formally opened by Colonel Stanhope, C.B. The premises have been built at a cost of more than 4,000*l*. They comprise on the street level a drill hall 85 feet by 45 feet, with a drill shed of

similar dimensions beneath it. An armoury, smoke-room, officers'-rooms, clothing-rooms, caretaker's premises, &c., are also provided.

GLASGOW BUILDING EXCHANGE.

THE annual meeting of the members of the Glasgow Building Exchange was held on October 29. Sir William Arrol presided. The report, which was submitted by the secretary, Mr. David Cook, showed that for the year ending September 30 the income amounted to 850*l*. 6*s*. 10*d*., and the expenditure to 668*l*. 8*s*. 7*d*., giving a credit balance on the year's working of 181*l*. 18*s*. 3*d*. Of this balance the executive have devoted a sum of 5*l*. 3*s*. 7*d*. to depreciation on furniture, being 5 per cent. on the total original cost, and a sum of 31*l*. 17*s*. 6*d*. to writing off 10 per cent. of the preliminary expenditure in connection with the formation of the company. These sums, amounting together to 37*l*. 1*s*. 1*d*., being deducted from the year's credit balance, leave a sum of 144*l*. 17*s*. 2*d*. to be carried to the credit of the exchange. This is a satisfactory state of matters, and sets at rest all fears as to the financial carrying on of the exchange. The executive have accordingly resolved to recommend that at this time a dividend of 5 per cent. be declared on paid-up capital. The membership continues to keep up, but with a little effort it could be substantially increased. "In connection with the November municipal election," the report goes on to say, "recognising the importance to the building trades of securing the return of reliable representatives, they in conjunction with the Landlords' Association framed certain questions which they had put to the candidates at the various election meetings in order to bring their views fully before the electors. Again, in view of the recognised fact that the by-laws under the Glasgow Building Regulations Act, 1892, are in many cases ambiguous and harassing, the executive, first by deputation and again by memorial, approached the Corporation with a view to obtaining a revision of these by-laws, and although they were not immediately successful they believed that they succeeded in bringing forcibly under the Corporation's notice the more glaring defects in the regulations, and that their efforts will not be without effect in the near future. The executive have pleasure in advertising to the fact that Edinburgh has followed Glasgow's example and inaugurated a building exchange on lines precisely similar to our own. Other cities have also indicated an inclination to follow our example, and it is not improbable that before very

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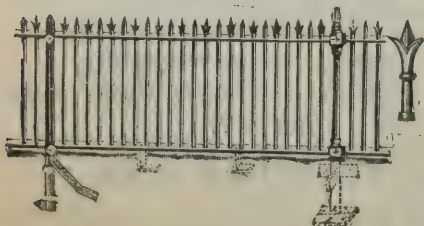
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long we shall have a building trades exchange in every city of any importance in Scotland. Should this come about, and reciprocal rights be introduced whereby any member of a building trades exchange would be entitled to make use of the exchange in any other city which he happened to be visiting, it would be an additional inducement to join such bodies. In conclusion, while satisfied with the progress that the exchange is making, the executive cannot but express their disappointment that greater advantage is not taken of the advantages it offers. They would especially desire to see a larger daily attendance of members at the exchange hour, which is from twelve till two. It is only by occasional attendance at the exchange and keeping in touch with its workings that individual members will begin to take an interest in all connected with the association, and the executive trust that during the current year there will be a marked advance in this direction." The report was adopted on the motion of the chairman, seconded by Mr. John Paterson. A vote of thanks to the chairman brought the proceedings to a close.

RIVAL BUILDING OPERATIONS AT SEAFORD.

THE case Hutchings v. the Seaford Bay Estate Company, Limited, has been heard before Mr. Justice Stirling. It was a motion on behalf of the plaintiff to restrain the defendants and their contractors till the trial or further order from working and getting chalk from the plaintiff's property, known as Sutton-cum-Seaford, so as to obstruct a cart-road constructed at the eastern boundary of his property.

It appears that at the end of last year or the beginning of this, plaintiff purchased a building estate of 830 acres at Seaford, adjoining the sea, and he found that there was in existence an agreement entered into in 1881 under which the predecessors in title of the Seaford Bay Company became entitled, subject to certain limitations, to take chalk out of the land so purchased upon the terms that they should construct a sea wall and parade along the whole frontage of the plaintiff's as well as the defendants' land. The sea wall was finished in 1892, and the work altogether, according to the plaintiff's view, came to an end in 1895. On May 7, 1897, he gave, as he was entitled to do, notice to the defendants to terminate the license to take chalk at the end of the year, and he discovered in September that Mr. Young, a contractor with the Seaford Bay Company, had laid down a line of 3-feet 6-inch gauge, and was working a

locomotive for the purpose of taking chalk, that a siding had been made upon his land, and that a road necessary for his building operations had been rendered impassable.

For the defendants it was denied that any right of the plaintiff had been infringed, or that any possible injury could be done to him by the contractor's mode of working. A portion of the sea wall had not yet been raised to the full height, and what the defendants were doing was in accordance with the original plans in the agreement of 1881. The plaintiff having given notice to terminate the license to take chalk from his land, a locomotive railway was the only means by which the quantity required could be raised in the time. The approach which the plaintiff complained was obstructed was not of the slightest use to him, was made by a person named Green, and, in fact, had never been used by any one for some time past, but the defendants had offered to make for him, if he desired it, a passage for his carts over the tramway.

Plaintiff conceded that the road was first constructed by Green, but it was completed by the plaintiff, and was necessary for other development of his property. He might not be entitled at that stage to make the defendants take up the rails, but if he was right in his contention that they ought not to have been laid down he was entitled to prevent the running of a locomotive upon them, and also to restrain the defendants from continuing a state of things by which a roadway of his was obstructed.

Mr. Justice Stirling said that the defendants were willing to undertake to put the road right, but there was still the question of whether what the defendants were doing was within the terms of the agreement of May 31, 1881, as to whether the approval of the plaintiff's agent was required. That depended whether the words "working or getting" included removal. In his opinion they did; that therefore the approval of the plaintiff or his agent was necessary to the means adopted by the defendants for the removal of the chalk. Certainly no approval had been given to the use of the locomotive, and he must restrain the use of it. The plaintiff was, however, of course, under an obligation to approve of a reasonable method of removal. The order would be that upon the defendants undertaking forthwith to restore the road and divert the line of rails so far as necessary, no order would be made upon the first part of the motion, but there would be an injunction until the trial of the action, or further order, restraining them from removing the chalk by any method not approved of by the plaintiff or his agent.

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"Owen stone" is a building material produced by a combination of siliceous sand and hydraulic lime in the proportions of $77\frac{1}{2}$ per cent. and $12\frac{1}{2}$ per cent. respectively. These substances are caused, under a pressure of 60 lbs. to the inch in the presence of highly heated water, to chemically combine, thus forming a hard, homogeneous and beautiful stone of excellent colour and fine texture.

The stone is made in steel moulds, which can be adjusted to any size, shape or design for which the finished stone may be required, and the process is of such a character that the most delicate designs or mouldings can be readily produced in blocks or pieces up to 10 tons in weight. The economy resulting from the manufacture of the stone in the form or shape for which it is ultimately required is of vast importance, saving, as it does, the labour of working the stone at the building and the transport of unnecessary weight.

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very important feature is that "Owen stone" can be carved, turned, worked, coped, &c., with as much ease and facility as the very best Portland stone.

The company have made a fortunate selection of land for their purpose, as the piece on which their works are situated has an area of 20 acres, the soil of which to a depth of at least 120 feet is composed of clean, white, sharp sand, exactly suited to the manufacture of the Owen stone. They have had a siding to the South-Western Railway constructed and have a plentiful supply of water.

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INSTITUTION OF CIVIL ENGINEERS.

ON Tuesday the opening meeting of the seventy-ninth session of the Institution of Civil Engineers was held. Sir John Wolfe Barry, the president, delivered the inaugural address.

The President, at the commencement of the proceedings, said he was requested by the unanimous vote of the Council to submit for the acceptance of the meeting a resolution of condolence with His Highness the Duke of Teck and family in connection with the lamented death of the Duchess of Teck. He felt certain that resolution would commend itself to the feeling of those present, and that the institution, as a body, would feel particularly that some message of sympathy was due to the Duke of Teck, who had always taken a great interest in the institution and was frequently a guest at their annual dinners. The resolution was as follows:—"The President, Council and members desire to place on record their profound sympathy with His Highness the Duke of Teck and family on the occasion of the death of Her Royal Highness Princess Mary of Cambridge, Duchess of Teck—a Princess universally loved, whose life was devoted to good works, and whose memory will be cherished for generations to come in the hearts of the people."

The motion was agreed to in silence, the members standing during the President's remarks.

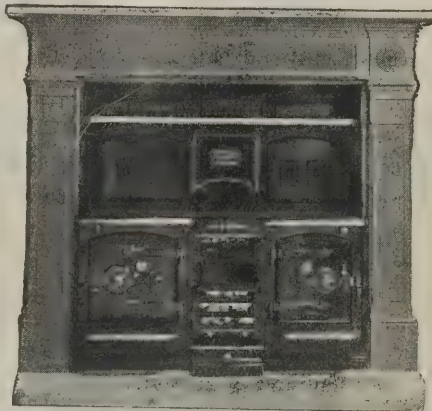
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FERRYBRIDGE, YORKS.

The President, after thanking the members for his election to a second year of office, entered upon a discussion of what he termed domestic affairs, as not only touching the *domum* or home of the institution, but also embracing matters which might affect the members either as a body or individually. With regard to the elections to the Council, he pointed out that the main burden of government, and the ultimate decision on important matters, devolved upon those members who were resident in London or its neighbourhood, and could consequently be assembled frequently at the Council table, and expressed the opinion that the system of local representation should not be carried too far. The ordinary work of the Council grew, and must further increase with the numbers and importance of the institution, now numbering 7,075 members, associate members, associates and students on its roll, and recent important changes in the work of the institution, and the construction of their new building, had rendered the labours of the council during the past two or three years peculiarly heavy. It was, he thought, a matter for satisfaction that the institution had recently undertaken functions of great utility which might formerly have been considered as outside their sphere of duty. He alluded to such matters as the determination of standards of the thermal efficiency of steam-engines, a committee on which subject, consisting of ten thoroughly representative persons, under the presidency of Dr. Kennedy, was nominated by the Council in 1895 under the auspices of his predecessor, Sir Benjamin Baker; and again to the consideration of the best method of tabulating engine and boiler trials, upon which an equally efficient committee, of which Sir William Anderson was chairman, was appointed by the Council this year. In connection with the subject of the widely-spread interests of engineering, he expressed his individual opinion that it was for the good of the institution and of the profession that the class of associates—not entitled to the privileges of corporate membership—should be carefully encouraged and developed. Dealing with matters which had occurred during his term of office, he said a new departure was made in the inauguration this year of their engineering conference in London, which occupied three days, and in respect of which a great success was achieved. The result of the whole experience indicated that they were right in thinking that those resident out of London would welcome the opportunity of making a more intimate personal acquaintance with their metropolitan brethren, and that the latter would highly prize the opportunity of meeting the engineers from other parts of

the kingdom. The numbers attending the meetings were approximately half from London and half from other places. Another important matter which had occupied much of their attention was that of the examinations for admission to the class of associate member, the first of which examinations had now already taken place. As in the conference, so in the matter of the examination syllabus, they were brought face to face with the many-sided aspects of their profession. And accordingly the regulations had been so made that, while ensuring that each candidate should satisfy the examiners on matters of general principles of science, which must always be and were recognised as the bases of their profession, each person might, so far as the specific application of his scientific knowledge went, qualify in the particular branch of engineering which he had studied or to which he desired to devote himself. Since the by-laws were passed on the subject of examinations 118 entries had been made of candidates for election, and of those eighty-nine were gentlemen who, *primâ facie*, would be classed if elected as associate members. Of this number sixty had been remitted for examination or for the submission of certificates from the various examining bodies which were recognised by the Council. While he was an advocate of examinations for the purpose of insuring that a man possessed the qualification of theoretical knowledge before he was classed as an engineer belonging to them, he did not wish for a moment to be understood as claiming for such knowledge one whit more than it was really worth in the equipment of an engineer for his career. It was one side only, however important that side might be, of their education. Practical knowledge was at least as necessary as theory, and, while advocating the cultivation of the latter, he felt very strongly the immense importance of the former. They did not desire to make their successors mere theorists, but good engineers; and they wanted them, under the pressure of foreign competition, to be in the future, as they had been in the past, second to none in the world. He anticipated that their certificate of a man being a corporate member of that institution would be recognised throughout the world as the highest and most coveted degree in engineering as well as a criterion of social status. With reference to the new building, which might now be said to be completed, and which had cost about 60,000*l.*, he thought it might be said that the structure would be a credit to any public body to which it might belong. It suited their requirements well for the ordinary work of the institution, and by dividing the attendances (some 3,000 in number) at the annual conversazione into two nights, they could entertain members

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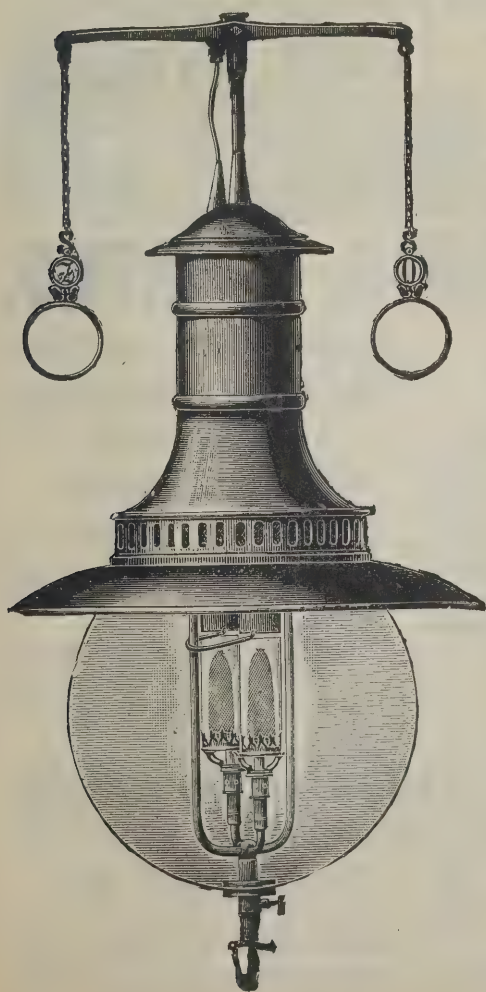
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and friends in a way which, he thought, left little to be desired. For himself, he wished that they had a hall in which they could not only satisfactorily receive all conversazione friends on the same night, but in which they could hold examinations, accommodate examiners, give lectures to students and candidates for associate membership, accommodate congress, and use for purposes extraneous to the present ordinary sessional and day-to-day business without interfering with the other work of the institution. Further, there were even now extraordinary occasions of special interest on which their theatre could not properly accommodate the members in meeting assembled and when a large assembly-hall would be of much use; while, lastly, it would be very satisfactory if they could give their annual dinner in their own home. After the large sums of money recently spent on the new building and its site they could not as an institution contemplate at the present time the expenditure from the funds at their disposal of such an amount as would be necessary for the site for and the erection of a hall of the proportions which he had in his mind, but he threw out the idea for the contemplation of some benevolent millionaire. In connection with such a hall, and as, perhaps, an even more important requirement, might be built a museum, which could readily be placed either over or under the hall without detracting from the utility or appearance of either apartment. At present they had to refuse almost everything that was offered to them in the shape of models and specimens, not for want of appreciation of their value, but because their accommodation in the only room they had—viz. that over the library—was utterly insufficient for any practical purposes as a museum worthy of the name, as illustrative of their work and experience. After alluding to the benevolent fund, which, he said, really merited more support than it received, he urged members, each in their particular branch of work and in their special walk in life, to realise the importance and character of their profession, judged by the responsibilities laid upon it, its past extraordinary progress, its present numbers and the certain future which lay before it. And while they did all in their power now to advance its present best interests and to insure its proper position, let them look ahead and, as far as they could, make provision in every respect for its future life and for its continued prosperity. In conclusion, he said it was a matter of profound pleasure to him to be a member of such a calling as theirs, which was, he knew, the envy of many thoughtful persons of other professions, who sighed for the exactitude attainable in their work, and longed for the pleasure which they, at least, could realise in the con-

templation of work successfully designed and executed, enduring monumentally of them when they themselves had passed away. Feeling as he did on these subjects, they might imagine how highly he valued the honour of being again their President, how grateful he was for such a mark of consideration and trust, and how determined he was to do everything in his power, with the help of the Council and officers, to serve the institution, and to prevent its interests from suffering in the slightest degree during the time given to him in which to work.

The medals awarded for the session 1896-97 were afterwards presented by the President, and a reception was held in the library after the meeting.

A vote of thanks was passed to the President for his address, on the motion of Sir Frederick Bramwell, seconded by Mr. Edward Woods.

THE CENTRAL LONDON RAILWAY.

ON Saturday last some members of the Institution of Junior Engineers visited the works of the Central London Railway. Nearly 100 feet below the level of Tyburn Hill, where it slopes towards a fashionable neighbourhood that disowns that ancient name, says the *Daily News*, huge shields driven by hydraulic rams that work up to a pressure of one ton on every square inch are burrowing silently through the blue clay at the rate of 4 to 6 inches for every working hour of the day. The engines that supply compressed air to these shields are stationary at the corner of Queen's Road, Bayswater, and from these the enormous hydraulic power is controlled. It was for the purpose of inspecting these engines, as well as the progress of tunnelling below ground, that the party visited the Bayswater works of the Central London Railway on Saturday afternoon by permission of Sir Benjamin Baker, its chief engineer, and Mr. John Price, the contractor. Jets of steam from a small funnel sufficed to indicate the locality, but beyond these there was little save the whirr of wheels on a travelling crane and the rattle of chains where a rude cage-lift ascended or descended, to suggest that resistless forces were in operation so far below the surface. One might have stood directly over the spot where a great shield was burrowing its slow way and felt not so much as a tremor of the ground that could have caused him to ask "Art thou there, old mole?" Though it was Saturday afternoon, gangs of navvies were in full work, so that the young

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engineers were enabled to see all the details of tunnelling just as it goes on every day of the week. Mr. Mott, who, as resident engineer, is Sir Benjamin Baker's representative, took charge of the party, and either he or members of Mr. Price's staff accompanying each batch of visitors explained to them all that needed explanation. First they were asked to look at the machinery for compressing air and the air-driven hydraulic pump by which all the actions of enormously powerful rams are produced. Except in their force these do not differ greatly from types with which nearly every young engineer must be theoretically, if not practically, familiar. The party then descended the 30-feet shaft by means of a rude cage, seven at a time, each detachment being under the care of one of Mr. Price's staff as a precaution against accident. Knowing what to expect, most of them had wisely arrayed themselves in the roughest garb, which could take no harm from contact with mortar-besmirched timbers, and put on boots that were sufficient protection against the moisture of clay puddle. No water finds its way into these tunnels from the surrounding soil; it is kept by pressure of air at the head of the shield. As that advances, sections of the great iron tube are bolted into their place, and embedded all around in blue lias lime, which, with a mixture of sufficient water to make it find its way into every little crevice, is blown round the outer surface of the iron tunnel by air-pressure. The primary object of this is to prevent any possible settlement, but it also acts as a preservative for the ironwork by excluding all moisture after once the lime has set. Any wetness of the clay through which visitors had to wade when they reached the bottom of the shaft came from the abundance of the water that has to be used in giving fluidity to the lime. Some waste is unavoidable, and as there is no escape for it through the impervious tunnel, it has to mix with the clay of a temporary floor and be there churned into mire by the passing of many feet as workmen go to and fro with the strings of trolleys which, drawn by horses, take away the excavated clay and return empty or laden with heavy sections of the iron arch-ribs.

The main tunnel, giving room for double lines of the ordinary 4 feet 8 inch gauge, will, when finished, have a diameter of 25 feet. A considerable section in this state was seen on Saturday, and at the end of it, boring its way westward, was the great shield, hidden from view by the mass of soil behind it, which gangs of workmen were shovelling into trolleys as the shield advanced under pressure from twenty-two hydraulic rams, each exercising a force equal to one ton on the square

inch. Behind this shield the ground was supported by a hydraulic ram acting on a girdle of massive iron which gives uniform pressure on the working face. As the shield advances this ram moves automatically in sympathy, giving room for a section of the iron tube to be inserted. Every part of each section fits to nicety, being cast in accurate moulds, and all the workmen have to do is to bolt the flanges, which serve as strengthening ribs, firmly together with nuts and screws. After this the lime is blown in under enormous pressure, and the shield begins to creep forward a few inches more. The work is carried on under strong electric light, for which Mr. Rudlestone, engineer of the Electric Traction Company, is responsible. The main tunnel does not by any means represent all the work that is necessary. Giving access to it from the main shaft at each centre of work which represents a future station are subsidiary tunnels, and there are also smaller shafts, 11 feet in diameter, which will eventually serve for ventilation. In addition there are cross tunnels above the crown of the great arch. These will be the passages leading to a central staircase, by means of which travellers will get from the station above ground to the platform. This is to be placed between the up and down lines, giving equal facility of access to either.

At the present rate of progress it is estimated that the Central London Railway between Shepherd's Bush and the Mansion House may be completed in another twelve months, or about two years and a half from the date of its commencement. Necessarily the work carried on at such a depth, and with so many elaborate appliances, will be very costly; but one element of expense is avoided by tunnelling far below the level where sewers or gas-mains might have been met with. The permanent way will be from 50 to 100 feet below the ground surface. In the length of the line there will be altogether thirteen stations, beginning at Shepherd's Bush in the West. Next will be Holland Park, then Notting Hill Gate, and then in succession Queen's Road, Westbourne Park, Marble Arch, Davis Street, Oxford Circus, Tottenham Court Road, British Museum, Chancery Lane, Post Office, and finally the Bank. Works for the station last named are far advanced in the open space that is fronted by the Mansion House, the Royal Exchange and the Bank of England. It will thus be seen that the Central London Railway promises well for residents in the far west of London, who have long wanted a quicker way of getting to the parks and Regent Street, the Law Courts and the heart of the City.

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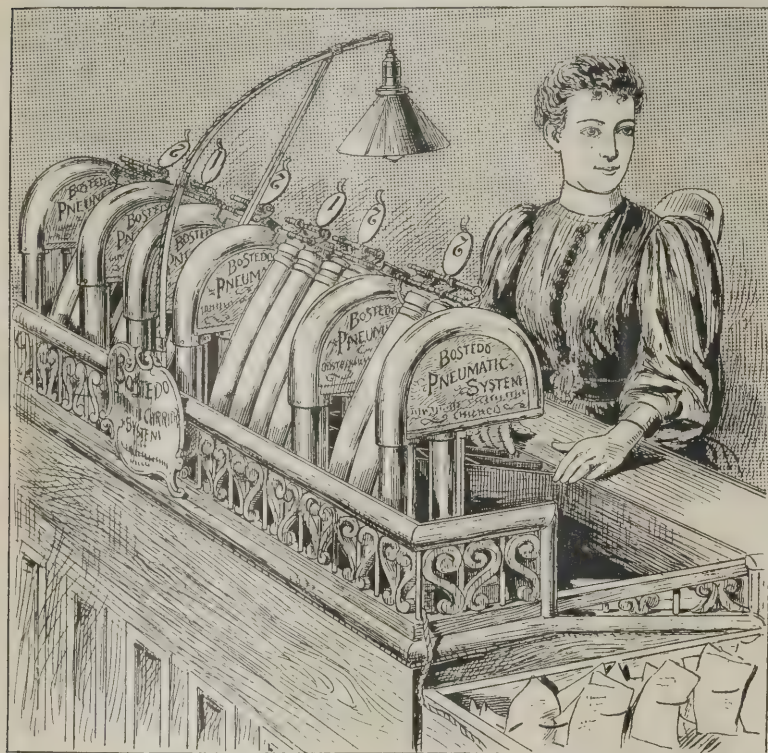
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room to room, floor to floor, or building to building, the tube presents itself as the quickest, most reliable, and by far the cheapest messenger.

A recent issue of the *Inland Architect and News Recorder* of Chicago describes at great length a pneumatic tube plant recently installed in the Illinois Trust and Savings Bank of Chicago, which is said to be the most unique and complete banking building in America. The system delivers leather carriers, $1\frac{1}{8}$ inch in diameter and 9 inches long, to and from every department in the building. All tubes are entirely concealed from view. Carriers travel at a speed of about 30 feet per second and discharge themselves automatically and noiselessly on arrival at their destination. Stoppages are impossible and power is economised to such an extent that its cost becomes too trivial to notice. This system was installed by the Bostedo Pneumatic Tube Company, of New York and Chicago, who claim to be the only company in the world exclusively engaged in all classes of pneumatic tube work. Their managing director for England, Mr. Erbine C. Phillips, 178 Charing Cross Road, shows a collection of photographs of American tube systems that are astonishing as to their size and extent, and says he has won the endorsement of every person and company with whom he has ever done business. His autograph testimonial album certainly contains hundreds of letters from his American patrons in support of his claims.



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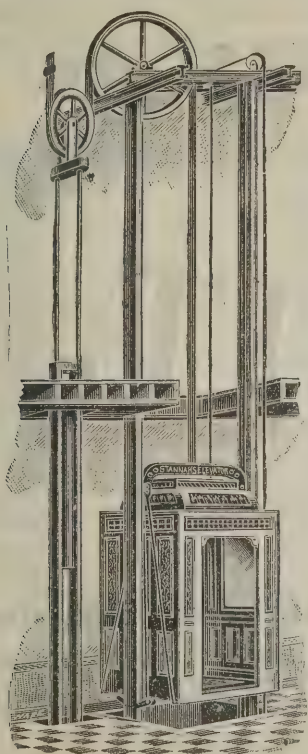
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BUILDING CONSTRUCTION AND PUBLIC HEALTH.

AN address was delivered on the 29th ult. by the chief sanitary inspector of Glasgow, Mr. Peter Fyfe, in the Glasgow Building Trades' Exchange, and under the auspices of the Glasgow Master Wrights' Association, on "Building Construction in Relation to the Public Health." Mr. Fyfe said there were two main principles in building construction on which all were agreed (1) that every structure intended to be occupied permanently by human beings ought to be as healthy as it is possible to make it; and (2) that every such structure should, as far as practicable, be able to resist the destructive influence of fire. In considering the subject, he spoke chiefly of those parts more immediately affecting the trade of the carpenter and joiner. A healthy house must firstly be dry in every part; secondly, it must be able to be thoroughly cleansed throughout; and, thirdly, it should leave no facilities within the four walls for the harbouring of infective or other dust. The work of the joiner was greatly influenced by the dryness or the dampness of a building. The Glasgow building regulations dealt with damp or offensive sites, and compelled that such shall be covered with a layer of concrete 6 inches thick, and that the space under the floor of any dwelling-house on or under the street level shall be sufficiently ventilated. All wood was peculiarly susceptible under conditions of dampness, closeness and darkness, unless protected by a metallic antiseptic solution, such as sulphate of copper; and a log which, exposed in the open to the weather would last thirty or forty years, when placed in dark and unventilated places and attacked by living organisms of various kinds would become rapidly a mass of rotteness. Hence the reason for the by-laws referred to. A powerful destroyer of the joiner's work in ground-floors was the absence of a proper and sufficient damp-proof course. This was provided for in by-law 21 of the Glasgow Act. In this connection it had become necessary to discuss the question, What constitutes a damp course of durable material impervious to moisture? Some firms had recently been trying to foist upon builders a felt composition saturated with tar, which they tried to maintain answered the above description. He took a piece of this material from the gable of a building a few years ago. The damp had already pervaded the inside of this gable wall to a distance of 3 feet above the floor. On examining this so-called damp-proof material he found it soaking with moisture and absolutely worthless as a damp course. Nothing

but sheet lead, Caithness flags or rock asphalt, or some such impermeable material should on any account be permitted. To protect the walls and wooden floors where the lowest floor is to be under the surface of the street or ground, by-law 22 provided that "such precautions shall be taken by building double walls or otherwise as effectually to prevent damp from penetrating the wall." This was intended to provide against the rain soaking into the masonry or brickwork at this point, and should be adopted in actual work. In our climate walls exposed to the full force of a southern or western rain became permeated with moisture. He had seen many substantial-looking walls in a saturated condition from this cause, particularly in new buildings. In such cases, and in the case of old walls which damp had entered, the services of the joiner were often employed to disguise the sore and not heal it. This was most objectionable; in fact, just as heinous a sanitary sin as was the hidden unjointed or badly-jointed drain of the mason or plumber. No joiner should obey such an order or perform such a piece of nefarious work. The wetness of such walls should be cured, not covered up. Lulled by the apparent dryness of the wood lining, ignorant tenants took basement or ground-floor houses, little reckoning what it covered, little knowing the abominations (animal and vegetable) which lurked behind—not dreaming that catarrhs, rheums, bronchial affections and respiratory troubles generally—nay, even diphtheria—might be induced by living and sleeping within such wood-lined habitations. He trusted some day that work of this kind would be punishable by law. The Glasgow by-law dealing with floors and flooring provided that "the space between the storeys of each dwelling-house or tenement of dwelling-houses, in other than fireproof buildings, shall be deafened. The deafening boards between the joists may be overlaid with a coating of lime mortar, upon which a layer of clean, dry, riddled engine ashes or other suitable material is spread, and the surface finished and flushed with mortar or a compost of lime, sand and ashes 2 inches thick may be used. All voids between the walls and contiguous joists shall be deafened, and all voids behind skirtings shall be solidly filled with mortar or other suitable material. All partition walls, unless built of brick or stone, shall be deafened." He regretted that the word "may" was used in the fourth line of the by-law instead of the word "shall." What had been the construction of house floors in the past? Under the joists were placed the laths and under them the plaster. On the latter ashes, shavings, chips of wood and other rubbish were laid and the flooring

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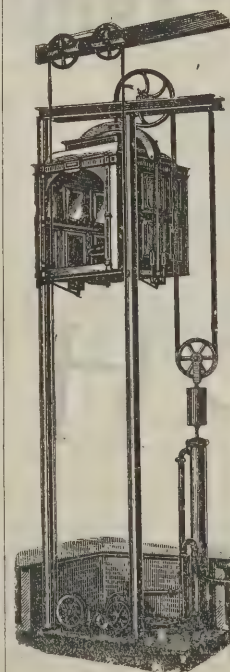
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boards nailed on without any filling up with mortar or lime compost. Very often even the ashes and rubbish were dispensed with. The result of this was that the space between each joist became a receptacle for dust and dirt of every description. From the constant swabbing and washing of floors, to say nothing of occasional accidental floodings with dirty water, it could be imagined in what a condition this huge dust container under floors must be. In even the best kept houses the tenants would be astonished to see what they were dwelling above if necessity occasioned the lifting of the flooring boards. In those houses inhabited by the humbler classes in this city he had witnessed again and again the dreadful mass of festering miscellaneous filth bred and retained by this most insanitary method of floor-making. Such dust contained millions of low organisms inimical to health. Had by-law 27 put an end to this? This was a question he left the meeting to answer. Every flooring board should be nailed down flush upon a thoroughly dry surface of mortar or clean lime compost, and be so tongued and grooved that no filth or dust could find its way to the underside. Then what about the casings around sinks, baths, basins and internal pipes? There was no by-law against the provision of such antiquated dust collectors. The architect and the joiner still combined to provide a quiet nook for the spider in which he could peaceably do his weaving and rear his progeny undisturbed. In those dark places he had neighbours whose presence was not only undesirable, but in many instances absolutely dangerous. Mr. Fyfe further referred to "our old unsatisfactory friend" the sash-window. Here, again, we had a long hollow box for the weights, which in time became a dust chamber, and one peculiarly situated in the direct line of the air-supply to the room. Through the chinks left all round our windows the large proportion of the fresh air to the room enters, and incoming air should not, if practicable, be caused to pass through or over any chambers or hollows where dust and dirt, to say nothing of fungoid growths, were permitted to lodge. A modern fashion had recently come in which he did not think an improvement, viz. the wooden moulding which was carefully nailed round the wall near the ceiling for the purpose of hanging pictures, &c. This formed a very comfortable situation from which myriads of microbes might select their time for pouncing down on the unsuspecting tenant. Dealing next with the roofs of buildings, he said that, from a sanitary point of view, the space between the joists of the top ceiling should be filled up in the same way as the floors underneath. Without

a smooth and level surface it was impossible for anyone to cleanse these places, which, as things were at present, were immense dark stores for dust and atmospheric debris. Coming to cisterns (of which there were comparatively few now in the city), he thought that all should be very carefully covered over and ventilated. He knew one case where the drinking water for the tenement was very peculiarly contaminated. The plumber had gone up to repair the ball-cock when he found that the water of the cistern, which was situated in a dark corner, had been very seriously contaminated by the sweep having just performed his morning's ablution in it. Of course, the sweep could not have done this if there had been a proper air-tight cover on the cistern. Contamination of the water in such cisterns by dead birds, mice and various insects is well known. He further advocated the adoption of the flat instead of the sloped or peaked roof, both on hygienic grounds and grounds of convenience. There would be the undoubted gain of the superficial area for an open space which could be utilised either as a washing green or as a playground. It certainly would be more advantageous to the health of children to play in an atmosphere three or four storeys high than in that which is found at the level of the street or in the back court.

On the motion of the Chairman a vote of thanks was awarded to Mr. Fyfe for his address.

NEW PAVILION FOR EDINBURGH ROYAL INFIRMARY.

THE plans for the new pavilion which it was resolved to erect in connection with the Edinburgh Royal Infirmary, in order to commemorate the Queen's Diamond Jubilee, came before the Dean of Guild Court on the 28th ult., and were passed. The new pavilion is placed at the southern end of the Royal Infirmary grounds, with its longer axis running north and south, immediately to the west of the existing medical pavilions. It thus stands upon the ground purchased some time ago by the managers from the directors of the Sick Children's Hospital. The pavilion resembles in outward appearance the other pavilions, so far as its larger size, and the difference in its internal arrangements rendered necessary in consequence of the special purpose it is to serve, will permit. It consists of a basement (entirely above ground), three floors of wards and an

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attic floor. The basement contains a bathing establishment, the want of which has long been felt by the managers of the infirmary. What may be termed the hydropathic treatment of certain diseases has made great progress during recent years, and it was felt to be unworthy of so great an institution as the Infirmary to be entirely without the means of affording the sick the opportunity of benefiting by these discoveries. This reproach will now be removed. The bathing establishment contains a Turkish bath, with three hot rooms, a needle bath, douche baths of various kinds, a vapour bath, and sulphur and other medicated baths. A spacious cooling-room is provided, and there is also ample accommodation in the way of dressing-rooms, hot linen-rooms, attendants'-rooms, lavatories, &c. In the basement, two four-roomed houses for resident officials are also provided. The three floors above the basement contain three wards, specially adapted for the treatment of diseases peculiar to women. At the southern end of the pavilion is situated on each floor a large ward of twenty-two beds, and access to this is gained from the main staircase, which is at the northern end, by a spacious corridor. Off this corridor are, on one side, an operating-room, two special wards of two beds each, a waiting-room, a demonstration-room and a physician's room; and on the other a kitchen, a bath-room (with three baths), a lavatory and other conveniences, an isolation ward, a linen-room, and a parlour and bedroom for the nurse in charge. Besides these rooms, stores for pails, brushes, &c., separate lifts for food and patients and a store for patients' clothes are provided off a cross corridor. The baths, &c., in connection with the large ward are placed in circular towers at its southern end. It will be noted that the nurse in charge sleeps and lives night and day close to her patients, instead of being removed from them, at least during the night. This is, however, rendered necessary by the nature of the diseases under treatment in this pavilion. The operating room is simply lighted from both the north and west. The windows are set in steel frames of large size and the whole window can be instantly opened wide, like a huge door, to admit fresh air. This is sometimes found useful while patients are under the influence of ether or chloroform. The waiting-room and demonstration-room can, when not in use, be thrown into one by means of a movable partition and they then serve as a convalescent-room for patients. The attic floor contains fourteen separate rooms for nurses and nine separate rooms for servants, besides bath-rooms, lavatories, &c. The pavilion altogether provides accommodation for about ninety-

seven persons, excluding the two houses in the basement floor. In the construction of the pavilion no straps or lath is used. The walls are lined with brick, with a hollow space between it and the main wall. Glazed tiles are freely used, both in walls and floors, in corridors, bath-rooms, lavatories, kitchens, operating-rooms, staircases, &c. The floors are constructed of iron and concrete, without wood joists. The ward floors are laid with hardwood planks, but these are nailed into a thick coat of specially prepared asphalt, laid above the concrete. The whole building is thus practically fireproof. In accordance with modern theories as to germs, all corners are widely rounded, and cornices, door mouldings, &c., are almost entirely absent. The pavilion is warmed by steam in pipes and coils. Fresh air is admitted at various points, and the foul air is to be removed by electric fans, placed in a specially designed tower at the north-east corner. The lighting is to be by electricity. On the south front, between two of the upper floors and forming a balcony are large panels, which will contain suitable inscriptions, stating that the building was erected to commemorate the sixtieth year of Her Majesty's reign. The total cost of the pavilion is expected to be about 40,000/. The architects are Messrs. Sydney Mitchell & Wilson, 13 Young Street.

PATENTS FOR INVENTIONS.

A VOLUME of classified abridgments of specifications of patents for the period 1884-88, dealing with class 20, "Buildings and Structure," has been issued from the Patent Office, and will shortly be followed by other similar volumes. With regard to the object of these publications, the Comptroller-General of Patents, Designs and Trade-Marks furnishes the following statement:—The Patent laws of this country make no provision for an official search as regards novelty, and all patents are taken out at the risk of the inventors. It is therefore incumbent on any person desiring to obtain a valid patent for an invention either to cause a search to be made or himself to make a search as to the novelty of his invention. By omitting such a search many a patentee has found, after paying his fees, that his treasured patent is worthless, because it has been anticipated. Of course in this case the first applicant or patentee possesses all the patent rights, and the second one has absolutely no rights at all. A complete and exhaustive search through published specifications of patents

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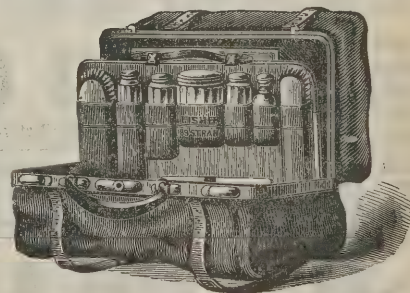


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is a task of considerable difficulty, even for the trained expert with all the resources of the Patent Office library, for at this moment the number of printed specifications of patents is well over a quarter of a million. A series of indexes and abridgments has been published by the Patent Office as a guide to the specifications themselves, and is freely distributed to the principal public libraries in this country. The abridgments give a general description of the nature of every invention patented, and the object of their publication is to enable the would-be patentee to carry out, at any rate in some cases, what may be termed a fireside search. By the study of these abridgments he will generally be able to select certain inventions which have already been patented, and which resemble his own invention sufficiently to render it desirable for him to examine their specifications in detail. A printed copy of any specification can be obtained at an inclusive price of 8d., through any post-office, by a special postcard (patents form, C¹). The abridgments are published in volumes, each volume dealing with one particular class of inventions, such as "steam-engines" and "cooking and kitchen appliances, &c." for a period of some years. The volumes up to 1877 are not illustrated, and all the subjects have not yet been dealt with, but from 1877 onwards a systematic series, very fully illustrated, is now in course of publication at a uniform price of 1s. per volume (including inland postage). The volumes for the periods from 1877 to 1883 and from 1884 to 1888 have been completed, those for the periods from 1889 to 1892 and from 1893 to 1896 are in active preparation, and later volumes will follow in due course. For the purposes of the abridgments the whole field of invention has been divided into 146 "abridgment classes," and the list of these classes in itself shows what an enormous field this is, and how greatly its products vary. Every triumph of applied science, such as the locomotive, the telegraph and the dynamo, is to be found here, and every one of our great national manufactures and industries finds its appointed place. Each volume contains abridged descriptions of the inventions falling under one of the 146 classes during the period of which it treats (illustrated by diagrams or drawings wherever possible), a detailed index to the inventions according to their subject-matter, and an index to the names of patentees or applicants. For the use of those who desire to make a careful study of patents, the Patent Office also publishes an "abridgment-class and index key" (price 1s., parcel postage 5d.), which shows in detail how inventions are classified, abridged and indexed throughout its publications.

PAINTS FOR IRON AND STEEL.*

THIS paper records the result of considerable thought, study and time, which have been given to the above subject during the last three years in making careful laboratory examinations of the various paints sold in the markets as "anti-rust," and under other names, and in practical experiments.

The compilation of the work thus far done is given in a condensed form only; therefore the usual style of reporting is reversed, and the recommendations and conclusions arrived at are given at the beginning.

From our present knowledge the following system for painting iron and steel bridges and other metallic structures is recommended:—

1. Give the iron and steel a coat of the best grade of refined linseed oil, properly boiled and settled clear; or, still better, mix linseed oil with about 10 per cent. of a good grade of lamp-black; this coat to be applied at the mills, the iron or steel being first carefully cleaned from loose scales.

2. After the structures have been erected, give them one coat of real asphaltic varnish paint, made from the best grade of asphalt, linseed oil and gum, compounded properly, so as to form a true varnish; or of a paint made from carbon black and a properly boiled varnish, compounded of the best grade of linseed oil and gum. This coat should be carefully applied by a skilful painter after the metal has been thoroughly cleaned from all loose scale, rust, shavings, filings, shrivelled oil and paint, grease, dirt or any foreign matter, because it is of the utmost importance that the paint should be spread and worked in such a way as to cover the surface properly, and be as free as possible from air bubbles and from a continuous coating. This priming or first coat should be applied fairly thick, the thickness depending, to some extent, on the nature of the paint used. Before the second coat is applied the first one should be thoroughly dried and hardened by natural oxidation, which will require at least ten days. If practicable, it would be a great deal better, as well as more economical, to apply the second coat not less than four weeks after the first one.

3. As a second coat, a good coat of graphite paint is applied as thickly as possible, working the paint thoroughly with the brush. From the examinations made of the various grades of graphite paints, as far as graphitic pigments are concerned,

* A paper by Max Toltz, read before the Civil Engineers' Society of St. Paul, U.S.

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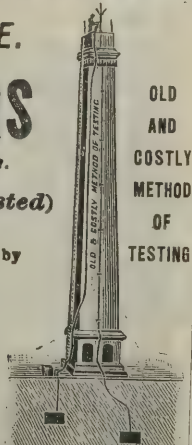
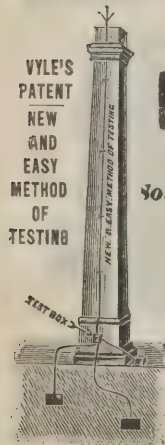
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there appears to be but little difference between them, provided of course that the pigment contains at least 33 per cent. of pure graphite, the rest of the pigment being natural rock ground very fine in pure linseed oil. The graphite paint should be bought in paste form, well ground, and contain not less than 70 per cent. of pigment and 30 per cent. by weight of the best quality of boiled linseed oil; the paste should be mixed with boiled linseed oil at the place where it is to be applied. No turpentine, no benzine and no Japan or driers should under any circumstances be allowed in this paint.

The system just described, if properly carried out, will give a protective coating which will last for many years, and it is firmly believed that this system of painting (provided that the paints are of the best quality) will protect iron and steel for a longer period than any other system now in vogue.

4. There are certain parts of steel or iron bridges, viaducts or tunnels that should have an additional (third) coat of paint. These include such places or parts of structures as are directly exposed to the steam, fumes and gases from passing engines. For such a coat some cheaper asphaltic paints applied very thickly over the coats above recommended would be all-sufficient. Such a coat would protect the underlying primary coats for many years, preserving their natural toughness and elasticity and preventing atmospheric action on the structure.

In recommending asphaltic varnish paint or carbon paint for the first coat, great stress is laid upon the necessity of having the surfaces of iron or steel as free from moisture as possible while the structures are being painted, otherwise there is great danger that the coating will not adhere very firmly, and that it will thus actually nullify the value of the paint. This precaution is less important when an ordinary iron-oxide paint or red-lead paint, simply mixed with linseed oil, is used; because linseed oil itself has the property of absorbing moisture quite readily, whereas carbon or asphaltic paint will not. The lack of this property in the two last-named paints is one of the principal reasons why they are superior to any other class of paints.

Although it is proper that true economy should always be exercised, preference should not be given to any paints whose properties lie simply in the fact that small quantities of them cover great areas. Often the first question asked is: "How many square feet can you cover with a gallon of your paint?" cheapness being considered the most important factor. Of course, the greater the number of feet that can be covered with one gallon of paint the thinner will be the protecting coat.

There is a limit beyond which it is inadvisable to carry this. Other things being equal, the paint that can be spread over a fairly good area should be considered superior to any which goes to the extreme either way.

The various paints examined are classified under the following heads:—

1. True asphaltic varnish paints.
2. So-called asphaltic varnishes or paints of inferior qualities.
3. Black carbon paints in which the vehicle is practically a varnish.
4. Iron-oxide paints, consisting of more or less iron oxide with more or less siliceous matter and compounds of lime or of magnesia.
5. Graphite paints and silica graphite paints.

The tests were carried on through periods ranging from six months to over two years. The number of paints subjected to test was twenty-two. All these paints have been analysed chemically to ascertain the quality of material used in them.

The true asphaltic varnish paints are compounded in the same manner as the black japans, known as baking japans, and are made practically in the same way as varnishes, from linseed oil, gum asphaltum and turpentine. Some of them contain carbon black and a small amount of inert mineral matter.

The carbon paints consist, as regards the pigment, mostly of carbon black with some white lead; the vehicle in which the paint is ground is practically a linseed oil varnish, thinned down with turpentine. These two paints are closely related to one another and are comparable. Both are considered to be of great value for the protection of iron and steel, if properly applied.

The asphaltic paints of inferior quality, which might be of value as a last coat, or wearing coat, especially on certain parts of bridges, viaducts or tunnels, are made of asphaltum dissolved in benzine or other volatile oils, but are not a true varnish made from linseed oil. They contain about 43 per cent. of volatile oils and 56.5 per cent. of solid carbonaceous bitumen (asphaltum).

In using these paints, namely, asphaltic dissolved in benzine, in mixtures of benzine or rosin spirit, or in other light neutral oils, the principal trouble is that in spreading them over oiled surfaces the light oil evaporates so fast that it is difficult to spread them properly. There is also another objectionable feature in connection with the benzine paint, namely, that where such a paint is applied to iron surfaces, the rapid evaporation of the benzine absorbs a great deal of heat, and if the air

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should happen to be highly saturated with moisture at the time, the reduction in the temperature of the surface of the adjacent iron may cause a condensation of moisture, preventing the paint from coming in close contact with the iron and producing a tendency to blister.

These cheap asphaltic paints may show up well enough in the beginning, but as a rule, after the volatile oil has evaporated, especially in subjecting the painted iron to the heat test, the coats become quite brittle, can be easily removed by abrasion and do not protect the iron against rust.

As a matter of interest it may be stated here that one of the so-called asphaltic paints when analysed chemically showed no asphaltum at all.

The iron-oxide paints were of different grades and qualities. It is not the intention of the writer to give their chemical analysis, because every paint was compounded differently and contained more or less iron oxide and siliceous matter. As a rule the paints were well ground, and spread and covered to a satisfactory extent.

As stated before, the graphite paints contain from 33 to 83 per cent. graphite, the balance being inert insoluble matter, consisting mostly of compounds of lime, magnesia, alumina and iron oxide.

Besides the chemical examination, the paints were subjected to a systematic practical test to ascertain their real values as anti-rust paints. For that purpose comparative tests by painting pieces of sheet iron, tinned iron and galvanised iron, wooden boards and shallow sheet iron dishes, were carried on. The iron dishes were about 12 inches in diameter and about $\frac{1}{2}$ inch deep, having a capacity of about half a pint. The scale or skin was carefully removed before painting, so as to have a clean surface of iron exposed next to the paint. Two dishes were painted with each kind of paint, one of them receiving one coat, the other two coats, the first coat having dried thoroughly (for at least a week) before the second coat was applied. After the second coat had completely dried and hardened, these dishes were exposed to the so-called water-and-moisture test, in which a given amount of water is placed in the dishes and allowed to evaporate to dryness at the ordinary temperature of the room. This is repeated a number of times until the inside of the dishes begins to show more or less rust. All dishes were carefully examined before each refilling. After most of the water has evaporated, there remains at the junction around the edge a thin film of water which, in contact with the air and with the carbonic and other acids in the air, acts on

the paint in such a way that the iron under the paint begins to rust. The rust thus formed develops more and more after each evaporation, in some cases practically covering the whole dish in a short period. In actual practice and service the same thing will happen, the only difference being that the rust will extend under the paint, and will not show as plainly as on the dish. This test is a most important and severe one for the purpose of determining in a relatively short time the weather-resisting power of a paint. If the paint is unable to resist the action of the water or moisture under these conditions, it cannot be desirable for the protection of iron or steel structures. But other qualities in the paint have to be taken into consideration in connection with this test before a correct opinion as to its merits can be formed.

The dishes painted with true asphaltic varnish and with the carbon paint were refilled fourteen times. The dishes painted with one coat showed very little deterioration, while the dishes with two coats showed none at all, the paint being as elastic and tough as when first applied.

The behaviour of the cheap and inferior so-called asphaltic paints, applied on the surface of the dishes, was quite different. After the fifth exposure, the dishes with one coat showed considerable rust all over. Those with two coats, after the seventh exposure, showed not much better.

Quite a difference was apparent in the test of the iron-oxide paints. On the average, after the fifth exposure, a good many rust spots or specks appeared on the surfaces of the dishes painted with one coat. The dishes with two coats were refilled six times and on them rust could be easily detected with the naked eye.

The graphite paints so far examined acted much the same in comparison with one another; although, upon chemical examination of the samples submitted, quite a variation was found in the amount of graphite present in the pigment.

The object of procuring graphite in the form of paste was, in the first place, to get the paints ground only in boiled oil, so that they could be thinned with oil before painting under exactly the same conditions; second, if after the examinations and tests any difference was found, it would be easy to ascertain whether or not such difference was due to the amount of graphite present. In mixing these different graphite paints with boiled linseed oil, ready to apply, $4\frac{1}{2}$ parts of paint and $3\frac{1}{2}$ parts of oil by weight were used. As all these graphite paints were received at about the same time, all the comparative tests were made under exactly the same conditions, and all

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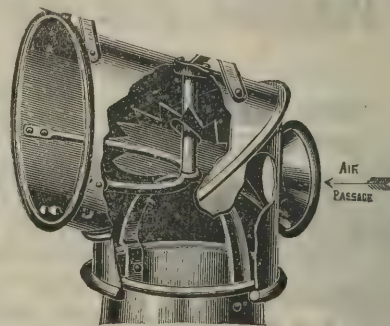
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moisture or water tests were made side by side. Therefore the results obtained so far are comparative, and consequently of more value than otherwise would have been the case. All the dishes with one coat were exposed ten times to the water test, and on examining the records it will be observed that all these graphite paints began to show a few specks of rust after the fifth evaporation, and that the number gradually increased after each successive evaporation. After the tenth exposure some slight difference between them is shown, but not very much. All the dishes given two coats have so far been exposed thirteen times, and none of them show any rust or indication of rust. The natural toughness and elasticity is still in the paint after the treatment.

Besides this moisture-and-water test, all paints have been subjected to a heat test, by placing painted sheet-iron in the core oven of the brass foundry of the Great Northern Railway shops. The temperature of this oven varies from 220 to 300 deg. Fahr., and as the fire is a direct one, all the gases of combustion, such as carbonic acid, sulphurous acid and watery vapour, came in direct contact with the painted iron. This test is of value also as showing promptly whether a paint will keep its elasticity or will become brittle so that it may be easily removed from the surface. In several instances this test brought out serious defects in some of the paints examined, which had shown fairly good results in the other tests. This was the case especially with the cheaper so-called asphalte paints.

After a month's exposure to the heat of this core oven, the painted pieces of sheet-iron were examined, and the asphaltic varnishes, carbon paints and graphite paints only were then found in good condition, although the paint had become very hard owing to the thorough oxidation and hardening of the linseed oil. These three paints adhere very firmly to the iron after the heat treatment; in fact, they seem to be more strongly attached to it than to a painted surface not exposed to heat.

The exposure of the painted iron to this high temperature is not exactly the same condition to which it will be subjected in actual service; but this test in connection with the others is of value, because if the paint should become very brittle or should flake off and be easily removed from the painted surface during this test, it will surely do so in practice after a long exposure to the direct action of the sun and to great variations in temperature.

The writer wishes to give due credit to Dr. P. H. Conradson, who very skilfully carried out these tests when at the head of the Great Northern Laboratory.

THE NEW EDINBURGH ASYLUM.

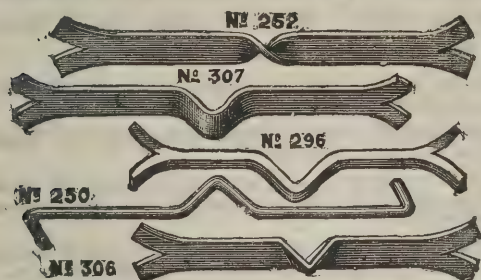
THE report prepared by the deputation of the Edinburgh Lunacy Board, which recently visited the principal asylums on the Continent and in England in connection with the proposed new asylum for Edinburgh, has now been considered by the Lunacy Board. The deputation recommended the adoption of the Alt-Scherlitz system, the basis of which is the segregation of the patients by means of separate dwellings, with home-like surroundings, the conditions of life being, in fact, very much like those in a village community. The Board have unanimously approved of that recommendation, and a remit has been made to Mr. W. W. Robertson and Mr. Peter Lawrence, acting along with Dr. Sibbald, Commissioner in Lunacy, to report upon the most adaptable site on the estate of Wester Bangour, by Uphall, which has been purchased by the Board for the purpose. The estate cost 13,000*l.*, and it is expected that the complete asylum will entail a burden on the ratepayers of the city amounting to about 100,000*l.* The estate is beautifully situated about three miles from Uphall. The Commissioners in Lunacy have expressed cordial approval of the place and its surroundings. Accommodation is to be provided in the new buildings for 600 patients.

ST. STEPHEN'S NATIONAL SCHOOLS, WESTBOURNE PARK.

THE important extension of these schools, which were opened on the 30th ult. by the Right Rev. Mandell Creighton, D.D., is designed to incorporate the existing building so as to form one large school equipped with all the improvements of modern school buildings so far as a close study of cost would allow. The site is a fine open one on a broad street, with the immense area of the Great Western Railway goods yard in front, so that the school buildings are visible at a long distance and enjoy both light and air to an unusual extent.

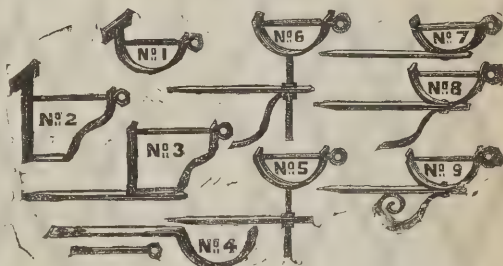
The new scheme divides the children into three isolated divisions on different floor levels, with separate entrances and staircases. It supplies the great want of classrooms, in addition to the old schoolrooms, the idea being to have, in addition to their schoolrooms, as at present, one infants' classroom and three ditto for boys and girls respectively. The scheme also gives a cloak-room to each department, whereas in the old

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"We are not surprised to hear that there has been a great demand for the beautiful reproductions of the well-known frieze by M. Paul Albert Baudoin, entitled 'The Corn Field.' The plates have been reproduced by subscription at half a guinea the set, and so great has been their success that a second edition is being issued."—*The Lady's Pictorial*
"They are beautifully done in colours by the permanent ink photo process, and form a very artistic and pleasing set at the extremely moderate price of half a guinea."—*The Stage*
"The well-known frieze entitled 'The Corn Field,' which is a splendid example of colour-work in permanent ink photo, by M. Paul Albert Baudoin, is to be reproduced at subscription of half a guinea a set. They are exceedingly artistic, and would grace the walls of any house."—*The Gentlewoman*.

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buildings there was no proper provision for this purpose, besides which a separate playground is now allotted to each school, where formerly all had to use one small courtyard in common. Lastly, the lavatories are now all outside instead of inside the main buildings and upon the proper scale, whereas before they were inadequate in number and very unwholesome. In view of the above defects the old buildings were about to be condemned by the Educational Department, being, moreover, very much overcrowded in all schools. Part of the scheme has been postponed for the present, but the actual increase in the numbers of places provided will more than double the former accommodation.

The new extension occupies the site of three houses which were purchased for the purpose and pulled down, the frontage of the schools being thus doubled.

The distribution is as follows:—The basement is used for parochial purposes in connection with the adjoining house. Half of the ground floor provides a small schoolroom 24 feet by 30 feet, the remainder is occupied by the new girls and boys separate entrances and staircases, as well as by the cloak-rooms for both departments. The first floor gives two large classrooms for sixty children each, while the second floor is the same except that here the two rooms can be thrown into one by means of a folding partition.

The schools are lighted throughout by electricity, and are probably one of the first of the national schools to be so lighted. This work has been executed by Mr. W. Mackie.

The building has been erected by Messrs. Rudd & Son, of Grantham, under the personal supervision of the architect, Mr. Arthur T. Bolton, of 2 The Sanctuary, S.W. The cost has been about 7,000*l.*, including the site, which cost 2,000*l.* The money has been nearly all raised in the locality, chiefly in the parish of St. Stephen's, Westbourne Park, through the zeal and energy of the Rev. M. R. Neligan, the vicar.

The general contractors are Messrs. Rudd & Son, of Grantham, and the architect is Arthur T. Bolton, A.R.I.B.A., 2 The Sanctuary, S.W. The Monks Park stone was supplied by the Bath stone firms, the red moulded bricks in chimney-stacks by Messrs. Wheeler, Reading; imperial green slating by Messrs. Roberts, Adlard & Co., London; fireproof floors and staircases by Messrs. Ward & Co., London; woodwork flooring by Messrs. Turpin, London; Messrs. Adams & Co., London, were responsible for the school sanitary fittings, and Messrs. Peace & Norquoy, Manchester, for the patent folding screen partition to architect's design; the quantities were prepared by

Messrs. Widnell & Trollope, Broadway Chambers, Westminster; Monsieur Chavalland, of Messrs. Farmer & Brindley, who has modelled the heads above the entrances and the angels flanking the foundation-stone, executed the sculpture; the painted frieze at the foot of the girls' stairs is the work of Mr. George Walton.

PATENTS.

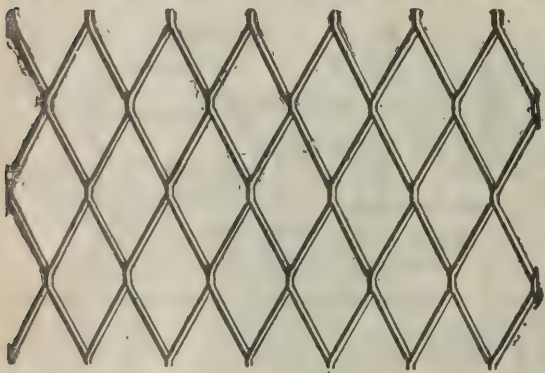
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

- 23934. Dennis Magrath, for "Sash bead fastener."
- 23962. Frederick Stanley Cox, for "An improved appliance for holding together the cords of window-blinds and similarly suspended articles."
- 24001. Alfred Lucas Henry, for "Improvements in dampers chiefly intended for use with kitchen ranges."
- 24040. John Partridge, for "Improvements in the mode of applying and working window roller blinds."
- 24063. Frederick Harry Heath, for "Improvements in apparatus for preventing the steaming of shop or other similar windows."
- 24125. Maurice Comerford, for "Improvements in binding staples."
- 24139. William George Jarvis, for "An improvement in the manufacture of bricks for fixing purposes."
- 24149. Charles Parker Dyer, for "Improvements in detachable joints for mechanical bedsteads."
- 24176. Reginald de Monfort Linstead, for "Improvements in finger-plates for doors."
- 24219. Daniel Hurst, for "Improvements in flushing cylinders for water-closets."

To INVENTORS.—Patents for Inventions, Trade-marks and Designs secured; every assistance given to inventors. Specialists in Building matters. Information free.—Messrs. RAYNER & Co., Patent Agents, 37 Chancery Lane, London, W.C.

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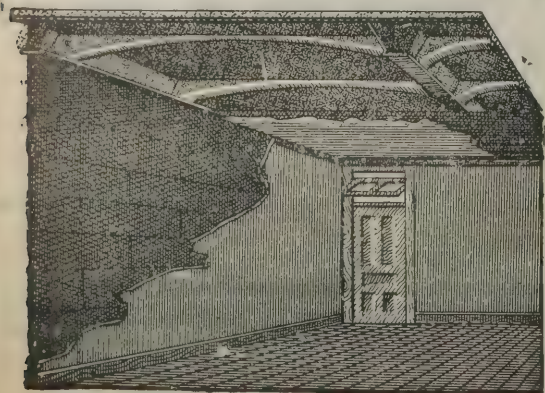
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EDITORIAL NOTICES.

The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.

Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

For Advertisement Scale, see page xiii.

COMPETITIONS OPEN.

BELPER.—May 1, 1898.—The Belper Urban District Council offer premiums of 50 guineas and 25 guineas for the two best schemes of sewage disposal. Mr. Joseph Pym, Urban District Council Offices, Belper.

BOOTLE.—Dec. 31.—The Corporation invite competitive designs of a central fire station, firemen's dwellings and district police station. Mr. J. A. Crowther, borough engineer, Bootle.

BYFLEET.—Nov. 13.—The committee of the proposed village hall for Byfleet invite competitive plans for a village hall and working-men's club, to be erected at a cost not exceeding 1,500l. A premium of 25 guineas will be awarded. Mr. F. C. Stoop, hon. sec., Albany House, Byfleet, Surrey.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500l., 300l. and 200l. respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

DORKING.—Dec. 15.—Competitive designs and plan, with descriptive report thereon and approximate estimates, are invited for erection of infirmary upon workhouse grounds. Mr. George Scales, 35 High Street, Dorking.

SOMERSET.—Nov. 30.—The Council invite competitive plans for large hall, with cloakrooms and retiring-rooms over

present post office, market house and fire-engine house communicating with the town hall, and for conversion of market house, &c., on ground-floor. Premiums of 25l., 15l. and 10l. will be awarded. Mr. Regd. L. Foster, town clerk, 1 Cathedral Green, Wells.

SOUTHEND-ON-SEA.—Nov. 20.—Plans invited for new church. Rev. E. E. Kimber, St. Albans, Avenue Terrace, Southend-on-Sea.

CONTRACTS OPEN.

ACTON.—Nov. 16.—For erection of a fire-engine station in the High Street. Mr. D. J. Ebbetts, surveyor, 242 High Street, Acton.

ABERYSTWITH.—Dec. 4.—For completion of the building of the chancel and vestries of the Holy Trinity Church. Rev. Prebendary Williams, Abergeldie House.

ANGLESEY.—Nov. 20.—For erection of a new school, master's residence, offices and boundary walls at Llandrygaen, Anglesey. Mr. Jos. Owen, architect, Menai Bridge.

ASHTON-UNDER-LYNE.—For erection of offices, board-room, tailoring department, sundry alterations to present central stores, &c. Mr. Thomas D. Lindley, architect and surveyor, Ashton-under-Lyne.

BATLEY.—For erection of two blocks of houses. Mr. George Hollies, Cross Bank, Batley.

BATLEY.—Nov. 12.—For completion of fourteen houses and outbuildings just erected in Beaumont Street, Purlwell. Mr. Harry B. Buckley, architect, Old Vicarage, Batley.

BRENTWOOD.—Nov. 22.—For extension of the clerk's offices at the asylum. Mr. W. P. Gepp, clerk to the visitors, Chelmsford.

BRIDLINGTON QUAY.—Nov. 18.—For alterations and additions to Bon Marche, King Street and Chapel Street. Mr. J. Earnshaw, architect, Carlton House, Wellington Road, Bridlington Quay.

BRIDLINGTON QUAY.—Nov. 16.—For erection of four dwelling-houses and two shops at Hilderthorpe. Mr. J. Earnshaw, architect, Bridlington Quay.

CARDIFF.—For erecting villa residence and stabling at Rumney. Mr. S. Rooney, 9 Quay Street, Cardiff.

CARDIGAN.—Nov. 18.—For erection of a dwelling-house and out-offices at Pencrugiau. Mr. T. James, Trefwrnanissa, Moylgrove, Cardigan.

DEAL.—Nov. 29.—For construction of an underground convenience near the South Parade. Mr. Thos. C. Golder, surveyor, 16 High Street, Deal.

DEWSBURY.—For erection of about 180 super yards of dry walling. Mr. Fredk. W. Ridgway, architect, Dewsbury.

ELGIN.—Nov. 16.—For erection of workmen's houses in Lossie Wynd. Messrs. A. & W. Reid & Wittet, architects, Elgin.

FENWICK.—Nov. 16.—For alteration and repairs at old Wesleyan chapel, and its conversion into a parish room. Mr. Thos. Latham, chairman of parish meeting.

GRANGE-OVER-SANDS.—For erection of a pair of semi-detached houses on Fernleigh Road. Mr. John Stalker, architect, 57 Highgate, Kendal.

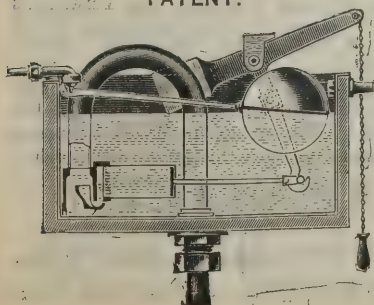
GREAT HARWOOD.—Nov. 22.—For erection of stables and fire-engine station. Messrs. Briggs & Wolstenholme, architects, Richmond Terrace, Blackburn.

GREENOCK.—For construction of two lavatories, &c., in Palmerston Buildings. The Master of Works' Office, Greenock.

HAMPTON COURT.—Nov. 15.—For pulling down part of a chapel and reconstructing same for coachhouse, stabling, &c., Mr. Harry Tagg, Thames Hotel, Hampton Court Bridge.

ARCHITECTS PLEASE NOTE.

PATENT.



The "Waterwitch" Cistern is now fixed and in operation at the

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HARROGATE.—For extension of the *Herald* printing works. Messrs. Whitehead & Smetham, architects, Albert Chambers, Albert Street, Harrogate.

HEYSHAM.—Nov. 18.—For erection of a house. Messrs. Rycroft & Firth, architects, Bank Buildings, Manchester Road, Bradford.

HORNSEY.—Nov. 15.—For erection of buildings for a central library. Mr. E. J. Lovegrove, surveyor, Southwood Lane, Highgate, N.

IRELAND.—Nov. 25.—For erection of two one-storey cottages at Ballyhaise Station, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

IRELAND.—For rebuilding Killinure House and building stables and offices. Mr. P. P. Metge, 9 Harcourt Terrace, Dublin.

KEIGHLEY.—Nov. 18.—For erection of stabling and warehouse, Low Bridge. Messrs. W. & J. B. Bailey, architects, Bradford.

KILKENNY.—Dec. 9.—For erecting forty houses and repairing twenty-four houses. Mr. William K. Cleere, executive sanitary officer, Kilkenny.

LANCASTER.—Nov. 15.—For alterations and additions to the girls' school, Middle Street. Messrs. Austin & Paley, architects, Lancaster.

LEEDS.—Nov. 18.—For heating infectious diseases hospital. City Engineer, Municipal Buildings, Leeds.

LEEDS.—For erection of two houses at Street Lane. Mr. E. Wray, Spencer Place.

LEEDS.—For plastering eleven houses and two shops. Messrs. Murgatroyd & Stevenson, Ashley Road, Burmantofts.

LEEDS.—Nov. 16.—For erection of a wood shed, 35 feet by 15 feet, at Roundhay. Mr. H. H. Hodgson, surveyor, 46 Frankland Place, Leeds.

LEWISHAM.—Nov. 23.—For erection of a coroner's court and mortuaries in the Ladywell Road. Surveyor, Lewisham Town Hall, Catford, S.E.

LYNTON.—Nov. 15.—For erection of a cottage residence at New Mill. Mr. G. C. Smyth-Richards, surveyor, Barnstaple.

MARKET BOSWORTH.—Nov. 17.—For erection of board-room and other work at the workhouse. Messrs. R. J. & J. Goodacre, architects, 5 Friar Lane, Leicester.

MORLEY.—Nov. 17.—For erection of eight houses in Fountain Street. Mr. George B. Clegg, architect, 2 Peel Street, Morley.

NEATH.—Nov. 15.—For erection of the Smith's Arms Hotel, Neath Abbey. Mr. J. Cook Rees, architect, St. Thomas's Chambers, Church Place, Neath.

PLYMOUTH.—Nov. 15.—For erection of poultry, fruit, vegetable and fish market. Messrs. King & Lister, architects, 8 Princess Square, Plymouth.

PONTEFRACT.—Dec. 4.—For erection of an infectious disease hospital. Messrs. Tennant & Bagley, architects, Pontefract.

PRESTON.—Nov. 23.—For erection of an auction mart and buildings in connection therewith at the cattle market, Brook Street. Mr. H. Hamer, town clerk, Town Hall, Preston.

PYRFORD.—Nov. 18.—For erection of a teacher's house. Mr. C. Welch, architect, London Street, Chertsey.

RAWMARSH.—Nov. 16.—For erection of manager's house at the sewage outfall works, Roundwood. Mr. J. Platts, architect, Old Bank Buildings, Rotherham.

REDDISH.—Dec. 6.—For erection of goods warehouse and extension of platforms at station. Mr. Oliver S. Holt, secretary, S. & M. Railway, London Road station, Manchester.

REDRUTH.—Nov. 22.—For erection of a children's ward in connection with the West Cornwall Women's Hospital. Mr. Alfred H. Jenkin, solicitor, Alma Place, Redruth.

ROTHERHAM.—Nov. 16.—For converting existing buildings into two dwelling-houses. Mr. J. Platts, architect, High Street, Rotherham.

SCOTLAND.—Nov. 30.—For erection of a post-office at Forfar. Mr. George Morham, 39 George Street, Edinburgh.

STAPLEFORD.—For erection of branch stores. Mr. Ernest R. Ridgway, architect, Long Eaton.

STOCKWELL.—Nov. 18.—For reconstruction of certain flues and chimneys at the South-Western Hospital, Landor Road. Mr. T. W. Aldwinckle, architect, 1 Victoria Street, Westminster.

STROUD.—Dec. 6.—For building a Board school, with work incidental thereto, at Rodborough. Mr. W. H. C. Fisher, architect, 6 Rowcroft, Stroud.

THORNE.—Nov. 19.—For renovation of Thorne Wesleyan chapel. Mr. J. Wills, Derby.

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WALES.—Nov. 20.—For erection at Coelbren of school buildings, with cloak-rooms, &c., and boundary walls. Mr. Richard Morgan, Coelbren House, Onllwyn, *via* Neath.

WALES.—Nov. 19.—For erection of a new police station and court at Port Talbot. Mr. T. Mansel Franken, clerk, Glamorgan County Offices, Westgate Street, Cardiff.

WALTON-LE-DALE.—Nov. 17.—For erection of engineers' cottages at sewage-disposal works, Carr Wood. Mr. F. E. Dixon, engineer, Bank Chambers, Fishergate, Preston.

WHITBY.—Nov. 18.—For erection of a shop and café in Skinner Street. Mr. Edward H. Smales, architect, 5 Flowergate, Whitby.

WOODHAM FERRIS.—For erection of four cottages near Woodham Ferris Station, Essex; two at West Hanningfield, Essex; and two at Caldicote, Cambridge. Mr. Brake, 18 Northumberland Grove, Tottenham, N.

SUPERANNUATION CONFERENCE.

AN adjourned meeting of the Conference (convened by the Municipal Officers' Association), with Mr. C. William Tagg as chairman, was held at Sion College on November 4, when it was unanimously resolved to reintroduce the Local Authorities Officers' Superannuation Bill in the next session of Parliament, and the necessary steps will at once be taken to secure this object. Mr. Tagg (chairman) and Mr. C. J. F. Carnell (hon. secretary) were unanimously re-elected to the respective positions and accorded a very hearty vote of thanks for their services during the last year. A committee, consisting of Dr. Dudfield, Mr. Chaloner, the chairman and hon. secretary was appointed to confer with other associations in support of the Bill. Representatives from the following bodies were present:—The Incorporated Society of Medical Officers of Health, The Municipal Officers' Association, The Metropolitan Rate-collectors' Association, School Board for London (Head Office Staff), Rural District Councils' Association, Poor Law Officers' Association, School Attendance Officers' National Association, London School Board Officers' Association, the Library Association, Schoolkeepers' Association and the County Surveyors' Society. Mr. C. J. F. Carnell, the hon. secretary, 33 Paulet Road, Camberwell, S.E., will be pleased to furnish any information respecting the measure.

TENDERS.

BARNES.

For erection of six shops and dwelling-houses on the Elm Grove Estate, Rocks Lane. Messrs. F. & W. STOCKER, surveyors, 90 and 91 Queen Street, Cheapside, E.C.

W. Watson	£5,975	0	0
J. Edwards	5,535	0	0
J. Watt	6,125	0	0
C. R. GURR, Chiswick (accepted)	5,150	0	0

BIRMINGHAM.

For widening and improving Bournville Lane, King's Norton. Mr. A. W. CROSS, engineer and surveyor.

Cruwys & Hobrough	£1,456	19	0
J. White, jun.	1,264	5	0
Jones & Fitzmaurice	1,248	8	6
G. Law	1,197	0	0

CURRALL, LEWIS & MARTIN, Birmingham (accepted) 985 16 9

For erection of new dining-hall and stores at the workhouse. Mr. W. H. WARD, architect, Paradise Street, Birmingham.

Quantities by Messrs. HARRIS & HARRIS.			
F. Nicholls	£2,735	0	0
D. J. Whittall	2,725	0	0
R. Fenwick	2,695	0	0
J. H. Whittaker & Co.	2,600	0	0
W. Bishop	2,545	0	0
H. Vickers	2,525	0	0
J. Atkinson	2,393	0	0
W. Robinson	2,377	0	0
SMITH & PITTS, Moseley Road (accepted)	2,277	0	0

BOURNEMOUTH.

For erection of a Wesleyan church, Westbourne. Mr. R. CURWEN, architect, 112 Hamilton House, Bishopsgate Street Without, E.C.

W. E. Jones & Son	£8,715	0	0
Entwistle & Cox	8,069	0	0
Jenkins & Sons	7,947	0	0
Slaymaker & Harlow	7,593	18	5
F. Hoare & Sons *	7,268	10	0

* Accepted provisionally, subject to modifications.

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For drainage work, Ongar Road.
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H. Moorcroft 7,480 0 0
J. Burrill 7,400 0 0
Brewer 5,212 0 0
J. Jackson 5,150 0 0
SAUNDERS & Co., Southampton (*accepted*) 5,023 0 0

CARSHALTON.

For making-up Alma Road. Mr. W. W. GALE, surveyor.
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For construction and completion of James Street.
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R. Townley 109 7 2
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For supply and delivery of a Cornish boiler for the sea-baths, Marine Parade. Mr. HENRY E. STILGOE, borough engineer, Town Hall, Dover.
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J. Thompson 227 0 0
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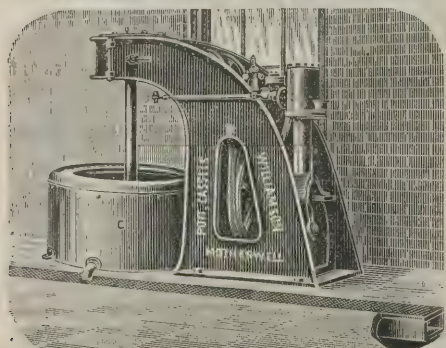
DURHAM.

For erection of branch stores and cottages at Clara Vale, near Ryton. Messrs. LIDDLE & BROWN, architects, Prudential Buildings, Newcastle. Quantities by architects.
J. Reed & Co. £2,453 0 9
Henderson & Son 2,427 18 6
T. & R. Lamb 2,429 18 1
Davison & Bolam 2,318 5 6
T. H. Wilson 2,312 15 0
R. Thompson & Co. 2,242 7 0
J. Bates 2,225 5 5
Armstrong 2,220 0 0
J. Pelton 2,083 0 9
Note.—Pelton refused the contract, and Bates and Armstrong submitted reduced tenders from schedule of deductions, and Bates's tender of £1,913 16s. 10d. was accepted.

ELGIN.

For erection of dwelling-house in West Road. Mr. GEO. SUTHERLAND, architect, Elgin.
Accepted tenders.
A. Garrow, mason.
Mackie & Mackenzie, carpenter.
A. McIver, plasterer.
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A. McKenzie, carpenter.
J. H. Clark, plumber.
J. Brodie, plasterer.
A. Fordyer, painter.
P. Bain, slater.

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For erection of a villa residence at Featherstone. Messrs. GARSIDE & KEYWORTH, architects, Ropergate, Pontefract.

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H. Foster, Castleford, plumber . . . 67 7 0
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For building chancel and doing other work at Fahan church. Mr. S. CLOSE, architect, Waring Street, Belfast.

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J. McClay . . . 375 0 0
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Accepted tenders.

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D. & J. TULLIS, Kilbowie, Glasgow (accepted)	3,072	0	0
Architect's estimate	3,475	0	0

For alterations to the Swan and Horseshoe restaurant. Mr. W. M. BRUTTON, architect, Trafalgar House, Green Street, Trafalgar Square, W.C.

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Godson & Son	2,218	0	0
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For additional shelter wings to the new entrance to the Alhambra, Charing Cross Road, W.C. Mr. W. M. BRUTTON, architect, Trafalgar House, Green Street, Trafalgar Square, W.C.

Hart, Son, Peard & Co. £285 0 0

MORECAMBE.

For alterations and additions at 19 The Crescent. Mr. J. PARKINSON, architect, 67 Church Street, Lancaster.

Accepted tenders.

R. L. Dilworth, Lancaster, mason	£270	8	0
J. Hartley, Lancaster, joiner	161	10	0
R. B. Abbott, Morecambe, plumber, &c.	69	16	0
W. J. Cross, Morecambe, slater and plasterer	56	0	0

ROTHES, N.B.

For erection of town hall. Mr. R. B. PRATT, architect, County Bank House, Elgin.

Accepted tenders.

G. Reid, Elgin, mason	£969	0	0
J. & A. Robb, Rothes, carpenter	541	0	0
J. Hunter, Elgin, plumber	135	15	0
Munro, Aberlour, plasterer	119	0	0
G. Ogilvie, Elgin, slater	87	16	0
Grant, Aberlour, painter	50	0	0

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Moulson, Bradford, joiner	1,120	10	0
E. Pearson, Farsley, plumber	302	0	0
F. Thompson, Stanningley, slater	244	0	0
J. Throp, Bradford, plasterer	104	0	0
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J. Scarth, Pudsey, heating apparatus	95	15	0

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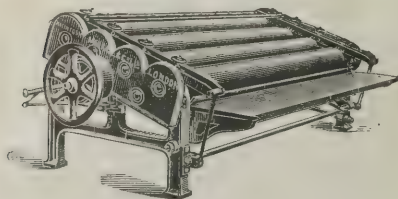
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W. Cox	205	10	0
Williams & Thomas	190	5	10
J. Wood	183	4	11
E. MOORE, Clive Road, Cardiff (accepted)	131	6	6

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J. John	£1,636	0	0
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Williams Bros.	1,261	0	0
M. Edmunds	1,200	0	0
TAYLOR & SON, Mountain Ash (accepted)	1,031	0	0

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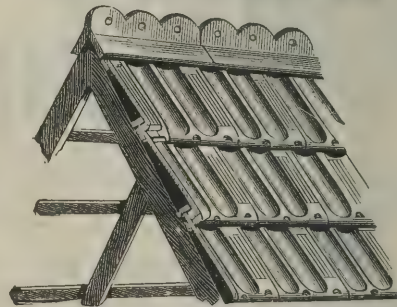
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T. Allen	790	0	0
G. SPRAKE, Milton, near Weston-super-Mare (accepted)	787	0	0

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WREXHAM.

For extension of sewers. Mr. J. PRICE EVANS, engineer Argyle Chambers, Wrexham.			
Jenkins & Jones	£129	10	0
A. McHutchon	123	15	0
PHILLIPS & JONES, Rhosllanychugog (accepted).	100	0	0

TRADE NOTES.

MESSRS. WILLIAM GODWIN & SON, encaustic, enamelled and art tile manufacturers, Withington, near Hereford, have just opened a London office and sample room at 15 Bartlett's Buildings, Holborn Circus, E.C.

THE Imperial Stone Company, Limited, whose works are at East Greenwich, have taken City offices and opened show-rooms at 4 and 5 Aldgate, E.C.

THE new sanatorium, Brighton, is being warmed and ventilated by means of Shorland's patent Manchester stoves with descending smoke flues, and Shorland's patent Manchester grates.

THE chancel of the parish church of Bottesford, near Grantham, which already contains many handsome memorials of the family of the Duke of Rutland, has been further enriched by the insertion of another stained-glass window to the memory of the late rector, Canon Norman. The window contains three

lights which respectively portray the texts, "I am the Light of the World," "I am the Bread of Life" and "I am the Good Shepherd." The window, which is very effective, is from the studio of Messrs. Jones & Willis, of Birmingham, London and Liverpool.

THE plates of the cathedrals as well as of modern buildings which we are now publishing, suggest the excellence of the photographs of Messrs. S. B. Bolas & Co. It will excite no surprise that the medal of the Royal Photographic Society has been awarded to Messrs. Bolas, who may claim to stand in the foremost place among photographers, owing to the skill by which they contrive to show details of buildings without any sacrifice of breadth. Their plates may be described as architectural and pictorial in quality.

BUILDING AND BUILDERS.

THE London County Council have passed plans for the erection of a new theatre in the Holloway Road, subject to the condition of making a new side street, for purposes of entrance and exit. The site is a large piece of ground almost adjoining the High-bury and Islington railway station.

A NEW cricket pavilion is to be erected by the Sussex County Cricket Club at Hove, which is to cost about 600*l*.

MEMORIAL stones of a new Congregational church, which has been erected at Mount Pleasant, Swansea, were laid on Thursday, the 4th inst. The building has cost 1,400*l*. and the erection has been carried out by Mr. Thos. Davies, from plans prepared by Mr. W. Williams.

ALL the necessary arrangements have now been made for commencing the extensive alterations and improvements in connection with Pontefract workhouse. These consist of developments of the accommodation for vagrants, and extensions of the laundry arrangements. The total amount involved is 7,695*l*. Mr. W. H. Greaves, of Pontefract, is the architect.

THE Metropolitan Asylums Board have, on the recommendation of the works committee, accepted the offer of Messrs. E. P. Bulled & Co., of Croydon, to take over a contract for the erection of a nurses' home at the Caterham Asylum, and complete it at the sum of 5,500*l*.

A NEW church is about to be erected in the parish of St. Andrew, Listerhills, Bradford. Mr. G. E. Turner has given a site in Horton Grange Road, and Mrs. Turner, of Westfield,

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has promised to give 1,400*l.* towards the endowment fund and 1,000*l.* towards the building fund in memory of her eldest son, the Rev. John Turner, at one time curate at Whitby.

A SITE has been secured for a new technical school for Harrogate, the present building being too small and unsuitable. The site selected is situated at the junction of Bower Road and Hayura Crescent, and the committee have decided that local architects be invited to send in competitive designs, for which prizes of 20*l.*, 10*l.* and 5*l.* will be offered. The chief room is to be at least 45 feet by 35 feet; whilst a number of smaller rooms are to be provided for the teaching of the many subjects now taken at the Harrogate School of Art. It is desirable that a large room should be available for conversaciones, &c., and it is suggested that the elementary, building and lecture-rooms should be so designed as to be convertible into one large room, and thus give the space required. The main entrance will be in Hayura Crescent, and the building will be so constructed as to allow for extension if necessary. The building proper will be of stone, and the cost (including heating, &c., but not architect's commission and clerk of works' salary) is not to exceed 3,500*l.*

ELECTRIC NOTES.

THE Harbour Commissioners of Aberdeen have adopted a scheme for the lighting of the quays and harbour sheds by electricity. Electric beacons will also be provided at the dock entrances for the better navigation of vessels at night. The supply of the current will be taken from the Corporation mains. The annual cost is estimated at 1,700*l.*, but of this sum 250*l.* will be contributed by the Town Council for the lighting of the streets around the quays.

IN the last Parliamentary session the St. Anne's Urban Council promoted a costly Bill to acquire the gasworks, but lost their measure. Soon afterwards an electric-lighting company served the Council with notice of their intention to apply for a Board of Trade order to supply the district with electricity. Despite this the Urban Council have decided unanimously to apply for a provisional order. Complaint was made as to the bad lighting of the new esplanade and it was intimated that in future the electric light would be used there.

AT a recent meeting of the Perth Police Commissioners the question was discussed of the introduction of the electric light into the city. A long statement on the subject was made by a

consulting electrical engineer from London, who has had charge of the installations in many large towns. He dealt with the possibilities of the project in the hands of the Corporation, and indicated in a general way the financial risks that would be involved. His statement was in favour of the Corporation taking the project into its own hands in preference to handing it over to a company. In particular, instances were given of corporations being compelled to pay large sums when taking over the rights of private companies, in whose hands the installation of the light had originally been placed. After the statement the feeling among the Commissioners present was that the proposal that a company should be allowed to get a provisional order for the introduction of the light into the city was the wrong one, and that the city itself had much better undertake the scheme.

AT the meeting of the Marylebone Vestry held on the 28th ult. it was unanimously decided, on the motion of the chairman of the electric-light committee, Mr. Brooke-Hitching, to give formal intimation to the Board of Trade and the Metropolitan Supply Company, Limited, of the vestry's intention to apply for a provisional order for supplying electric energy for public and private purposes in the parish of Marylebone. It is now to be hoped that this important parish, whose rateable value far exceeds that of Leeds, Sheffield, Brighton or Portsmouth, may speedily light Oxford Street, Edgware Road, Marylebone Road, Portland Place and other important streets within its area by means of the most approved methods of electric lighting. Many of the private houses in this district are already lighted by the Metropolitan Electric Supply Company, Limited. Board of Trade orders are also being sought by the London County and Brush Company, Limited, and the Marylebone Electric Supply Company, Limited, to compete. The chairman gave as his opinion that the value of a full Board of Trade order was not less than 10,000*l.*

A LOCAL GOVERNMENT inquiry has been held at Harrogate by Major-General H. D. Crozier, R.E., with respect to the application of the Corporation to borrow 17,500*l.* for the purpose of electric light extension. The Harrogate Corporation during the early part of the year put down an installation, 25,246*l.* being borrowed for the purpose in 1896. A portion of the centre of the town has been lighted, and though further applications have been made for the light it is impossible to comply with them without an extension of the plant. At present there are in use in the town 7,366 eight candle-power lamps, and during September the income was 251*l.*, whilst the expenditure,

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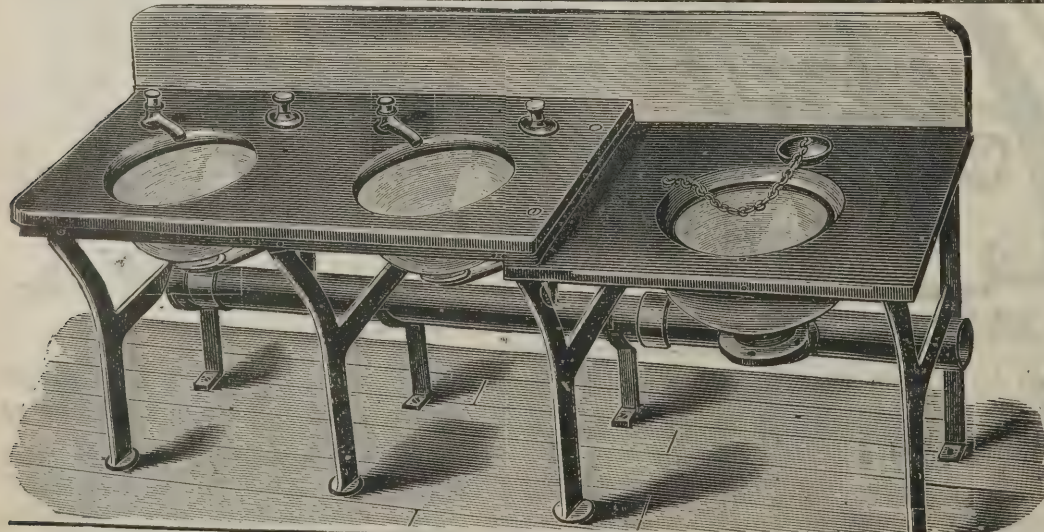
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including repayment of interest and a portion of the sinking fund, was 253 $\frac{1}{2}$ l. The town clerk (Mr. J. T. Taylor), Mr. G. Wilkinson (electrical engineer) and Colonel Thwaites (chairman of the committee) gave particulars of the work. After the necessary evidence and a vote of thanks, the inspector viewed the electric-lighting station on the Corporation Farm.

THE cost of electric light in Leeds is about to be again reduced. The Yorkshire House-to-House Electricity Company have had in progress a large extension of their works and plant, and after considerable delay caused by disputes in the building and engineering trades, the new machinery is now in operation, and the company are thus prepared to produce a much greater output than has hitherto been possible; hence the possibility of introducing the reduced scale of charges. The present standard price in Leeds, as in most other large towns, is 6d. per unit. On and after January 1 next the maximum price will be 5d. per unit, and this is reduced to 4 $\frac{3}{4}$ d. in cases where the consumption for the quarter is not less than 1,000 units. The special advantages are not confined to large users, as the present system of discounts, based on the number of hours during which the lamps are used, is continued. Hitherto a hindrance to the use of electric light has been the charge for connecting consumers' premises to the mains. In future occupiers of premises situate within 10 feet of the public road will be able to have the connection made free of charge. This concession comes into effect at once.

THE installation of the electric light in the village of Treeton, near Rotherham, is now an accomplished fact. The enterprise shown by the Treeton Parish Council in putting down an electric-light plant has caused a good deal of interest throughout the country, inasmuch as Treeton is believed to be the only village in England which has its roadways illuminated by electricity. During the last few years Treeton has become an important mining centre, and the population has grown enormously in consequence. It is a unique coincidence that this village, which has the honour of leading the way in the matter of village lighting by electricity, should be the birthplace of Sir Wm. Cooke, the inventor of the electric telegraph. The scheme, which has cost about 600 $\frac{1}{2}$ l., has been carried out by Messrs. Dewhurst & Sons, of Sheffield.

THE parish church of Halifax was reopened after renovation on Saturday afternoon.

VARIETIES.

ENGLISH Churchmen are arranging to build at Lucerne a new church for the use of English-speaking residents and visitors. The building and site will cost 7,000 $\frac{1}{2}$ l.

A TERRIBLE explosion took place recently at the engineering works of Higginson & Co., Mersey Street, Liverpool, resulting in serious injury to eight men.

THE Bishop of Chichester recently opened new science and other rooms, which have just been added to Brighton Training College.

A SITE for the proposed Technical Institute at Harrogate has been chosen at the junction of East Parade and Bower Road. The cost of the building will be about 3,500 $\frac{1}{2}$ l.

THE opening ceremony in connection with the Queen Victoria Institute for Nursing the Sick Poor of Reading, which has been founded by local effort to commemorate the Diamond Jubilee of Her Majesty, was performed on the 5th inst.

THE chapel of St. Nicholas, at Mostyn House School, Parkgate, Leeds, was, on the 4th inst., dedicated by the Right Rev. the Lord Bishop of Chester. The new building provides accommodation for about 200 worshippers.

MR. DUNCAN MACLENNAN, clerk in the office of Dr. Naismith, sanitary inspector of Cupar Fife, has been appointed in succession to Mr. John M'Kenzie, who has been appointed to the Kirkcaldy district of Fife County Council.

THE ancient parish church of Duffield, near Derby, has been thoroughly restored, a new side aisle has been added and a stained-glass window erected. The work has been done by Mr. Bridgeman, of Lichfield, and has cost some thousands of pounds.

THE opening meeting of the winter session of the Northern Architectural Association will be held at the Meeting Room, Art Gallery, Newcastle-upon-Tyne, on Wednesday next, November 17, at 7.30 P.M. The president (Mr. Frank W. Rich) will deliver his inaugural address.

ST. MARK'S new schools and parochial hall, Dublin, were opened on Wednesday last. The new buildings consist of boys, girls' and infant schools, which will accommodate 500 children. There are classrooms and a kitchen in which the elder girls will be taught cookery and laundry work. The old school has been turned into a parochial hall, and a large piece of ground at the rear will be utilised as a playground.

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PREMIATED DESIGN FOR HOTEL METROPOLE, MORECAMBE: ELEVATION TO PROMENADE.—ELEVATION TO MARINE DRIVE.

In the official list of awards of the Brussels Exhibition, just published, Messrs. Farmer & Brindley, in the British section, are awarded a gold medal for their exhibit of Egyptian porphyry. Two medals are also awarded to the Verde Antico Marble Company; one for choice quality of the material, the other for skill in design of objects exhibited in the marble. The old Egyptian quarries of porphyry, and the Thessalian Verde Antico marble, were both rediscovered by Mr. Brindley.

CALSHOT Castle, a defence originally built in the reign of Henry VIII., and now remodelled for the protection of the entrance to Southampton Water, has hitherto been included in the group of Portsmouth and Spithead Forts. Owing, however, to its position, it has been decided that it shall form the 1st inst. form part of the system of fortifications embraced by the Isle of Wight sub-district.

THE Midland Railway Company have under consideration a scheme for the construction of a central station in Sheffield. The long distance at which both existing stations are situated from the centre of the city is the cause of great inconvenience to the travelling public, and is believed to be operating against the further development of Sheffield.

DURING the progress of Divine service at Marylebone Presbyterian church on Sunday last a loud explosion took place, followed by dense clouds of vapour rising from the centre of the building. The church has accommodation for 1,500 people, and was at the time of the explosion filled. A panic ensued, but no one was injured. The explosion, as was subsequently ascertained, was due to the bursting of one of the hot-water pipes.

A SMALL syndicate, with a capital of 5,000*l.* in 5,000 shares of 20*s.*, is in course of formation, having for object the development of Sardi's gas generator, which is described as a complete and safe apparatus, enabling consumers to continuously and

automatically manufacture their own gas (acetylene) for illuminating purposes, being equally available in outlying districts as in London itself.

THE illuminating power of several lighthouses has been considerably intensified on the dangerous French coast line at the entrance to the English Channel. Since the loss of the *Drummond Castle* and several other vessels there last winter, the French authorities have had the matter under consideration. In addition to intensifying the penetrating power of the existing light, a new lighthouse has been erected, and others are to follow on the Ushant coast.

THE Bristol Town Council have, in consequence of a statement by the Chairman of the docks committee as to the result of interviews with the Great Western and Midland Railway Companies, rescinded the resolution passed at a previous meeting to apply next session for a Bill to construct new docks at Avonmouth, and gave instructions to the committee to continue negotiations with the railway companies and report to the Council next March, with a view to applying for a Bill next session.

AT a meeting of the committee entrusted with the restoration of Stratford-on-Avon parish church (the burial-place of Shakespeare) it was decided to rebuild the electric organ, and to improve the heating apparatus of the nave. Other work contemplated is the relaying of the floor of the nave, the provision of new oak benches and repairs to columns supporting the arcading. The utmost care is being exercised in preserving all the ancient characteristics of the edifice. On the work of restoration 6,000*l.* has already been expended, and an additional sum of 5,000*l.* is required to make it complete.

EDDLESTON (N.B.) parish church was reopened on Sunday last. It is almost a year since the interior of the church was completely gutted by fire, only the walls being left. The church as restored presents a very comfortable appearance. It will be heated by hot-water pipes. Previously there was no vestry in connection with the church, but a neat and commodious one has been added. The restoration of the church is estimated to cost about 1,160*l.*

ON Saturday afternoon an accident happened at Troon new graving dock, at present in course of construction, by which two men were badly injured. A 4-ton crane on the side of the workings was lifting a block of stone weighing about 3 tons when the glands of the crane snapped, and the crane and stone came to the ground. John M'Farlane and Matthew Semple,

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who were employed at the place, were struck by the crane, the former receiving a compound fracture of the left arm and his left shoulder blade was badly smashed. Semple got a severe scalp wound and other injuries about the body.

THE Dumfriesshire and Galloway Natural History and Antiquarian Society has concluded a week's excavation on a site on the farm of Raeburnfoot, in the high-lying parish of Eskdalemuir, about fourteen miles above Langholm. It has been matter of local tradition and report that the place in question had been a Roman camp, but there was no satisfactory proof of it, and the Society undertook the work of excavation with the consent of the parties interested in the ground. It was not necessary to go to any great depth to obtain clear proof that local tradition was well-founded, as a few feet from the surface various small articles were forthcoming which were quite satisfactory to antiquarians; and, besides, a well-defined road was come across, which was still hard and gave proofs of its ancient origin. The excavations were carried out under the personal superintendence of Mr. Barbour, architect, Dumfries.

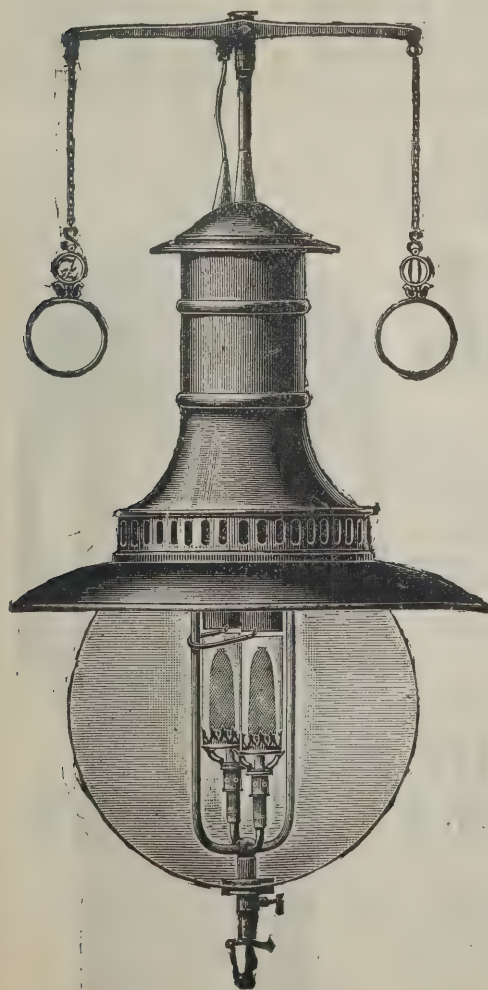
MR. ROBERT COX, M.P., in opening the second day's proceedings of the bazaar in aid of the building fund of the Episcopal Church of the Good Shepherd at Murrayfield, in the Music Hall, Edinburgh, on Saturday, said he was glad to see that the new church was to be made of stone—not brick—and he thought he might put in a word for good architecture by advising them not to let cheapness ruin their site. There were enough eyesores in the way of churches perpetrated in Edinburgh already, and he earnestly beseeched them to give the work to a capable architect, in whose taste and abilities they had confidence, so that a temple worthy of God might be erected upon the proposed site.

A VERY compact and light-weight driving engine worked by steam has just been constructed by Messrs. Merryweather & Sons, of Greenwich. This engine is on the lines of a very powerful engine built for the War Office, the object being to get great power into a small compass, while at the same time portability is one of the important considerations. The driving engine referred to consequently is suited for export to countries not yet provided with roadways. Developing 8 to 10 horse-power actual, its weight is only 8 cwt., and, being vertical, it can be carried complete on shoulder poles by men. In the event of its having to be carried by mules many miles over hilly country to far inland districts, it is designed to be taken

to pieces readily, no part exceeding 250 lbs. weight. As compared with the ordinary machine sent out to the colonies and other countries having neither roads nor rails, this engine and boiler complete, while being of equal power, is practically one-third the weight. It is somewhat surprising that so few of our prospecting engineers have yet adopted Messrs. Merryweathers' machinery, but perhaps this is owing to their name being so greatly associated with fire-engines. However, the firm goes with the times, and hence their production of engines and pumping plant which meet "up-country" needs both as regards simplicity of construction, strength, efficiency and lightness of weight. When one considers that a Merryweather fire-engine indicating 150 horse-power weighs only 3 tons, one can readily realise the perfection they have aimed at as regards light and substantial machinery.

ON Monday night quite a commotion was caused in Alloa by the announcement that a fire had broken out in the Municipal Buildings. It turned out, however, that the outbreak had occurred in the stables behind the Municipal Buildings proper, and when the discovery was made five or six horses were in their stalls and all the men were away for the night. With difficulty the constables on duty got the horses safely out, but about ten minutes elapsed ere a connection with the street hydrants was made, and by this time the entire hay-loft was ablaze. Once a copious supply of water was secured the firemen succeeded in saving the larger part of the buildings, but the roofs of the stable and soup-kitchen adjoining were entirely demolished, and much damage was otherwise caused by water.

ON Saturday last the members of the public libraries committee of the Hampstead Vestry inspected the just completed new central public library in the Finchley Road, for the building of which Sir Henry Harben, the chairman of the Vestry, presented the parish with 5,000*l*. The new library is a handsome two-storey building, erected from the designs of Mr. Arnold S. Tayler, architect, in the domestic Tudor style. It is built of Cranleigh red bricks, with dressings and mullions of Portland stone, and stands in an easily accessible position in almost exactly the centre of the parish. The upper floor comprises the reference library and reading-rooms and the lower floor accommodates the lending library, with various stores and offices. The library will be opened on Wednesday next by Sir Henry Harben, who laid the foundation stone of the building exactly a year ago on that day.



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THE CITY LUNATIC ASYLUM.

THE visiting committee of the City of London Lunatic Asylum recently submitted to the Corporation plans for proposed improvements to the asylum building at Stone, near Dartford, at a cost of 46,770*l.*, and these plans were adopted. It was arranged that the expense should be met by a county rate on the City. The visiting justices afterwards invited tenders for the work from eighteen well-known firms of builders. Three declined, and the remaining fifteen sent in tenders ranging from 59,000*l.* to upwards of 80,000*l.* Those tenders were for the erection of the fabric of the building only, and did not include any machinery, internal fittings, or furnishing. The visiting justices consider that a further sum of 10,000*l.* beyond the amount of the lowest tender will have to be expended on those items and on certain works which have recently become necessary. A very considerable increase has taken place in the price of builders' materials, more particularly in the price of bricks, and owing to the disturbed state of the engineering trade difficulty has been experienced on the part of the firms tendering in obtaining quotations for the ironwork required. Those causes have largely tended to increase the estimate originally formed, and as it is considered of the utmost importance that the works should be at once proceeded with, the visiting justices are seeking to obtain an increase of the grant from the Corporation to 70,000*l.* instead of 46,770*l.*

WOODS AND FORESTS.

THE seventy-fifth report of the Commissioners of Woods and Forests has just been issued as a Parliamentary paper. The income derived from sales of forest produce in the New Forest amounted in the year 1896-97 to 7,355*l.* 4*s.* 11*d.*, in addition to certain surface rents amounting to 3,099*l.* 11*s.* 8*d.*, the corresponding receipts in 1895-96 being 7,060*l.* 12*s.* 7*d.* and 3,014*l.* 13*s.* respectively. In the case of Dean Forest the same sources of income produced 5,305*l.* 17*s.* 7*d.* and 1,856*l.* 12*s.* 11*d.*, as against 6,530*l.* 3*s.* 10*d.* and 1,959*l.* 6*s.* 1*d.* in 1895-96. The mineral royalties of Dean Forest for the year ending March 31 last reached a total of 13,906*l.* 19*s.* 7*d.*, as against 12,332*l.* 10*s.* 8*d.* for the preceding year. The greater part of the oak woods, the report says, have arrived at an age when the income derived from their thinning may be expected to be less than heretofore

for some time to come, and the system of management which was best when the oak was grown specially for the purposes of the Navy requires reconsideration now that it is no longer devoted to the building of ships. It is suggested, therefore, that it is desirable to produce other kinds of timber for which there is a market, and to utilise the oak already planted according to present-day requirements. Turning to other parts of the United Kingdom, the report states that Crown property in Scotland produced during the year an income of 24,737*l.* 16*s.* 1*d.*, in Ireland 37,954*l.* 8*s.* 4*d.*, consisting mainly of quit rents, in Wales 15,107*l.* 12*s.* 1*d.*, and in the Isle of Man 5,654*l.* 7*s.* 5*d.*

THE SANITARY INSPECTORS' ASSOCIATION.

A MEETING of the members of the above was held on Saturday, the 6th inst., in Carpenters' Hall, E.C. The chairman of the Council, Mr. T. G. Dee, presided. A discussion took place on the application of two female inspectors for membership. The names of the two applicants were Miss Alice Tattersall (Lancaster) and Miss Emma Coppock (Manchester). A long discussion took place on the advisability of their admission. Some of the members, in opposing the proposition, urged that women were encroaching into the various businesses that were best controlled by men. Mr. Thomas contended that there were many cases where women sanitary inspectors were more useful than men. The question was then put to the vote, when there were for the resolution 39, against it 49. The proposition was therefore lost. A great deal of excitement afterwards took place, when nine candidates were proposed for various divisions of the Metropolis. In eight cases the full male Christian name of the candidate was given, but one was A. Elliott, of St. George-the-Martyr. A member happened to ask what was the full name of A., and he was then informed by the seconder that it was "Annie." A scene ensued. The name of Annie Elliott was struck out, and the others carried *en bloc*. The Chairman, in his presidential address, reviewed the work done by the Association. Always let them remember that they were banded together in an attempt to obtain a condition for their countrymen in which they might have that greatest of all blessings, health, and therefore if that blessing was to be the result of their labours, it naturally followed that no profession could be higher than theirs.

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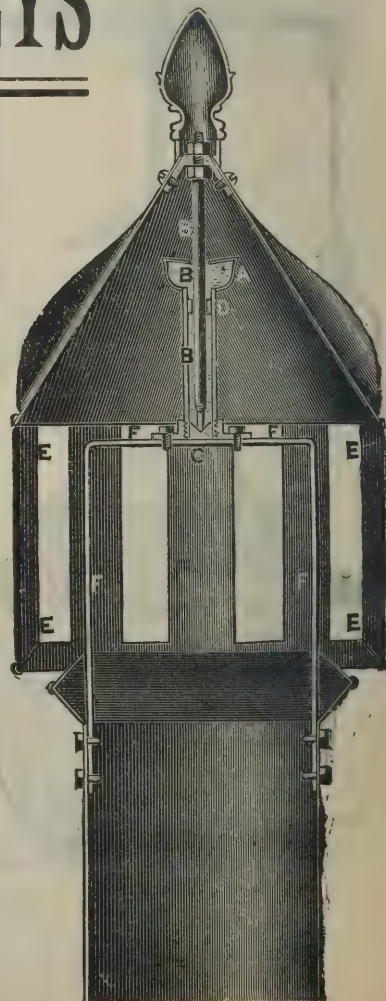
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IMPEDING WORKMEN.

"A LONDON ARCHITECT," in a letter to the *Times*, writes:—
The correspondence and information appearing day by day in the columns of the *Times* must be gradually educating the public as to the true nature of this dispute. The "eight hours" question is by no means at the bottom of it all.

As an architect I have not been able to avoid noticing the alteration during the last few years in the way in which the workmen proceed in carrying out their duties, and I will as briefly as possible note some of the facts which have presented themselves to me:—

1. There is a clearly-organised and, indeed, compulsory arrangement that the men are to consume the greatest possible amount of time in producing the smallest possible amount of work.

2. And there is an intolerable amount of interference on the part of the men as to the manner in which a builder is to conduct his business.

As to 1. Bricklayers who have been many years in the employ of a certain contractor and perfectly willing to do an honest day's work have been compelled to restrict themselves to laying not more than 450 bricks per day, when they could, in certain work, easily lay 1,000, and they dare not disobey the order. The men generally will stand in groups idling away their time, and will boldly grin at anyone who, by an understood look, expresses surprise at their audacity. This is particularly conspicuous in the men employed by the Works Department of the London County Council and by the workmen employed by vestries and electric-lighting bodies. There are some kinds of work where "elbow-grease" is required. I have been shown men who appeared to be doing real work, but who were not applying that "elbow-grease" which was necessary for a paying result and so on.

Then, as to 2. I had to pave a large building with granolithic paving. When about half of it had been done by men thoroughly competent to lay it to the proper falls and to arrange and set out the channels for water the plasterers took it into their heads that they were the proper men to do this work, and told the builder that unless he allowed them to do it they would all leave the job. He had to comply, and the result is the work cost him more money and is inefficiently performed both as to falls and finish. A bricklayer was building a manhole to a drain the other day and was finishing the inside with a coat of Portland cement. Again the plasterers waited upon the

foreman and told him that unless they were allowed to do this little piece of Portland cement work they would all leave the job, and again the builder had to succumb. The constant interruptions on works because unionists will not work with non-unionists are well understood by all, and I myself have known of the losses incurred by builders because of the tyranny which one set of workmen exercise over another.

I could go on with a dozen instances of disgraceful behaviour on the part of the unionists and of their laziness and blunders, but perhaps I have said sufficient to give a small idea of what masters have to put up with from their workmen. I sincerely hope that the employers in the engineering trade will convey a lesson to engineers which will permeate through every trade in the country, and which is sure to lead ultimately to that welfare of our workmen which all desire, but which the workmen themselves are doing so much to injure and destroy.

BY-LAWS IN EASTBOURNE.

ON Monday last Messrs. Charles Peerless Dennis and Sydney Walter Winter, trading as C. P. Dennis & Co., Terminus Road, were summoned, says the *Sussex Daily News*, for proceeding with the erection of fourteen new buildings upon the Cavendish Bridge Estate without giving notice or submitting particulars as to the area, situation, character of buildings, &c., to the Town Council. The town clerk (Mr. H. West Fovargue) appeared in support of the prosecution, and Mr. Wintle, who represented the defendants, pleaded guilty to a technical breach of the by-laws, explaining that the buildings were not being proceeded with. What had been done was to lay the concrete foundation, upon which afterwards the houses were to be erected.

The Chairman regarded the proceedings of the defendants as a real and substantial breach of the by-laws.

Mr. Field, the building surveyor, said the plans had been received by him only that morning.

It was ultimately agreed, upon the defendants giving an undertaking not to do anything until the plans were passed by the Council, to adjourn the case for a month.

Arthur Blackman, builder, 40 Terminus Place, was also summoned for contravening the building by-laws by proceeding with the erection of cottages upon the Simmon's estate without first depositing complete plans and sections.

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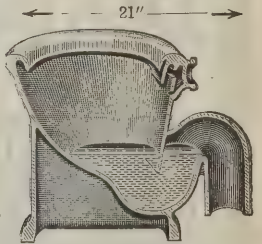
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The defendant admitted the offence, but said that he thought the plans had been sent in ; it was a contract job.

The Town Clerk said this case was taken up as an example out of some half-dozen that had occurred. The estate plans had only just been approved of between the owners and the Town Council ; but notwithstanding this the defendant and others had proceeded to erect these buildings. The penalties, it was explained, to which the defendant and others in a similar position had rendered themselves liable to were 20*l.* for going on with the building ; a fine of 5*l.* for failing to deposit plans, and to a daily penalty.

The defendant said he quite understood, after receiving the warning letter from the Town Council, that he was to take the risk of what he was doing.

The Chairman : So that if the plans are disapproved you know that you may have to pull every brick down again ?

The defendant : Exactly.

Mr. Field said it was the fact that the levels of the buildings in question were faulty, that the intercepting drains were above the level of the ground.

The Chairman observed that in preceding cases of this kind, while the buildings which they had inspected were very faulty ones, they had hesitated to deal with them because the work had been done, but if the regulations of the local authorities were wilfully and deliberately disregarded, as they were in this case, and the builder snapped his fingers and said he was quite prepared to take the risk, it became necessary to make an example ; otherwise they would have no local control whatever over the action of the builders. The whole town was affected. They would impose the full penalty of 5*l.*, to include costs.

The defendant : Is it quite fair to make me a victim for what other builders have been doing for years ?

The Chairman : The bench were unanimous in taking this view. Your conduct has been so wilful and so deliberate.

The defendant : It is the case with all the others.

The Chairman : Well, it must be put a stop to. It is a pity that the penalty should fall upon one man, but it must be brought home to the builders.

THE Archaeological Society at Athens has decided to resume the works for the restoration and strengthening of the ruins of the Parthenon. The English company which is working the marble quarries at Pentelicos has offered for the purpose marble blocks of excellent quality and large size.

RESPONSIBILITIES OF DRAINAGE BOARDS.

ON the 5th inst. in the Irish Queen's Bench Division, before the Lord Chief Justice, the Lord Chief Baron, Mr. Justice O'Brien and Mr. Justice Johnson, judgment was given in the case of Bligh and others *v.* Rathangan River Drainage Board, which had been reargued during the present sittings. The plaintiffs, farmers residing in the vicinity of Allenwood and Robertstown, had brought actions against the Drainage Board to recover damages caused to their holdings and crops by a flood in July, 1894, owing, as they alleged, to the negligence of the defendants in cleaning and scouring the bed of the Rathangan River and its tributaries. The defendants denied their liability to cleanse the channel, and submitted that there was no commission or misfeasance on their part that gave the plaintiffs any right of action, as the Board had been authorised to construct certain drainage works by Act of Parliament, and, as it was admitted, the works were properly constructed. It was also relied on by the defendants that the plaintiffs, though resident within the district area, were not contributors to the maintenance of the works. The county court judge decided in favour of the defendants. Against this decision the plaintiffs had appealed, and Mr. Justice Johnson, before whom the appeal was heard, on the application of the defendants, stated a case for the opinion of the Divisional Court. Briefly what was brought out in evidence was as follows :—The Board had been constituted under the Drainage Acts, and they had obtained the permission of Parliament to make certain alterations in the Rathangan River. The engineer to the Board had submitted the necessary scheme to the Board of Works, and a provisional order was made sanctioning the scheme, and by reference to the provisional order it was clearly apparent that a greater body of water had been brought into the district than originally had been, and on this account it was contended on behalf of the plaintiffs that the defendants were liable in an action for damages for omitting to keep the river clean. It was part of the duty of the defendants to maintain as well as alter the bed of the river. It was also proved that the plaintiffs had suffered material damage by reason of the river not having been so maintained and kept clean, and that when the heavy rains came their lands had been seriously flooded.

The Divisional Court were now unanimously of opinion that the county court judge was wrong in his judgment and should have decided in favour of the plaintiffs, who should get their costs of the proceedings.

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The Lord Chief Justice, in delivering judgment, said the case involved a question of very considerable importance. That question was what was the liability (if any) to riparian proprietors and occupiers along the Rathangan River for damage caused to them by the Rathangan Drainage Board omitting to scour and cleanse the main artery of their drainage district. It had been found in the case that the river had not been scoured for some years, and that if it had been scoured and cleansed the damage which was done would not have occurred. The plaintiff in the test case was not a proprietor or lessee, but he occupied lands held under a parole tenancy adjacent to the banks of the river. The main contention on the part of the defendant Board was based on the distinction between the consequences which attached to acts of commission and acts of omission. It was alleged on their behalf that the damage complained of arose from their omitting to scour and cleanse the river, and although they should be held responsible for misfeasance or acts of commission, no responsibility attached to them for mere nonfeasance. No doubt the distinction between acts of commission and nonfeasance formed the basis of the decision in many cases cited at the Bar, and the question was whether this case fell within that category of the cases where mere nonfeasance was held to establish a ground of immunity. They (their lordships) thought it did not fall within that category, and on the ground that in this particular case the common law right of the riparian proprietors and occupiers along the banks of the Rathangan River were interfered with and infringed by the acts of the defendant Board. No doubt the Board had a statutable justification for the original works, but nevertheless these works, though authorised, interfered with the common law rights of the plaintiffs, because the river having been diverted and straightened and widened there was an increased volume of water at an increased velocity sent down through an altered channel. It appeared to him that the question in the case was whether the defendants had justification under the Act of Parliament. They would, in his opinion, have a justification if their powers were limited to works of original construction merely, but in his judgment they had no such justification, as it was plain from the section of the Act they were to maintain as well as to construct, and had for this purpose an express statutable power to enter and scour and clean the stream, and to raise the necessary funds, which indeed by the statute they were not only empowered, but required to raise. This, he thought, was the principle of the decision in the well-known case of *Gedden v. the Proprietors of the Bann Reservoir*. His lord-

ship here read several reports from judgments of the law lords, and in conclusion said in the case now before them there was an original common law right infringed. There was power to enter and cleanse, and in the words of Lord Chief Justice Blackburn, there was a neglect to make a reasonable use of the powers given to them by statute. The defendant Board, in his opinion, was accordingly responsible, and the decision of the learned county court judge should be reversed.

LONDON WORKS COMMITTEE.

At the meeting of the London County Council on the 9th inst., the fire brigade committee reported that four tenders had been received for enlarging and altering the Hampstead Fire Station, the lowest of which exceeded the architect's estimate of 4,170*l.* by 785*l.* The work had been offered in July to the Works Department, but the manager was not satisfied with the amount of the estimate. The firm submitting the lowest tender stated in their tender that if the work were carried out under the general conditions for building contracts agreed upon by the Royal Institute of British Architects and the Builders' Society, and adopted by the Central Association of Master Builders of London, the firm's tender would be reduced 5 per cent. The firm also added that it would require the clause in the form of contract as to payment altered. The architect stated that 100*l.* of the difference was attributable to the rise in labourer's wages which took place in June last, but, having looked over the bills of quantities of the lowest tenderer, he found that some items were priced at rates which, in his opinion, were excessive. The committee recommended that neither of the tenders should be entertained.

Mr. M'Kinnon Wood moved an amendment to refer the matter back for further consideration, to include the causes which had led to the tenders exceeding the estimate by so large a sum. He said that in the past considerable complaint had been made against the works committee of quarrelling with the estimates. The present case went far to justify the action of the committee. They said the estimate in the present case was too low, and that had been confirmed by the contractors.

Mr. White said that his complaint against the works committee had been that it had accepted work at too low a cost. The reason that contractors were shy of tendering for the Council's work was that the conditions imposed by the Council

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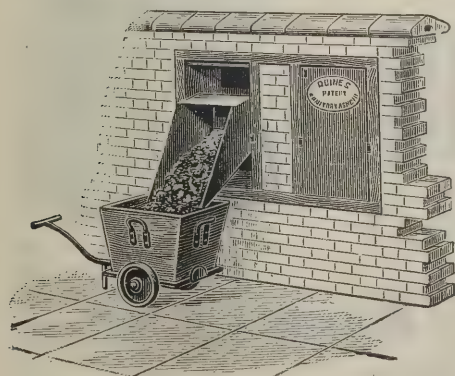
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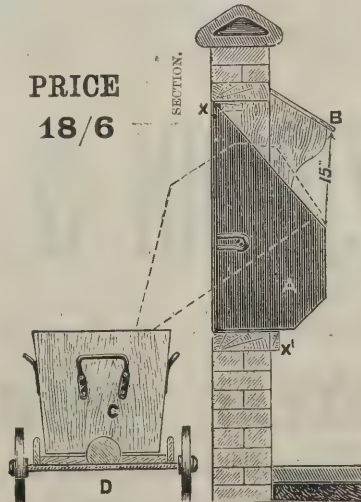
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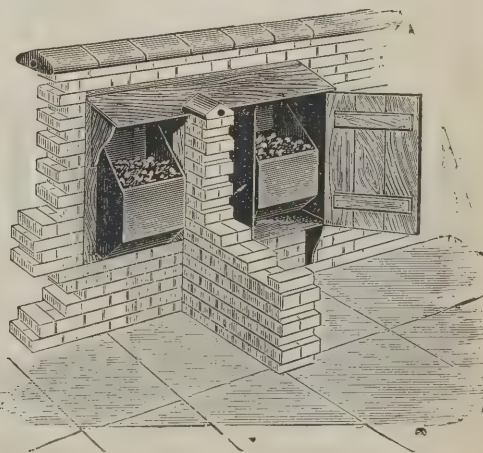


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were very onerous. This fact also probably accounted for the tenders in this case being so large.

After further discussion the amendment was agreed to.

Mr. White drew attention to a paragraph in the report of the main drainage committee, in which the Council was asked to sanction an additional expenditure of 343*l.* for the repainting of the middle level sewer aqueduct over the Metropolitan Railway at Farringdon Road. He said that the work was carried out by the Works Department under a schedule of prices, the value amounting to 375*l.*; whilst the actual cost of the work had been 718*l.* If this work had been given to a contractor this excess would never have occurred; and the ratepayers would not now be saddled with this loss. He moved as an amendment that the excess expenditure should not be sanctioned until the finance sub-committee on works had reported on the details of the expenditure.

Mr. Fletcher seconded the amendment, which was agreed to.

The Earl of Hardwicke moved, "That the finance committee be requested to furnish to the Council before its second meeting in the month of December next the estimated and actual cost of all works completed up to September 30 last as reported to the executive committees; together with a return of works refused by the Works Department for which tenders were afterwards received from contractors, in continuation of the return presented on May 11 of this year."

Mr. Whitmore, M.P., seconded.

The resolution was agreed to with several verbal additions to the effect that returns should also be presented of the lowest tenders accepted for works not offered to the Works Department during the same period and the amount of the architect's estimates.

FISSURE IN A RESERVOIR.

A REPORT has been presented to the District Council of Castleford by Mr. Malcolm Paterson, M.Inst.C.E., on the state of their service tank on Red Hill, which is almost without a precedent in this country. A huge fissure extends across the entire surface of the bottom, 2 feet to 5 feet in width, and about 28 feet deep. This was laid bare some months ago, after the sudden disappearance of the contents of the tank, when the concrete bottom was partly removed. The reservoir site is on the Permian formation, the strata consisting of magnesien limestone, lying in a compact sand bed almost indurated to rock.

This rock yields the best moulder's sand, and has been excavated by mining for many generations in long galleries with supports and adit entrances. The workings extend for miles, and have been proved to approach within a few feet of the reservoir, and probably extend below it on the north side. By exposure to air and the infiltration of water they have gradually crumbled and fissured, causing leakages from the tank, which in their turn have accelerated the waste and the subsidence, and have caused the ruin of the tank. An inspection of these workings was necessary, though attended by danger from loose rock in the roof. In Mr. Paterson's report a previous proposal to buttress the north side by a retaining wall, arched on plan, is set aside as a futile and hazardous operation. Instead of this, he proposes to construct a new reservoir, holding 1,250,000 gallons, on a new site on adjacent ground to the west of the present tank, which appears to be the only suitable site not honeycombed by the sand workings; but even here he considers that five or six borings, not less than 50 feet deep, are indispensable to prove the ground. The present population of Castleford is 17,000, having increased from 6,271 in 1871. The cost of the new reservoir, if open, is estimated at 3,250*l.*, or if covered at 4,700*l.*

NEW SANATORIUM AT HASTINGS.

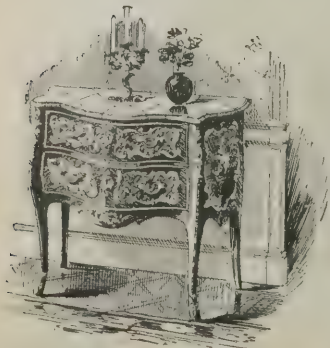
A MEMORIAL-STONE has been laid at the new Sanatorium buildings just approaching completion at Ore and adjoining the building at present in use at Cackle Street, Hastings. The building and road have cost about 12,000*l.* and other accessories about another 2,000*l.* The plans were prepared by the borough engineer (Mr. P. H. Palmer), and the buildings are arranged on the pavilion principle. Mr. Peter Jenkins, of St. Leonards, is the contractor, and Mr. Bouley clerk of the works. Altogether there are eight buildings—four buildings furnish the hospital accommodation, two being isolation wards. There is accommodation for forty-six inmates. No small-pox cases are to be received, as in the event of such occurring the Corporation possess the Ore Villa farm Sanatorium. The heating is by Messrs. Messenger, Loughborough and the stoves have been supplied by Messrs. Shorland, Manchester. The buildings were inspected by the company. The ceremonial of laying the memorial-stone was performed by the Mayor.

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HOME GRANITE v. FOREIGN STONES.

THE importation of foreign stones for the purpose of polishing has been on the increase for some years, and as they are sent off from Aberdeen when finished they have gradually been accepted in England and in other countries as Aberdeenshire grey or blue granites, thus giving a bad name to pure and true granites. It is therefore of importance to have a comprehensive report by such an authority as Professor James Geikie, D.C.L., LL.D.; F.R.S., Professor of Geology in the University of Edinburgh. Some specimens were sent to him, including "Labradorite, Swedish"; "Bon-accord, Swedish"; "Finland, Russia"; "Victoria Grey, Swedish"; and also a specimen from the deepest level in Rubislaw Granite Quarries, Aberdeen. With regard to the foreign specimens the report says:—"Some can be called granites, others not even that, and not one of them is a true or normal granite."

Professor Geikie reports on "Rubislaw":—"This rock is a true granite, and is the only true or normal granite submitted to me. This is one of the most durable kinds of granite."

The following is the text of Professor Geikie's report:—

University of Edinburgh: July 14, 1897.

Sirs,—Having now examined the several specimens of crystalline rocks you put into my hand, I am able to certify their petrographical character as follows:—

I. Specimen labelled "Labradorite, Swedish."

This is a greyish green and very coarsely crystalline rock. To the naked eye it seems to consist chiefly of large feldspars, showing some play of colours, with a subordinate proportion of dark mica and pyroxene.

Under the microscope the feldspars prove to be the varieties known to mineralogists as anorthoclase or cryptoperthite, that is, mixtures of albite and orthoclase.

The other ingredients are dark greyish green augite with diallage structure, deep brown biotite (mica), magnetite and apatite, which appears in relatively large crystals. This rock belongs to the class of augite-syenites (known to geologists as laurvikites), which are well developed in Southern Norway. The rocks referred to are somewhat variable in composition, containing often zircon, occasionally olivine and nepheline, and less commonly quartz.

II. Specimen labelled "Bon-Accord, Swedish."

This rock is an olivine-gabbro. Its constituent minerals are plagioclase feldspar, augite (diallage) and olivine, with a small proportion of black mica and magnetite. The plagioclase occurs in fairly well-formed crystals, which are occasionally enclosed in the augite,

thus showing a tendency to what is known as the ophitic structure so commonly seen in the rock called diabase. The olivine is very fresh and rather abundant. The black mica (biotite) mostly occurs in the form of scales around the magnetite. Gabbros of this character occur at Elfdalen in Sweden.

III. Specimen labelled "Finland, Russia."

This rock is a fine hornblende-granite. In the hand-specimen it has a schistose aspect, a structure which is not seen under the microscope. The chief mineral constituents are hornblende, biotite, orthoclase, plagioclase and quartz.

The accessory and minor ingredients are apatite, magnetite, zircon and sphene, the last-named being fairly common. The hornblende is green and the biotite is dark brown. Both occur in small crystals, usually associated and often well formed. The orthoclase is very fresh and abundant. Plagioclase is not very common. Quartz occurs in fair quantity. Epidote (a secondary mineral or product of decomposition) is present.

IV. Specimen labelled "Victoria Grey, Swedish."

This rock is quite a normal granite, consisting of orthoclase, biotite and quartz. Along with these occur a little microcline and micropegmatite, apatite and zircon. The last-named is enclosed in the biotite, and is surrounded by black halos.

V. Specimen labelled "Rubislaw."

This rock is a true granite. It contains white and black micas (Muscovite and biotite), of which the latter is the more abundant, together with feldspars and quartz. Of the feldspars, microcline is the most prevalent, but plagioclase occurs in fair quantity. Fine needles of rutile are seen in the quartz. Other accessory ingredients sparingly present are zircon, apatite and magnetite. This is one of the most durable kinds of granite.

Igneous crystalline rocks are usually classified as follows:—
1. Acid rocks, with 65–80 per cent. of silica. 2. Intermediate rocks, with 55–70 per cent. of silica. 3. Basic rocks, with 45–60 per cent. of silica. 4. Ultra-basic rocks, with 35–50 per cent. of silica.

Of the specimens of rocks submitted to me—

No. I., "Labradorite, Swedish," belongs to the intermediate group, and can in no sense be described as a granite.

No. II., "Bon-Accord, Swedish," is one of the basic group, and has equally no title to be called granite.

Nos. III. ("Finland, Russia"), IV. ("Victoria Grey, Swedish"), and V. ("Rubislaw") all belong to the acid group, the most basic of the three being the hornblende-granite, No. III.

The percentage of silica in IV. and V. is probably much the same. Nos. III. and IV. are granites—that is, biotite-granites—the only true or normal granite being No. V. ("Rubislaw").

Yours faithfully,

(Signed) JAMES GEIKIE, LL.D., D.C.L., F.R.S.

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THE COST OF AN INDIAN EARTHQUAKE.

THE official report from the secretary to the Chief Commissioner of Assam on the earthquake of June 12 last, which resulted in the loss of 1,542 lives and the destruction of an enormous quantity of property, has arrived. The cost of repairing damages in the Public Works Department alone is estimated at more than 35 lacs of rupees, or, to put it moderately, over one quarter of a million pounds sterling. These figures do not include the cost of damage to local communications chargeable to municipalities and local boards or departmental expenditure not borne by the Public Works Department. In the circumstances, the Chief Commissioner is applying for a grant from Imperial revenues to assist the administration to recover from the effects of the earthquake. "Here," says Professor Milne, "we have a danger threatening life and capital which can only be avoided by the acceleration of engineering operations. With regard to the proposals that the various headquarters of the Assam administration shall be shifted to more favourable sites, the interference which such a step would cause to public and private interests makes it desirable that the effects of earthquakes in the future should be met, not by escape to localities where movements might be less, but by changes in the methods of construction. During late years Japan has suffered from earthquake movements probably more severe in the ratio of nearly five to three than that which in June last created so much destruction in Assam. . . . Profiting by experience and guided by experiment, Japanese engineers and their European colleagues have gradually departed from stereotyped methods of construction, with the result that structures of the new type, whether they are ordinary dwellings or other works, have so far remained standing, whilst what is old is slowly disappearing. The fact that the Japanese Government annually votes from 1,000% to 5,000% to assist a committee in investigations which may result in modifying earthquake effects, has a bureau controlling the seismic survey of its country, and has appointed a professor of seismology at its University (at which all students of engineering listen to some twenty or forty lectures on construction in earthquake countries, and by this time may have read the report of its trained seismologist, Dr. F. Omori, sent to Assam to note anything that might be of benefit to his own country), are strong testimonies that material benefits have already been obtained from the study of earthquakes. When we consider the British capital invested throughout the seismic regions of the world

and the money from time to time expended in the restoration of consular and other buildings, we must surely feel that the sooner we turn attention, if only to that which has already been done to mitigate the effects of earthquakes, the sooner will the loss of life and property which accompany such disasters be reduced."

THE LONDON SCHOOL BOARD AND THE AUCTIONEERS' INSTITUTE.

THE secretary of the Auctioneers' Institute, Mr. Charles Harris, has forwarded some correspondence which has passed between that body and the School Board for London with regard to the procedure in negotiations for the purchase of land by the School Board for London. In December last Mr. James F. Field, the president of the Institute, wrote to the clerk of the School Board calling attention to "the procedure now being adopted and known as a 'new rule,'" which, he says, appears to comprise the following points:—(a) The refusal to serve a notice to treat as an initial proceeding, as required by the Lands Clauses Act; (b) its use, when proposed to be served as a threat that the compulsory powers of the Board will be enforced; (c) the violation of the spirit of section 82 of the Lands Clauses Act and the practice under it by the refusal of the Board to pay surveyors' fees, except in exceptional cases; (d) the refusal by the Board to hear any explanation of a claim from the claimant's surveyor; and (e) their refusal to accept a practising surveyor as umpire in cases of disputed compensation. Mr. Field, in his letter, contends that if this "new rule" be acted upon and not published, nearly every surveyor in London would be put in a false position, for if a client told him his property was scheduled and inquired his terms for conducting the business, he would, in ignorance of the rule, reply that every public body paid the claimant's surveyor's fee if a settlement was arrived at. The council of the Institute desired to save surveyors being put in this false position. They therefore contended that the rule should be publicly announced.

On behalf of the works committee of the School Board, the clerk to the Board replied to this letter on April 6, 1897, and stated that there was no "new rule" in connection with the negotiations for the purchase of interest in sites. The committee declined to give any undertaking which might restrict their liberty as to their mode of procedure. With reference to the complaint that notices to treat were not always served as

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an initial proceeding, the committee held, on legal advice, that this need only be done before they could avail themselves, as against an unwilling vendor, of the machinery of the Act. On June 29, Mr. Field again wrote to the clerk to the Board, pointing out, in reference to his statement that there was no new rule, that the land surveyor to the Board, in a letter from him to Messrs. Saffery, Huntley & Son, had written of a "rule which had been come to not to pay surveyors' fees." Mr. Field said he was glad, however, to find that there was no new rule, and he apprehended that the Board's surveyor had been acting under a misapprehension. On July 7 the clerk of the Board wrote to Mr. Field refusing on behalf of the works committee to accept responsibility for the interpretation put on his previous letter. Writing again on August 30, Mr. Field pointed out that the rule was, and, if not altered, is that the board paid the vendor's surveyor's fees, yet the board's surveyor had written to a vendor that the board would not consent to do so, though later on he wrote that as the vendor was a trustee he had no doubt his committee would pay. If, therefore, there were no new rule, the board's surveyor ought not to have written as he did, and the fees which had been paid by claimants ought to be refunded by the board. On September 28 last the secretary to the institute again wrote, enclosing a letter from a member of the institute intimating that in a case in which he was concerned the board had added a proviso to the notice to treat that they would not pay the surveyor's fees. Up to the 28th inst. only official acknowledgments of the receipt of these last two letters had reached the Institute.

INSTITUTION OF JUNIOR ENGINEERS.

THIS Institution held the inaugural meeting of its seventeenth session on the 5th inst. at the Westminster Palace Hotel. Sir Alexander Binnie, the retiring president, was in the chair, and presented the Institution premium to Mr. W. R. Beckton for his paper on "The Protection of Buildings from Fire." Mr. H. B. Vorley moved and Mr. W. J. Hunter seconded a vote of thanks to Sir A. R. Binnie for the services rendered by him to the Institution during his year of office, and this was heartily accorded. Mr. John A. F. Aspinall, M.I.C.E., chief mechanical engineer to the Lancashire and Yorkshire Railway, was then introduced to the members as President for the ensuing session by Sir A. R. Binnie. Mr. Aspinall, who was warmly cheered,

delivered his presidential address, the subject of which was "Some Aspects of Railway Work." The greater part of the address dealt with matters of a technical nature, but the President, in the course of it, urged upon any young man who intended to learn the business of a railway engineer to make the best use of his powers of observation when he was in the workshop, so that he might store up a fund of useful information by the time he was fortunate enough to secure any position of responsibility. His experience had been that those young men who had in the first instance gone to one of the engineering schools and had afterwards gone into the workshop had generally begun at the wrong end. The tendency of the lad who went first of all to an engineering school and acquired some slight knowledge of what could be done upon a lathe or other simple tool was, when his time came to enter a mechanical engineering establishment, to assume he knew a great deal more than he actually did, and to give considerable offence to the workmen among whom he was placed, instead of setting himself patiently and quietly to acquire as much knowledge from them as he possibly could during the short time he would be in the shops. His view was that it was far better for a young man to enter the workshops for one or two years, and after that to go to one of the engineering schools, returning again to the workshops to finish his time. If that was done, he entered the engineering college with some appreciation of why he was learning the things which were put before him and a great deal more knowledge of human nature, and, he thought, set himself to learn different theoretical subjects with very much greater interest, because he had somewhat definite ideas of the way in which theory could be applied to practice.

ASSOCIATION OF SANITARY INSPECTORS.

THE quarterly meeting of the Association of Sanitary Inspectors of Carnarvonshire and the adjoining district was held at Portmadoc under the presidency of Dr. Fraser, medical officer of health. Mr. Morris Williams, Crickieth; Mr. John Geo. Jones and Mr. Robert Jones, Portmadoc, were elected members of the Association. Mr. Worrall (Penmaenmawr) proposed "That the objects of the Association would be best realised by amalgamating with the North-Western and Midland Sanitary Inspectors' Association, and that a committee be appointed to confer with the council and submit to the next meeting a basis of amalgamation." After a discussion Mr. Worrall agreed to

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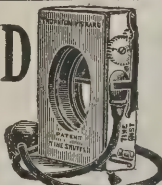
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an amendment to simply appoint a committee. It was decided to hold the next meeting at Conway. Dr. Wm. Jones Morris read an excellent paper on "Sanitation," and Dr. Walter Williams made some admirable remarks with regard to "Diphtheria at Home," with diagrams. Mr. J. D. Lewis, Portmadoc, read a paper on house sanitation. He said nine-tenths of the poisoned atmosphere in towns and villages would be prevented by the proper sanitation of each house and its occupants. The poorest men and women should not lack healthy houses to live in, and it ought to be the care of the rich for their own sake if for no other reason, that the dwellings of the poor were made wholesome.

LONDON ASYLUM ACCOMMODATION.

THE asylums committee of the London County Council will shortly ask the Council to sanction a large expenditure for the provision of temporary buildings for the accommodation of female lunatic patients on the Horton Manor Estate, Epsom. It is on this estate that the Council is about to erect a permanent asylum, but as this cannot be finished before the end of the year 1900, it has become necessary, owing to the inadequacy of the vacancies occurring at the London asylums to meet the demands for recent cases of lunacy, to immediately provide further accommodation. The Bexley Heath Asylum, which is now being constructed, will not be finished until the beginning of 1899. Accommodation has been obtained for pressing cases at out-county asylums wherever it has been procurable, and the committee have just recently entered into a contract with Fisherton House, Salisbury, for the reception of 206 cases at a *per capita* cost of 19s. 3d. a week. The number of applications now outstanding is still very large and increases weekly, and the expeditious erection of buildings is a matter of extreme importance. The committee point out that the cost of maintenance of London patients in other institutions for lunatics is high, the rate at licensed houses ranging from 19s. 3d. to 2l. 2s. a week, and many of these institutions are so far distant from London that the visits of friends are thereby made prohibitive, and the cost to the guardians for removals is considerable. The primary cost of the proposed buildings, which are designed to be occupied for fifteen years and to accommodate 700 female patients, is 147,000l. This is equal to a charge of 5s. 5d. per head per week on the number of patients accommodated. Adding the weekly cost of maintenance in the London

asylums, namely, 9s. 11d., the whole weekly cost, including capital charges of lunatics in these buildings, would be about 15s. 4d. a week. The lowest charge for accommodation in licensed houses being as already stated, a saving of at least 4s. per week would be effected on every patient in the temporary buildings as compared with the cost of licensed houses, and this saving on 700 beds for a period of fifteen years represents a sum of over 100,000l. The whole of the works are to be completed in twelve months.

PATENTS.

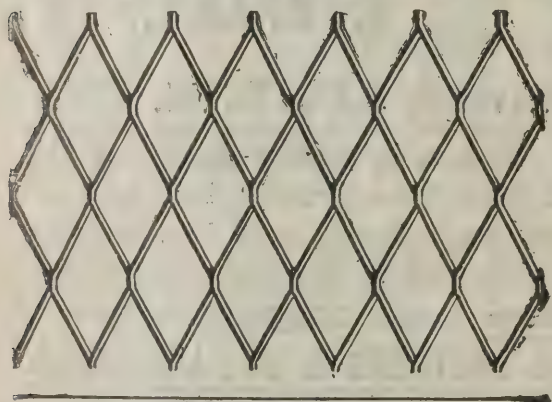
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

- 24617. John Dean, for "Improvements in and connected with water-closets."
- 24647. James Eagles, for "An improved rotary engine or pump."
- 24660. Edward Bear Ridges, for "Improvements in connection with window frames."
- 24737. Joseph Goulson, for "Easy water tap."
- 24757. Charles Mills, for "Improvements in convertible open and close fire ranges."
- 24848. Arthur Petrie Florance, for "Improvements in stoves, grates, fireplaces, kitchen ranges and in apparatus appertaining thereto."
- 24905. Adalbert Pogonyi, for "Improvements in stoves."
- 24924. Aaron Larson, for "Improvements in stoves."
- 24956. Walter Charles Harris, for "Improvements relating to the ventilators of horticultural buildings."
- 24983. Herbert Edward Richard Rayner, for "Improvements in fencing standard."

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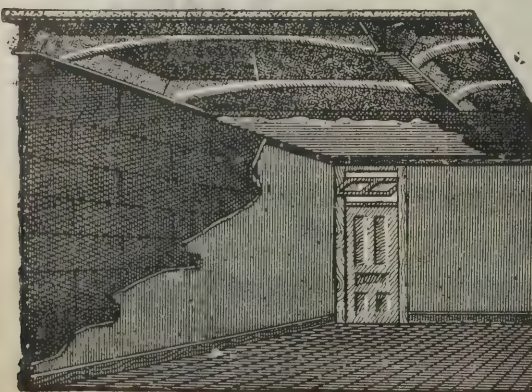
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The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.

Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

** * As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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COMPETITIONS OPEN.

BELPER.—May 1, 1898.—The Belper Urban District Council offer premiums of 50 guineas and 25 guineas for the two best schemes of sewage disposal. Mr. Joseph Pym, Urban District Council Offices, Belper.

BOOTLE.—Dec. 31.—The Corporation invite competitive designs of a central fire station, firemen's dwellings and district police station. Mr. J. A. Crowther, borough engineer, Bootle.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500l., 300l. and 200l. respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

DORKING.—Dec. 15.—Competitive designs and plan, with descriptive report thereon and approximate estimates, are invited for erection of infirmary upon workhouse grounds. Mr. George Scales, 35 High Street, Dorking.

SOMERSET.—Nov. 30.—The Council invite competitive plans for large hall, with cloakrooms and retiring-rooms over present post office, market house and fire-engine house communicating with the town hall, and for conversion of market house, &c., on ground-floor. Premiums of 25l., 15l. and 10l. will be awarded. Mr. Regd. L. Foster, town clerk, 1 Cathedral Green, Wells.

CONTRACTS OPEN.

ABERYSTWITH.—Dec. 4.—For completion of the building of the chancel and vestries of the Holy Trinity Church. Rev. Prebendary Williams, Abergeldie House.

AYRSHIRE.—For erection of a free church at Colmonell. Mr. Alexander Petrie, architect, 134 Wellington Street, Glasgow.

BARNSELY.—Nov. 24.—For erection of house and shops, &c., at Stairfoot. Mr. Herbert Crawshaw, architect, 13 Regent Street, Barnsley.

BELFAST.—For erection of six houses in Mersey Street and two blocks of three each near Lawnbrook Avenue. Mr. William Campbell, architect, 4 Hurst Street, Belfast.

BINGHAM.—For erection of board and waiting-rooms at the workhouse. Mr. A. R. Calvert, architect, Nottingham.

BRADFORD.—Nov. 22.—For erection of nine houses at Lapage Street, Leeds Road. Mr. J. H. Dixon, architect, 90 Heap Lane, Otley Road, Bradford.

BRADFORD.—Nov. 23.—For erection of a metal factory in East Parade. Messrs. Milnes & France, architects, 99 Swan Arcade.

BRADFORD.—Nov. 25.—For additions to premises in Otley Road. Messrs. Rycroft & Firth, architects, Bank Buildings, Manchester Road, Bradford.

BRIDLINGTON QUAY.—Nov. 27.—For erection of lavatories at the corner of Queen Street and Ship Hill. Mr. Chas. Gray, clerk, Bridlington.

BRISTOL.—Nov. 29.—For erection of a pupil teachers' centre in Broad Weir. Messrs. La Trobe & Weston, architects, 20 Clare Street, Bristol.

BRENTWOOD.—Nov. 22.—For extension of the clerk's offices at the asylum. Mr. W. P. Gepp, clerk to the visitors, Chelmsford.

BURY.—For erection of two houses and shops in Bolton Road. Messrs. James Sellars & Son, architects, Union Chambers, Bury.

CARDIFF.—For erecting villa residence and stabling at Rumney. Mr. S. Rooney, 9 Quay Street, Cardiff.

COLCHESTER.—For reinstating the two houses lately damaged by fire in East Street. Mr. Chas. E. Butcher, architect, 3 Queen Street, Colchester.

COLCHESTER.—Nov. 23.—For erecting nurses' accommodation, also for supplying and fixing new entrance gates at the workhouse. Mr. G. H. Page, Trinity Chambers, Colchester.

COLCHESTER.—Nov. 27.—For erection of a nurses' home and laundry, and other works at the hospital. Messrs. Goodey and Cressall, architects, Victoria Chambers, Colchester.

DEAL.—Nov. 29.—For construction of an underground convenience near the South Parade. Mr. Thos. C. Golder, surveyor, 16 High Street, Deal.

DUDLEY.—For erection of a billiard-room at the club-house, Tower Street. Mr. A. Gammage, architect, Imperial Buildings, High Street, Dudley.

DURHAM.—For erection of fifteen houses at Consett. Blooms', 9 High West Street, Sunderland.

DOWNPATRICK.—Nov. 24.—For additions and alterations to the District Lunatic Asylum. The Secretary, Board of Control, Custom House, Dublin.

ELGIN.—Nov. 23.—For erection of kiln and manager's house at Glen Moray Distillery. Mr. Charles C. Doig, architect, Elgin.

ENFIELD.—Dec. 2.—For erection of a junior mixed department at Chesterfield Road school, Enfield Lock. Mr. G. E. T. Laurence, architect, 181 Queen Victoria Street, London, E.C.

FIFE.—Nov. 23.—For erection of a chimney-stalk at the Fife and Kinross District Lunacy Asylum. Mr. Osborne, Cupar.



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FLEETWOOD.—For erection of shop and dwelling-house. Mr. D. Rankin, Church Street.

GREAT HARWOOD.—Nov. 22.—For erection of stables and fire-engine station. Messrs. Briggs & Wolstenholme, architects, Richmond Terrace, Blackburn.

HACKENTHORPE.—Nov. 22.—For erection of church. Mr. John D. Webster, architect, Cairns Chambers, 19 St. James's Street, Sheffield.

HALIFAX.—Dec. 9.—For erection of police station, court-house, stables and coachhouse and appurtenances thereto. Messrs. George Buckley & Son, architects, Tower Chambers, Halifax.

HEMSWORTH.—Nov. 26.—For erection of Victoria Hotel, Hemsworth. Mr. Walter E. Richardson, architect, 28 Bond Street, Leeds.

ILKLEY.—Nov. 22.—For erection of pair of villas. Messrs. Isitt, Adkin & Hill, architects, Prudential Buildings, Bradford.

IRELAND.—Nov. 25.—For erection of two one-storey cottages at Ballyhaise Station, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

KEIGHLEY.—For erection of houses in Skipton Road, Keighley. Messrs. Peterson & Lawson, architects, 1 Bank Street, Bradford.

KILKENNY.—Dec. 9.—For erecting forty houses and repairing twenty-four houses. Mr. William K. Cleere, executive sanitary officer, Kilkenny.

KINGSTHORPE.—Nov. 24.—For building infectious hospital, with outbuildings, administrative cottage, fencing, &c. Mr. John Ingham, architect, Abington Street, Northampton.

LEEDS.—Nov. 22.—For erection of three pairs of semi-detached villas on the Victoria Park Estate. Mr. John Jackson, architect and surveyor, Barry Street, Bradford.

LEWISHAM.—Nov. 23.—For erection of a coroner's court and mortuaries in the Ladywell Road. Surveyor, Lewisham Town Hall, Catford, S.E.

LINCOLN'S INN, W.C.—Nov. 23.—For enlargement of receiving workhouse at Bear Yard. Mr. A. H. Maddocks, clerk, 15 Henrietta Street, Covent Garden.

MORECAMBE.—Nov. 22.—For erection of the Hotel Cecil. Messrs. Jas. Marshall, Butterworth & Duncan, architects, Back Crescent, Morecambe.

NEWQUAY.—Dec. 9.—For erection of a villa on the Tolcarne Building Estate. Mr. William Square, architect, Tavistock.

NORMANTON.—Nov. 27.—For pewing the Primitive Methodist chapel, Castleford Road, Hopetown, Normanton. Mr. Joseph Land, Alpine Villas, Castleford Road, Hopetown, Normanton.

PONTEFRAC.—Dec. 4.—For erection of an infectious disease hospital. Messrs. Tennant & Bagley, architects, Pontefract.

PONTYPOOL.—Nov. 24.—For erection of house near St. James's Church. Rev. John Turner, 25 Clarence Street, Pontypool.

PRESTON.—Nov. 23.—For erection of an auction mart and buildings in connection therewith at the cattle market, Brook Street, Mr. H. Hamer, town clerk, Town Hall, Preston.

REDDISH.—Dec. 6.—For erection of goods warehouse and extension of platforms at station. Mr. Oliver S. Holt, secretary, S. & M. Railway, London Road station, Manchester.

REDRUTH.—Nov. 22.—For erection of a children's ward in connection with the West Cornwall Women's Hospital. Mr. Alfred H. Jenkin, solicitor, Alma Place, Redruth.

REDRUTH.—For alterations to Lanner Board schools. Mr. S. Hills, architect, Redruth.

ROWLEY REGIS.—Dec. 6.—For erection of additional accommodation for infants at Blackheath Board school and alteration to the girls' and infants' department there. Mr. J. T. Meredith, architect, Kidderminster.

SALTAIRE.—For erection of semi-detached villas. Messrs. Peterson & Lawson, architects, 1 Bank Street, Bradford.

SCARBOROUGH.—For building fourteen large houses on the South Cliff. Mr. A. Moore, 23 West Bank, Scarborough.

SCOTLAND.—For erection of business premises at Mallaig. Mr. Dun. Cameron, architect and surveyor, Inverness.

SCOTLAND.—Nov. 26.—For erection of cottage at Cameron Road, Fort William. Mr. Thos. R. Soutar, architect, New Post Office Buildings, High Street, Fort William.

SCOTLAND.—Nov. 30.—For erection of a post-office at Forfar. Mr. George Morham, 39 George Street, Edinburgh.

SCOTLAND.—Nov. 30.—For erection of a post office at Forfar, for the Commissioners of H.M. Works and Public Buildings. Mr. George Morham, 39 George Street, Edinburgh.

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AGENTS APPOINTED IN ALL LARGE TOWNS.

STROUD.—Dec. 6.—For building a Board school, with work incidental thereto, at Rodborough. Mr. W. H. C. Fisher, architect, 6 Rowcroft, Stroud.

SHEFFIELD.—Dec. 4.—For construction of a concrete retaining wall (brick faced), also pits for engine, breaker, &c., in connection with new coal sidings at their Grimesthorpe station, for the Sheffield United Gaslight Company. Mr. Hanbury Thomas, Commercial Street, Sheffield.

SHOREDITCH, N.E.—Nov. 24.—For rebuilding a wall and constructing an area at casual wards and workhouse. Mr. F. J. Smith, 17B Great George Street, Westminster.

ST. ALBANS.—For general repairs to premises in Victoria Street. Mr. T. Foster Woodman, St. Peter's Street, St. Albans.

SWANSEA.—Nov. 22.—For additions and alterations to Plasmarl School. Mr. G. E. T. Laurence, architect, 181 Queen Victoria Street, London, E.C.

THORNTON.—Nov. 22.—For erection of a pair of semi-detached villas. Mr. W. Pickels, architect, Thornton.

ULVERSTON.—Nov. 22.—For the heating and ventilation of the Higher Grade school. Mr. J. Y. McIntosh, Cornwallis Street, Barrow-in-Furness.

WALES.—Nov. 25.—For erection of a new infants' school, Ton, Pentre. Mr. Jacob Rees, architect, Hillside Cottage, Pentre.

WHICKHAM.—Nov. 27.—For building eight cottages. Mr. R. Rutherford, Whickham.

WHITEHAVEN.—Nov. 25.—For building ten dwelling-houses on Bransty, Whitehaven, and two dwelling-houses at Frizington. Messrs. Moffat & Bentley, architects, Whitehaven.

WOOLWICH.—Nov. 23.—For construction of an additional coal-store at the Public Baths, Market Street. Mr. H. O. Thomas, surveyor, Town Hall, Woolwich.

THE markets committee of the Leeds Corporation have appointed a sub-committee to obtain tenders for the erection of a wholesale dead meat market and abattoir on ground at Harper Street, York Street, at the estimated cost of 18,000*l*. The plans, which were prepared by Mr. Walter Hanstock, architect, Leeds and Batley, have been already described.

TENDERS.

ANDOVER.

For sinking a storm-water well, &c. Mr. ALFRED PURKISS, borough surveyor.
F. BEALE, Andover (*accepted*) £25 0 0

BARNESLEY.

For the painting of the wood and ironwork outside the Hunningly Lane and Barnsley Road, Stairfoot, and Hoyle Mill School.
E. SCOTT, Stairfoot, near Barnsley (*accepted*) £28 10 0

BASINGSTOKE.

For widening Victoria Street and construction of a contiguous street. Mr. GEORGE FITTON, borough surveyor.
F. Talbot £675 0 0
J. Ball 622 7 0
S. Kavanagh 577 0 0
J. THUMWOOD, Basingstoke (*accepted*) 446 5 6
Borough surveyor's estimate 571 0 0

BRADFORD.

For erection of a shop and two houses in High Street, Great Horton. Mr. SAM. SPENCER, architect, 344 Great Horton Road, Great Horton.

Accepted tenders.

A. Emsley, mason.
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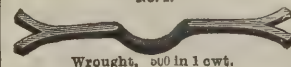
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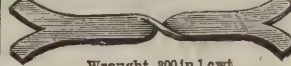
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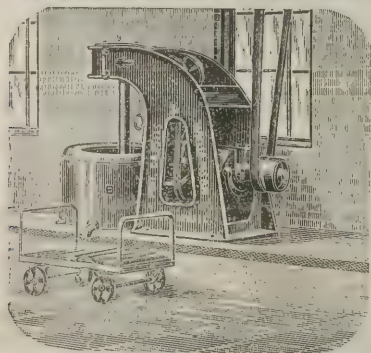
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Stevens Bros.	1,262	0 0
E. Triggs	1,241	0 0
G. S. S. Williams & Son*	1,230	0 0

For erecting offices for boys, adapting boys' old offices for girls, and providing part new drainage scheme at Whittington School.

Samuel Mason, Limited	£1,596	17 5
J. Willmott & Sons	1,430	0 0
R. A. Yerbury & Sons	1,350	0 0
E. Lawrence & Sons	1,235	0 0
Stevens Bros.	1,227	0 0
G. S. S. Williams & Son	1,200	0 0
Cowley & Drake*	1,140	0 0

* Recommended for acceptance.

LONDON SCHOOL BOARD—continued.

For rebuilding boys' offices, adapting existing offices for new urinal, improving lavatories and providing part new drainage scheme for old school, Creek Road.

Samuel Mason, Limited	£1,703	5 1
J. Garrett & Son	1,400	0 0
F. G. Minter	1,156	0 0
W. V. Goad	1,097	0 0
G. Parker	1,039	0 0
Frampton & Co.	1,017	0 0
E. Triggs*	935	0 0

For reconstructing the male and female infants' offices, erecting closets for masters and schoolkeeper and providing part new drainage scheme, London Fields.

J. Willmott & Sons	£1,772	0 0
J. Grover & Son	1,710	0 0
E. Lawrence & Sons	1,608	0 0
Stevens Bros.	1,528	0 0
G. S. S. Williams & Son	1,359	0 0
Johnson & Co.	1,351	0 0
R. A. Yerbury & Sons*	1,281	0 0

For providing and fixing sectional boiler and additional heating surface in two class-rooms in each department, Buckingham Street.

A. H. Skinner & Co.	£280	0 0
Geo. Davis	275	0 0
Comyn Ching & Co.	269	8 0
Jones & Attwood	260	8 0
Chas. Seaward & Co.	248	0 0
W. G. Cannon & Sons	238	0 0
Dargue, Griffiths & Co., Limited	205	10 0
Duffield & Co.*	188	0 0

For providing and fixing boiler and main, providing additional heating surface and overhauling apparatus, Compton Street.

Wenham & Waters, Limited	£503	0 0
J. & F. May	375	0 0
Hill & Drummond	369	0 0
Bates & Pearce	356	0 0
John Grundy	326	10 0
Z. D. Berry & Sons	326	0 0
J. Wontner-Smith, Gray & Co.	322	10 0
J. Fraser & Son*	244	10 0

* Recommended for acceptance.

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Portable Filters on this System, £1 5s. to £3.

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LONDON SCHOOL BOARD—continued.

For providing and fixing low-pressure hot-water apparatus and independent boiler, and converting gas radiators into hot-water coils for heating hall, three classrooms and corridors in infants' department and one classroom and corridors in boys' and girls' departments respectively, Oldridge Road.

J. C. & J. S. Ellis, Limited	£610	0	0
Maguire & Gatchell, Limited	482	0	0
J. & F. May	462	0	0
Wenham & Waters, Limited	438	0	0
W. G. Cannon & Sons	437	0	0
Z. D. Berry & Sons	420	0	0
Strode & Co.	396	0	0
Purcell & Nobbs	367	0	0
Edwin Oldroyd & Co., Limited *	319	0	0

For providing and fixing boiler and complete low-pressure hot-water apparatus, Sleaford Street.

Maguire & Gatchell, Limited	£876	0	0
J. C. & J. S. Ellis, Limited	690	0	0
F. Milan	680	0	0
Edwin Oldroyd & Co., Limited	495	0	0
Geo. Davis	460	0	0
Samuel Mason, Limited	451	0	0
J. Defries & Sons, Limited	432	15	0
Russell & Co.*	379	0	0

For providing and fixing saddle boiler and additional relief main and overhauling apparatus, Lower Chapman Street.

H. C. Price, Lea & Co.	£235	0	0
A. J. Kallaway & Co.	189	17	0
Wippell Bros. & Row	165	0	0
Hill & Drummond	155	0	0
J. C. Christie*	146	10	0

For providing and fixing telephone from superintendent's room to lodge, Gordon House, Isleworth.

Edmundsons' Electricity Corporation, Limited	£15	10	0
Gent & Co.	13	0	0
The Private Wire and Telephone Installation Co.*	12	19	6
J. W. Gray & Son	7	10	0

* Recommended for acceptance.

MORECAMBE.

For erection of a house and two shops in Queen's Square. Mr. JAMES MARSHALL, architect, Back Crescent, Morecambe. J. EDMONDSON, Clarence Street (accepted) £1,659 7 6

ORPINGTON.

For wrought-iron gates, gate pillars and railings for new Board school buildings. Mr. GEORGE ST. PIERRE HARRIS, architect.

WORRALL & Co., Liverpool (accepted).

PUTNEY.

For erection of a new vestry, with furnace-room under, at St. John's Church. Messrs. LEE & PAIN, architects, 63 Lincoln's Inn Fields, W.C.

ADAMSON & SONS (accepted) £890 0 0

REDDISH.

For paving, flagging, &c., of Gorton Road. Mr. T. S. M'CALLUM, engineer, 4 Chapel Walks, Manchester. J. SHARPLES, Spring Hill, Accrington (accepted) £2,768 0 0

STOCKBRIDGE.

For construction of a dwarf concrete wall, about 200 yards in length, near the Waggon and Horses Inn. Mr. W. J. AYLES, district surveyor, Broughton, Stockbridge.

C. Allen, Reading	£73	4	0
C. Grace & Sons, Clatford, Andover	65	0	0
H. H. Gilbert, Stockbridge	49	10	0
A. Winksworth, Stockbridge	33	10	0
Surveyor's estimate	40	0	0

Note.—No tender accepted; work not to be carried out this season.

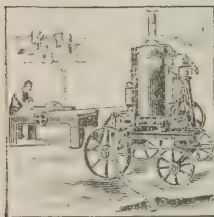
STONEHAVEN.

For works of proposed Corporation lodging house. Messrs. J. & J. A. SOUTTAR, architects, 42 Union Street, Aberdeen.

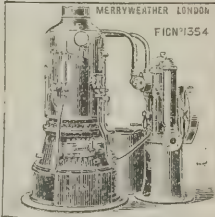
Accepted tenders.

W. Smith, mason	£345	0	0
G. Mitchell & Son, carpenter	269	0	0
E. Pithie, plumber	103	10	0
R. Burness & Son, slater	60	15	0
A. Cormack, plasterer	35	5	8
Barron & Son, Aberdeen, painter and glazier	33	10	0

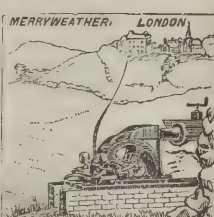
MERRYWEATHER on WATER SUPPLY TO COUNTRY MANSIONS, &c.



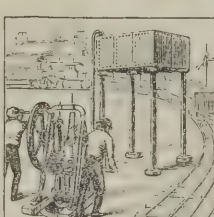
"Estate" Steam Pumping and Driving Engine.



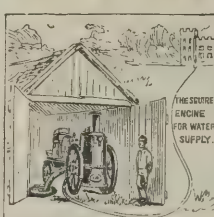
Light Pumping Engine and Boiler.



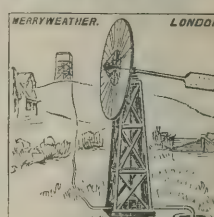
Water wheel Pumps.



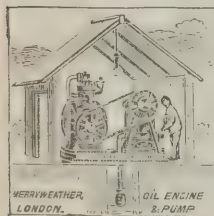
"India" Pattern Pumping Engine.



"Squire" Portable Fire Engine.



Windmill Pump.



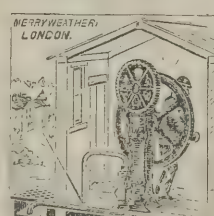
Oil Engine and Pump.



Estate Manual Force Pump.



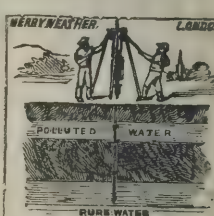
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WALES.

For seating and renovating the Richmond Road Baptist chapel, Pontnewydd.
J. Morgan £104 0 0
T. Titley 95 0 0
H. Parfitt 80 10 0
J. P. HOWELL, Abersychan (accepted) 68 0 0

For construction of a concrete reservoir at Twrgwyn, Bangor, to contain about half a million gallons. Mr. JOHN GILL, borough surveyor.
W. O. Daniel, Bangor £770 0 0
W. Parry, Bangor 700 0 0
G. Webb & Co., Swansea 644 0 0
Note.—No tender accepted.

WATTON.

For extension of the Watton town sewer up the Norwich Road.
Waters & Sons £96 14 6
R. Button 89 2 6
ADCOCK & SONS, Watton (accepted) 80 0 0

WESTON-SUPER-MARE.

For erection of two pairs of cottages in the Uphill Drove Road. Mr. S. J. WILDE, architect, Boulevard Chambers, Weston-super-Mare.
J. Solway £1,900 0 0
Keen & Keen 1,590 0 0
R. Wilkins & Sons 1,450 0 0
G. Sprake 1,440 0 0
J. Wilcox 1,310 0 0
W. M. Dubin 1,164 0 0
C. & E. STRADLING, Anstice Terrace, including boundary wall (accepted) 1,100 0 0

A MEETING of the sub-committee appointed to consider the plans for the reconstruction of certain portions of Glasgow Royal Infirmary was held on Friday last. Mr. James Thomson submitted block or ground plans, which were carefully examined by the committee, who are of opinion that they will meet the requirements of a modern hospital. It was agreed to submit the plans to the full executive committee.

NEW UNITED PRESBYTERIAN CHURCH IN EDINBURGH.

A NEW church in Fountainhall Road, Edinburgh, was opened yesterday, Thursday, with some pomp and circumstance. The new church has been built to the designs of Mr. Graham Fairley, architect, Edinburgh. It is a handsome building and adds considerably to the architectural features of the locality. Alike in plan and design, the edifice is an adaptation of the thirteenth-century Gothic architecture to the requirements of a modern church. Included in the plan are the traditional nave, aisles, transepts and chancel; and while the nave is wide in span the aisles are narrowed to the width of side passages. By means of this latter arrangement all the congregation can see the minister, whether at the lectern or in the pulpit. There is no gallery. The chancel, in which stands a communion table of oak, is reserved for the use of the elders; and the choir are accommodated in the east transept, where accommodation for the organ—driven by a 1 horse-power electric engine—is also found. So far as the exterior of the church is concerned, the design suggests that the architect has had in view the well-known front of Dunblane Cathedral—different proportions in width of front and of height, of course, necessitating a different treatment of details. Dignified simplicity of design—almost approaching to plainness—in the large and solid grouping, in contrast to the gaining of effect by smaller grouping and richer ornamentation, is the outstanding feature of the structure; and in order to secure a solidarity of appearance, as it were, from the very base, Mr. Fairley has placed a low parapet wall of stone in front of the church, and separating the ground from the footway, instead of an iron railing, which is usually adopted in such cases. Internally the building has an almost plain but at the same time a dignified and impressive appearance. The effect is in part due to the number of beautiful stained-glass windows, most of them gifts from members of the congregation. Two of these windows are of special interest in that they will serve to remind the congregation of its previous place of worship. They are the chancel windows, part of which was brought from the Infirmary Street building. One of them is a memorial in stained-glass to Dr. Bruce, the minister of the congregation from 1838 to 1882; the other is in memory of Mr. George Burn, who was an elder of the church from 1840 till 1893. The windows lighting the aisles are also in stained-glass. On the

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east side these represent historical Old Testament characters, while on the west the representations are of New Testament figures. In the vestibule, in the west transept and in the clerestory of the nave—on the west gable of the building—are beautiful memorial windows, all designed so as to harmonise with the style of the building. Placed on the west side of the chancel, the pulpit—also the gift of a member—is of most artistic design. It is of Caen stone and red marble, and in the niches are figures of the Saviour and of the Apostles Paul and Peter. The desk is of polished brasswork. In the centre of the chancel is a lectern of hammered brasswork, and on the east side a handsome font of the same material as the pulpit—both gifts. The church will accommodate a congregation of six hundred. The seats are of pitch pine, stained in a dark green tint; and the roof is of open timber-work, also stained. Ample provision is made for the lighting of the building by means of electricity—the heating, again, being on the low-pressure system. Behind the chancel, with a cross passage of communication, are the halls and offices, which are very conveniently arranged. The large hall is a spacious, well-lighted apartment, giving accommodation for 200, and it, like the church, is furnished with an open timber roof. The building is valued at about 8,000*l*.

TRADE NOTE.

The burgh schools, St. Andrews, are being warmed and ventilated by means of Shorland's patent Manchester grates.

The Marquis of Ripon (chairman of the Ripon Board of Guardians) laid a foundation-stone on the 11th inst. in connection with the new infirmary in course of erection at the Ripon Union workhouse. The new building is estimated to cost 2,650*l*. It has an admirable position on the east side of the existing buildings, with a good view in the direction of Ripon railway station and the valley of the Ure. Including provision for nurses in the centre of the building, there will be accommodation on the ground and second floors for about forty persons. In addition to the sick wards for men and women, there are day and duty-rooms, foul wards, lying-in ward, with separate bathrooms and lavatories in each section. There will also be hot-water apparatus for heating the building.

ILLUSTRATIONS.

- CATHEDRAL SERIES.—CANTERBURY: SOUTH TRANSEPT, AND VIEW LOOKING NORTH-WEST.
- ST. GABRIEL'S CHURCH, WILLESDEN GREEN.
- ST. JOHN'S COLLEGE, BATTERSEA, NEW LECTURE THEATRE AND LIBRARY.
- NEW CHURCH SCHOOLS, SIDLOW BRIDGE, REIGATE.—SOUTH ELEVATION.—NORTH-EAST ELEVATION.
- SWIMMING BATH, KENNINGTON ROAD.

VARIETIES.

THE new intermediate schools at Llanfyllin were formally opened on the 12th inst.

DAMAGE to the amount of 30,000*l*. resulted from a fire which broke out on the 11th inst. at Bishop Auckland in flour mills owned by Messrs. Appleton, French & Scragton.

TWO memorial windows of an heraldic character, and interesting from local associations, are being erected in Neilston parish church.

THE Archbishop of York has dedicated a chancel screen placed in the church of St. Michael and All Angels, Sheffield, to the memory of the late Mr. Wake, of Sheffield.

THE new church for the parish of St. George, Altrincham, has now been completed, and the act of dedication has been performed by the Bishop of Chester. Erected on the site of a church, built in 1799, the new church has cost 5,300*l*.

A TELEGRAM from Guayaquil states that the Peruvian town of Loreto, on the Amazon, has been destroyed by a hurricane. Only a few buildings are left standing, and there has been considerable loss of life.

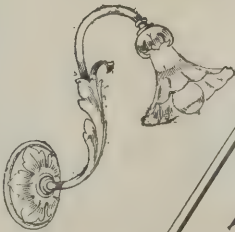
THE contract for the national harbour at Dover has been settled, and Messrs. Pearson & Co.'s tender accepted. The amount of the tender, it is stated, was between three and a half and four millions.

A NEW convalescent home in connection with the Manchester Children's Hospital, which has been built and equipped at St. Anne's-on-Sea by Sir William Agnew, Bart., president of the hospital, has been formally opened and presented to the board of governors and trustees.

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ELIZABETHAN,
GOTHIC,
ITALIAN,
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LOUIS XVI.
STYLES.

Special Designs
Free on Application.
LIBERAL TERMS
TO THE TRADE.

ON Saturday last Lord Lilford opened the new Church schools at Tarleton erected to meet the requirements of the Education Department and of a growing district. The estimated total cost of the buildings and site was 2,700*l*.

SIR H. HARBEN, chairman of the Hampstead Vestry, opened on the 10th inst. a new central public library which he has erected for Hampstead at a cost of 5,000*l*. on a site purchased out of the rate raised under the Public Libraries Act.

THE Archbishop of York recently attended the opening ceremony of a new Church mission-room at Millhouses, near Sheffield. The building, the site of which was given by Mr. Wilson Mappin, will accommodate 250 persons, and has been erected at a cost of 2,000*l*.

NO little excitement was occasioned in Newgate Street on the 15th inst. by the discovery that fire had broken out in Christ's Hospital. On examination it was found that the roof of the west wing had taken fire through a defect in the flue, and some 12 feet by 10 feet of the roof was involved; but the firemen effectually overcame the mischief before it could extend to the building underneath.

THE Great Northern Railway Company's engineers on Sunday last performed a remarkable feat in reconstructing the old iron bridge south of Hatfield, and over which run four lines of railway. Traffic was temporarily suspended, and with every necessary appliance in readiness the old bridge was removed and replaced by a new iron-girder bridge, the work being accomplished in about fifty minutes.

THE Painters' Company offer a Travelling Studentship of 50*l*. for the encouragement of the study of decoration. The studentship is open to competition by students between the ages of twenty and twenty-five in any recognised school of art or other institution devoted to the study of applied art in any form, and situate within the limit of the larger Metropolitan postal area.

THE Palace Theatre is still crowded nightly, and the programme is well up to Mr. Charles Morton's well-known high standard of excellence. Undoubtedly the feature of the evening is the biography of a ride on the engine of an express train, and the effect of this is as singular as interesting. Nothing is seen of the train, but the line and the surrounding country approaches the audience at express pace. Presently a tunnel is seen in the distance; this approaches, is entered, and after a time the darkness is broken by a point of light far ahead; this in its turn grows and grows until suddenly sunshine and scenery

are again entered. The illusion is excellent, and should on no account be missed. Other excellent turns are Zæo in her charming studies of light and grace, the Ibrahim troupe of Arabs, and many of the old favourites.

THE eight side windows in Bothwell parish church have been entirely renewed. The centre of them has been filled with variously tinted cathedral glass, the borders being alternately decorated with hand-painted leaves and flowers. The two end windows have been filled with painted glass, similar in character and design to the window presented to the church several years ago. In one of them the Old Testament types of the Israelites gathering manna in the wilderness, Moses striking the rock, the brazen serpent, and the scapegoat are represented; and in the other the following incidents in the New Testament, taken from the Acts of the Apostles, viz.:—Peter and John healing the lame man, the martyrdom of Stephen, the setting apart of Paul and Barnabas to preach the gospel to the Gentiles, and Paul preaching at Athens. The grouping is excellently conceived and very successfully carried out. The colouring is rich and varied, but chaste and fitting in tone.

A MONUMENT has been erected by Her Majesty in Crathie Churchyard over the resting-place of the late Mrs. Macdonald. The tombstone consists of two massive blocks of red Peterhead granite, on the top of which is carved an interlaced Celtic cross, while the base bears the following inscription in raised polished letters:—"This stone is placed by Queen Victoria in grateful and affectionate remembrance of Annie Macdonald, daughter of William Mitchell, of Clachanturn, and widow of John Macdonald. She was in the Queen's service for forty-one years, and during thirty-one years was Wardrobe Maid, and the faithful servant and devoted friend to the Queen, by whom her loss is deeply deplored. She was born at Carn na Cuimhne, January 3, 1832, and died at Clachanturn, July 4, 1897, beloved and mourned by all who knew her."

NEW school premises, which have been erected at a cost of 4,000*l*., in connection with St. Mark's parish church, Westland Road, Dublin, were opened on the 10th inst. by His Grace the Archbishop of Dublin. The new school buildings consist of boys', girls' and infants' schools, separate lavatories in connection with each school, classrooms and a kitchen, in which cooking and laundry lessons will be given to the female pupils. The old school has been converted into a parochial hall, and a large playground at the rear of the schools has been secured for the scholars.

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THE UNITED ASBESTOS PATENT "SALAMANDER" DECORATIONS.

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ELECTRIC NOTES.

MR. F. J. WARDEN-STEVENS has been appointed the consulting engineer to the Smethwick Council in connection with the electricity supply scheme for the town, and to render the technical assistance necessary for obtaining the provisional order. The gasworks are owned by the Council, and they are considering the erection of refuse-destroyers. The site suggested for the electricity supply works adjoins the proposed site for the refuse-destroyers. Mr. F. J. Warden-Stevens has also been retained as the expert to advise the Oldbury Council in the question of electric lighting and power supply for the town. The Council owns the gasworks, and the site suggested for the electric supply works adjoins. Mr. Warden-Stevens has inspected the district, and the streets in which mains will be laid to commence have been settled.

THE General Electric Company of London and Manchester have added another branch to their business at 9 William Street, Dublin. The branch is under the management of Mr. Fletcher, who has had some years' experience with the company in London.

A COMPANY is being promoted in Musselburgh whose object will be to produce an electric light supply for the town. Water power will be obtained from the mill lade which runs through the burgh. The promoters are confident of success and of their ability to compete with the local gas company, which supplies gas at 3s. 9d. per 1,000 cubic feet. The gas company paid a 10 per cent. dividend on last year's operations, and shares, which are privately transferred, are seldom on the public market. The gas consumers consider the charge too high.

No less than seven local authorities have signified their intention to make application to the Board of Trade, under the Electric Lighting Acts of 1882 and 1888, for provisional orders to supply electricity for public and private purposes. These authorities are the Urban District Council of Barnes, the vestry of the parish of Bermondsey, the Corporation of Maidenhead, the Urban District Council of Willesden, the Urban District Council of East Ham, the Urban District Council of Aldershot and the Corporation of St. Albans. In addition to these intimations Mr. James de Lara Cohen, of Acton, has given notice that he intends to apply to the Board of Trade for a provisional order to empower him to supply electricity for public and private purposes within the area known as the Friar's Place Estate, Acton.

PREMISES have been purchased adjoining the General Post Office in Prince's Street, Dublin, for the erection of a power station, which will be furnished with engines to generate power for working the pneumatic system of transmitting telegrams as well as for lighting the whole of the Post Office and the Returned Letter Office in Upper Sackville Street. The lighting arrangements are to include three arc lamps in the public office, three outside the Prince's Street side, three in front of the portico in Sackville Street, and three in Henry Street. These should brilliantly illuminate the buildings inside and outside. The numerous internal offices will also be lighted by the new generating plant, more than a dozen lights being required for the instrument-room and an equal number for the sorting-room, and so on in proportion for the other departments. The Returned Letter Office in Sackville Street will be lighted by the same plant internally and externally. This plant will include a couple of boilers to deliver 200 horse-power, two pneumatic engines of 30 horse-power for the pneumatic transit of telegrams, and two hydraulic engines of 16 horse-power to supply hydraulic pressure for the lift. The whole of the General Post Office will be heated by a specially-designed apparatus; and the decision to erect a power station was, it is said, arrived at by the postal authorities in consequence of the Corporation being unable to give them the supply they required. This will be a distinct loss to the rates of the city.

BUILDING AND BUILDERS.

It is proposed to erect a new church in the St. Andrew's parish of Bradford.

At a meeting of the Nigg (Aberdeen) Parish Council, plans of a new hall, to be built at the junction of the Stonehaven and Cove Roads, were approved.

THE foundation-stone of a new billiard-room in connection with the Mechanics' Institute, Guisborough, was laid on the 9th inst. The contract for the works amounts to 595*l.* 12*s.* 10*d.*

PLANS were submitted at the Wetherby (Leeds) District Council meeting on the 11th inst. for thirteen new houses in Wetherby, where there is a great demand for them at present.

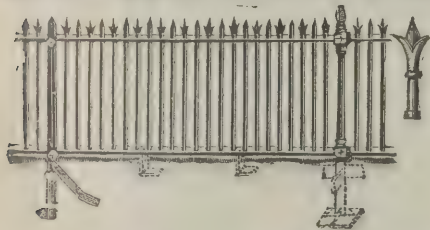
NEW theatres are springing up in all directions with quite unexampled celerity. Thus we are informed that the works

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committee of the Paddington Vestry have approved amended plans for the erection of a theatre on the site of Nos. 212 to 220 Harrow Road. Having regard to the associations of Mrs. Sarah Siddons with Paddington, it is suggested that the new playhouse should be named "The Siddons Theatre." And that the plans of the new Coronet Theatre, Notting Hill Gate, have received the final approval of the County Council. Mr. W. G. R. Sprague is the architect of this theatre, which will occupy a site in High Street, Notting Hill Gate, open on three sides, having frontages to High Street, Johnson Street and Uxbridge Street. The frontage is to be entirely of white Portland stone. The audience will enter to the better part of the house direct from the High Street. The house is to be on the two-tier system, and is without a single column, the construction throughout being of concrete and steel and thoroughly fireproof. On the lowest level are stalls, pit-stalls and pit, the first circle consisting of dress circle and balcony, and second circle consisting of amphitheatre seats and gallery. The stage is some 40 feet deep, with a width of 65 feet and a height of 55 feet to grid. The decoration and furnishing throughout will be in Louis XVI. style, and the electric light will be utilised to the utmost. The theatre will be able to accommodate some 2,000 persons and will be ready for opening early next autumn. The cost will be about 25,000*l.*

SANITARY INSPECTORS' ASSOCIATION.

THE ninth meeting of the session of the North-Western and Midland Sanitary Inspectors' Association was held at the Royal Institution, Colquitt Street, Liverpool, on the 13th inst., Mr. William Urquhart, of Crewe, presiding. A large number of members and associates was elected, bringing up the total to 249. Mr. A. Kent, assistant sanitary inspector, Hanley, read a paper on "Disinfection," in the course of which he explained the various chemical methods employed, and laid stress upon the importance of the disinfectant being of the proper strength. He was of opinion that full power should be given to all sanitary authorities to have all places where infection had occurred, and also the bedding and clothing, thoroughly disinfected, without having to go through the formalities prescribed by the 128th section of the Public Health Act, 1875, and the 5th section of the Diseases Prevention Act, 1890. It

should also be made compulsory for all authorities to provide suitable disinfecting apparatus, while infected clothing should be removed weekly instead of being allowed to remain until the recovery of the patient.

GLASGOW CATHEDRAL.

ON Monday, the 15th inst., Mr. MacGregor Chalmers, president of the architectural section of the Philosophical Society, delivered the opening address of the session. There was a large attendance of members and friends. The subject of the address was "Notes taken from a Sketch of the History of Glasgow Cathedral," a sketch which the President intimated he had now in preparation for publication. Dealing first with the connection of Glasgow with the three great leaders in the Christianising of Scotland—St. Ninian, St. Columba and St. Mungo—a brief description was given of the early plans of church fabrics, both of the Roman and the Celtic types. The first church at Glasgow would naturally be of the Celtic type, and although its form had not influenced the designers of the succeeding structures, still the site of this early church had always been a dominant factor in the planning of all the later work. That our present cathedral stands on the site of St. Mungo's early church cannot be doubted, since the cross which the saint reared at his church existed even at the end of the twelfth century, and was then believed to have power to work miracles. Although St. Mungo's Church has disappeared, his well remains, and it is still possible to identify the spot where tradition says the saint deposited the corpse of Fregus, which he brought with him at the first that he might take possession of the land by a grave. Then we had, but no longer have, St. Mungo's bell, and gone, too, is St. Mungo's tree. Only a faint ray lightens the centuries between St. Mungo and the coming of David, Prince of Cumbria, who founded a cathedral anew, in conformity with the church system so closely associated with the name of St. Margaret. Nothing remains of the first church, which was dedicated in 1136. It may have been the centre aisle only of a small choir, terminating at the east end in a semicircular apse. The first bishop of whose work any part remains is Bishop Ingelram, who came to the see in 1164. A few loose fragments of this period are preserved in the chapter-house, but the only part of the structure is the small wall shaft near the west end.

SANITARY CONGRESS, LEEDS, SEPTEMBER, 1897.

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of the south aisle of the lower church. This indicates the eastern limit of the old south aisle, and, with that, the general plan, and the probability that the side aisle was treated in an apsidal form. To the choir of this period Bishop Jocelin, who succeeded in 1175, began to add a great nave, and at a level which shows that by this time, at least, if not previously, a double choir was contemplated. The transitional character of Bishop Jocelin's nave is still preserved. A charter, granted to the bishop by King William the Lion, in 1190, explains why this great work was stopped—the choir was burned. Bishop Jocelin then rebuilt it entirely new, with the exception, evidently, of the single insignificant shaft referred to. Of this work considerable fragments remain in the north wall of the north aisle, and in the south aisle almost in its entirety, including the walls and vaulting. To this has to be added the carving of the capital of the old shaft, which had been left uncut, evidently, at the first. The mystery which has always been made to surround the preservation of this portion of the building vanishes when it is recognised that it remains, because it was never touched. When the choir was again completed, work was resumed on the nave, to be interrupted a second time, when Bishop William de Bondington began the erection of the present magnificent lower church and choir. The Chapel of the Four Altars at the east end of both churches was shown to be an interesting feature, carried out simultaneously at other places. The special features of the lower church were described, but a complete description and survey of this work is now prepared for the forthcoming volume of Transactions of the Archaeological Society. Attention was also drawn to the carving of the chapter-house door, which may have inspired the designer of the great rood screen to adorn it with the Seven Ages of Man. The two sarcophagi in the lower church, the fifteenth-century slab recently found in the churchyard, and the effigy at the east end of the lower church are the only Mediæval memorials of the dead. The sarcophagi were compared with the famous one at Govan, which was illustrated from the president's scale drawings, which appear in the first volume published by the Regality Club. The recent history of the effigy was narrated with the slight evidence upon which the present name rests. Had the fact been noted years ago that the feet had to be hewn away before the effigy could be placed in its present position, the conclusion would then have been inevitable that this is not the original site chosen for the effigy. The current opinion that the central

tower was the tower which was built at the end of the thirteenth century, destroyed at the beginning of the fifteenth century, and restored by Bishop Lauder, because that bishop's arms are carved upon the central tower, was shown to have had a blighting influence upon the study of the present nave. The thirteenth-century tower was the semi-detached north-western tower, destroyed needlessly about fifty years ago. The three sculptured stones which were taken from it at the point where the later work was joined to the early lower part are of early fifteenth-century workmanship. They are preserved in the chapter-house. Reserving any reference to the artists whose work adorns the cathedral, the following detached links were offered as a tantalising puzzle:—King Alexander II. married Marie de Coucy. Château de Coucy is the greatest Mediæval fortress in Europe, and was built in the thirteenth century. Bothwell Castle was directly copied from the Château de Coucy, and was built in the latter part of the thirteenth century. Robert de Coucy was one of the most famous architects in Europe, to whom we owe a great part of Rheims Cathedral, built in the thirteenth century. What was it brought Robert de Coucy here at the beginning of the fourteenth century? The lecture was illustrated by a large number of drawings and lantern photographs, and at the close a cordial vote of thanks was passed to the president.

DILATORY WORKMEN.

"A LONDON BUILDER" writes as follows to the *Times*, confirming the statements in a letter from "A London Architect" published last week:—

I have seen the letter in your issue of to-day signed "A London Architect," and I think it only fair to him that the statements which he has put forward should be either controverted or supported by the experience of a builder, and it is satisfactory to know that architects are taking notice of the manner in which the men engaged in building operations are fulfilling their duties and obligations to the general public, because after all they are the employers of the workmen, architects and builders being only intermediaries, and it is some consolation to the builder to know that the undue increase of cost of all building works will be placed to the account of the parties who are the cause of it, and not put down to the credit or discredit of the grasping employer.

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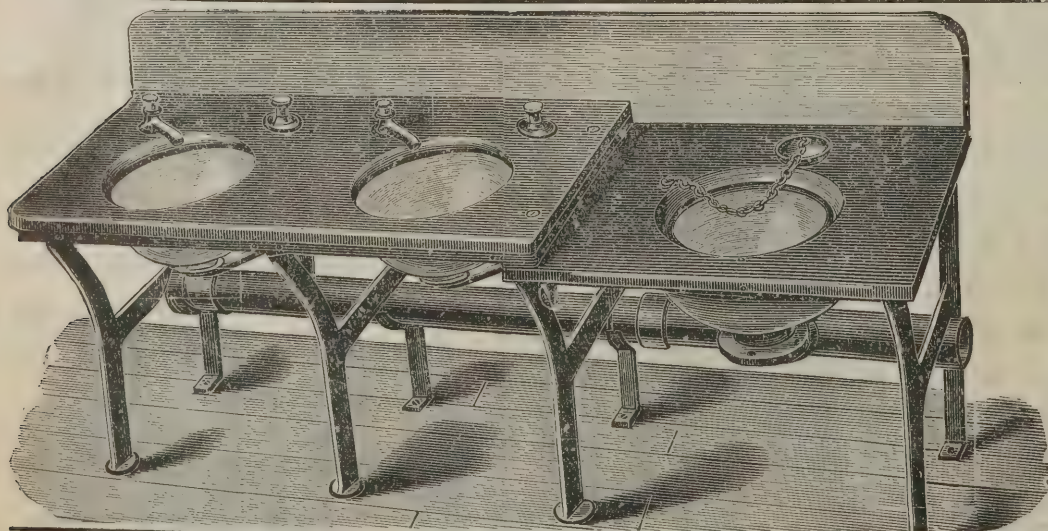
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So far from your correspondent having underrated the case against the workmen I am quite certain it is otherwise, and I am sure the experience of other builders will confirm what I am about to submit, and that is, that on many jobs in London at the present time the bricklayers do not lay 450 bricks per day nor half that number, and I am not now referring to glazed bricks, or any special or expensive kinds of bricks, but ordinary common stocks or like quality.

I do not suggest that this method of fulfilling their obligations is confined to the trades mentioned, but it is general, and the men do credit to their teachers, if not to themselves. It is not many years since they were told openly, either in Trafalgar Square or Hyde Park, at a meeting to consider the question of the number of unemployed and the remedy for it, "You, each of you, do half the work you are doing at the present time, and there will be work for two where there is now only work for one."

It will be asked, What can this have to do with trade unionism? Well, in reply to this question the answer is that such a temporary violation of economic law can only be effected by organisation on the part of the violators; individual effort would be powerless, but the adoption of the sentimental suggestion by the leaders of a powerful organisation renders the trial of the experiment possible.

The foregoing observation applies with equal force to the other illustrations given by your correspondent of the numberless ways in which an employer of labour is molested and interfered with in the conduct of his business, and the absurd contentions put forward as to which and whose particular right and province it is to perform what in many instances are trivial and unimportant operations.

The employers in the present dispute have made enormous sacrifices in contending for the principles that :—

1. Labour is entitled to be paid for at market rates and, in view of the severe competitive "free trade" under which they obtain their orders, at a rate which will enable them to successfully compete with their competitors, and not on any sentimental standard rates which may be adopted or put forward by the men who run trade organisations, and in very many instances could not possibly keep a job where competitive merit came into play or existed. For, after all is said, the question of hours in the present dispute is a question of wages, nine hours' pay for eight hours' work.

2. That the employer is to determine in what way he should conduct his own business and utilise the machinery and

appliances which he has expended his capital on for the purpose.

It is difficult to see how the intervention of third parties can aid the permanent settlement of a question or questions where both sides fully realise and comprehend all the points involved, and where the only solution is the surrender or abandonment of the position which has been taken up.

In this instance the employers at any rate recognise that the intervention of third parties can mean only the unsatisfactory method of "auctioneers' equity," and they are not prepared to crown their eighteen weeks of sacrifice with such a miserable result.

If this conflict results in a demonstration that there are economic laws which, as other natural laws, must be regarded and not violated, however great the sacrifices may be which have been made by both the parties, they will not have been made in vain if the principle is brought home to the minds of others engaged in industrial operations before they enter into a similar conflict.

METROPOLITAN WATER SUPPLY.

ON Tuesday, the 16th inst., at the half-yearly meeting of the West Middlesex Waterworks Company, the chairman, Mr. E. Boulnois, M.P., referred to the proposals of the London County Council concerning the water supply of the Metropolis. He said that at the time of the lamentable outbreak of typhoid fever at Maidstone there were some who endeavoured to create an alarm in the public mind, hinting that there might be an analogy between the water supplied by the London companies and that supplied by the Maidstone Water Company. There was, however, no analogy. London received its water after the most effective system of storage and filtration, and the people of Maidstone received their water, not from the river, as they did in London, but from springs, which were tapped before they reached the river. It was, therefore, simply ridiculous to suggest that there could be any parallel between the supply of water at one place and the other. Notwithstanding this, and the full knowledge of all the circumstances, the Progressive party in the London County Council had endeavoured to unhinge the public mind as to the purity of the water they received from the water companies, and suggested that there was a parallel between the two supplies. In consequence of this they had decided to relegate to one of their committees an investigation into the condition of the water supply. The

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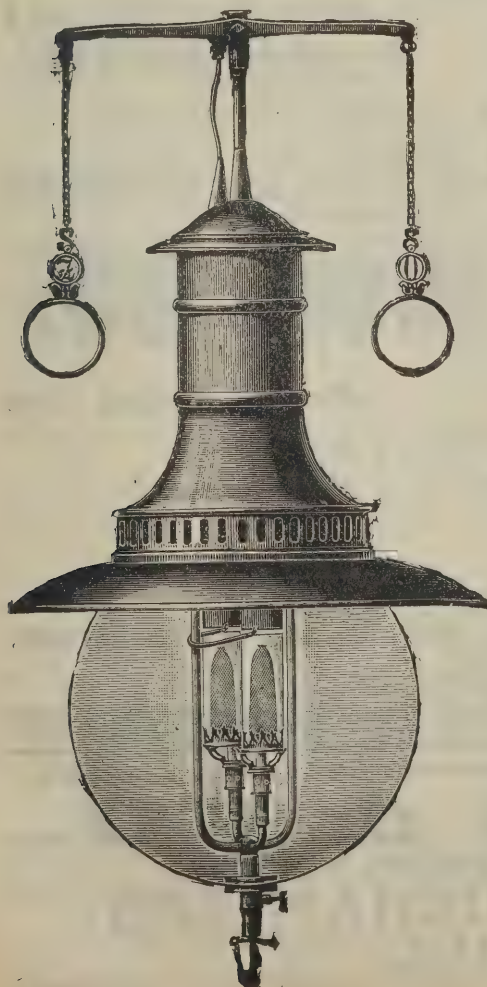
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London companies were getting used to inquiries and investigations; they were pretty well used to Royal Commissions and to other committees, and they generally came out with an enhanced reputation when they left these committees or investigations. If the so-called investigation by the London County Council was likely to be an impartial one he should have no fear whatever, and should unhesitatingly say that they had every reason to be satisfied that an investigation should be made if there was any doubt in the public mind as to the purity of the water supplied by the companies. But they knew perfectly well that the investigation would be a one-sided and not an impartial one. The engineer of the London County Council, Sir Alexander Binnie—who, of course, would be one of their principal witnesses on the investigation—had publicly declared that London water was no better than diluted sewage. Against this very wild assertion they had the testimony of such men as Sir Archibald Geikie, Mr. James Mansergh, Sir William Crookes, Sir E. Frankland, Sir G. Bruce, Professor Dewar, Dr. Ogle, and last, but by no means least, the Council's own late chemist, Mr. Dibdin, who had declared publicly the excellence of the water supply of the London companies. He (the speaker) thought the public would be more inclined to place confidence in the testimony and evidence of experienced men like those he had named than rely on the opinion of Sir Alexander Binnie and Mr. Idris. As a matter of fact, London was the only place where the inhabitants were treated to an inspection and analysis by the Government as regarded their water supply. The examination by the Government inspector took place frequently, and he had to report to the Local Government Board from time to time as to the quality of the water. Moreover, the water companies themselves, so anxious were they that any impurity that might exist in the water should be detected, arranged for an examination by two independent gentlemen—Professor Dewar and Sir William Crookes. The last report of those two gentlemen was dated the 10th inst., and in it they said, "Of the 182 samples examined during the month all were found to be clear, bright and well filtered;" and they went on to say that "the filtration and settling appliances of all the companies have been in a high state of efficiency during the past month. The water of every company has been specially tested for pathogenic organisms, but with negative results." He did not know that they could have any higher testimony than that; and this examination was not a fitful one, but was made every day throughout the month, except, of course, on Sundays. He

thought that the public would rest satisfied in their own minds that there was no analogy between the water supply given at Maidstone and that given in London; and he was sure they would be satisfied that the department of the Government which was responsible for the public health was taking every precaution to insure the purity of the water, and that the companies themselves were not behindhand in the matter. The Royal Commission to which reference was made in the last report, and over which Viscount Llandaff was to preside, would hold their first sitting next Monday, and it was their intention to offer to the commission every facility, and to give all the information in their power, in order to help them to carry on the investigation which Parliament had called upon them to make. During the past six months the directors had endeavoured to safeguard and protect the proprietors' interests, and although, for the moment, there was apparently a lull in the direct attacks which were made upon the water companies, yet they would be none the less watchful and none the less determined in guarding their valuable property. In answer to a question, the chairman stated that, as far as he knew, the London County Council had no intention of applying in the next session of Parliament for power to purchase the water companies' undertakings. It would be the first session in which the companies had been let alone for a considerable time. They had reason to be grateful for the respite, but he could not prophesy whether the County Council would pursue their policy thereafter. It was natural that they should await the result of the investigation which was to be made by the Royal Commission as to whether the purchase of the companies' undertakings would be beneficial to the ratepayers or not.

AN IRISH LUNATIC ASYLUM.

At the last monthly meeting of the Governors of the Omagh District Lunatic Asylum two important communications were read from the Board of Control relative to the unsanitary condition of the institution, which, it was alleged, gave rise to disease amongst the inmates.

The report made by Dr. O'Farrell, Inspector of Lunatics and Commissioner of Control, was to the effect that he had visited the asylum on the 7th and 8th ult., and in consequence of the serious condition of ill-health prevailing among the patients he again visited the institution on the 19th ult.,

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accompanied by his colleague, Dr. Courtney, and Mr. Ussher Roberts, the consulting architect of the Board of Control, and they made a careful inspection of the works in progress. On this occasion they met some of the governors in conference, and also the architect responsible for the carrying out of the works in connection with the alterations and additions to the house. It was impossible for him not to express regret at the slow progress of these structural works, commenced so far back as July 1895, and which when completed, by increasing the accommodation, would relieve the overcrowding and permit of many improvements in the classification and treatment of the patients. It had been stated that the building had been retarded by strikes. Considerable progress had now been made with the remodelling of the drainage, and some of the sanitary annexes were now available for the use of the patients. But greater efforts should, in his opinion, having regard to all the circumstances of the case, have been made to remedy defects in connection with the old system of drainage and sanitary appliances which were to be removed on the completion of the new works; and as the continuance of serious illness called fresh attention to these defects, which the Board of Control and the resident medical superintendent had so often alluded to in the past, the Board of Control had considered it necessary to obtain the opinion of a sanitary engineering expert as to the efficiency of the new drainage works, and how the unsanitary conditions which had proved such a serious danger to the institution could be most promptly dealt with. In fairness to the architect he wished to state that in his opinion the new system of drainage devised by him had been carefully thought out, and was likely to prove in every way successful.

Mr. W. Kaye Parry, C.E., reported also having visited the asylum on several occasions in October. He stated that the existing drainage plans were found to be in many respects incomplete and unreliable, no doubt owing to the very large number of successive alterations. In regard to water in one of the tanks, which was not very clean, the analysis would seem to show that the water was quite unfit for drinking, and it was not a little remarkable that this water supplied the divisions in which by far the largest number of cases occurred, and that water had been condemned by the analyst in the most emphatic terms. In another tank he found the water to be in an exceedingly dirty condition. He was of opinion that the evidence appeared to point to the imperfect and unsuitable arrangements for water storage, and the want of attention to the

cleanliness of the water tanks, as the most probable and immediate causes of the epidemic of typhoid fever which was stated to have occurred, although the defects in the old drains might be regarded as one of the predisposing factors.

The governors regarded the reports as disclosing a very serious state of affairs, and so exhaustive and important that they could not deal with them that day. A committee was appointed to consider the reports, and it was also ordered that they should be printed and circulated among the governors, the recommendations of the committee to be considered at the January meeting.

THE NEW LINE TO LONDON.

THREE years ago, writes a special correspondent of the *Leeds Mercury*, the Countess of Wharnclyffe cut the first sod of the new line to London at Alpha Road, St. John's Wood, which will afford the Great Central Railway Company—until recently known as the Manchester, Sheffield and Lincolnshire Company—-independent access to the Metropolis. The construction of the line was let in six sections, one of the conditions in each case being that the work should be completed in two and a half years. The undertaking has proved a more formidable one than had been anticipated, and although it has been vigorously pushed forward, its completion will probably not be realised until July or August of next year. The endeavours of the directors to fulfil the long-deferred desire of their late chairman, Sir Edward Watkin, "to land the old Sheffield in London," have been remarkable for a persistency scarcely equalled in the annals of railway enterprise in this country. It is nearly ten years since the company made their first independent attempt to extend their line in a southerly direction, from Beighton to Chesterfield, and thus secure a share of the heavy traffic from the rich coalfields in Derbyshire and Nottinghamshire. A Bill with this object was, owing to a misapprehension, thrown out in committee, but subsequently, by dint of dauntless persistency, the company obtained Parliamentary sanction to a scheme embracing the construction of a line from Beighton to Annesley, with running powers from the latter place into Nottingham, for which privilege they were indebted to the Great Northern Company. In 1891 the company promoted a Bill for a line to cover the whole distance between Annesley and Quainton Road, near Aylesbury (Bucks), where it was proposed to effect a junction with the Metropolitan

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line. This Bill was, however, thrown out. The following year the company deposited an amended Bill, and after a prolonged struggle, in the face of strong opposition, the scheme was passed by both Parliamentary committees. The undertaking is the largest of the kind that has been attempted for many years, and marks an epoch of vital importance in the history of the coal trade of South Yorkshire, Notts and Derbyshire. The company will be able to carry a large tonnage direct to London, instead of handing it over to the other companies at Doncaster. In addition, the line will provide a new and independent route from Lancashire and Yorkshire to London, placing Chesterfield, Nottingham, Loughborough, Leicester, Lutterworth, Rugby, and other places on the main trunk line, besides providing railway accommodation for extensive districts at present inadequately served, if served at all. Apart from this extension the company's system consists mainly of a line running from west to east, starting at Southport, Liverpool and Chester, and passing through the thickly populated manufacturing towns of Lancashire and Yorkshire, as well as the Notts, Derbyshire and South Yorkshire coalfields, and the important iron and steel manufacturing centre of Sheffield and district, to such important towns as Grimsby (the largest fishing port in the world, and owned entirely by the company), Hull, and Cleethorpes. In following the action of the other railway companies in extending their line and getting into London, the Great Central Company were animated by the knowledge that out of the gross receipts from the traffic put on their existing system they received only 33·35 per cent., while other lines took 66·64 per cent. Another reason for their action, as Lord Wharnclyffe, the chairman of the directors, pointed out in a speech delivered on the occasion of the sod-cutting ceremony, was that for thirty years no single new line had gone into London, and that London had been increasing at the rate of something like 70,000 people a year. The northern section of the new line extends from Rugby, by way of Leicester, Loughborough, Nottingham, to Annesley, where a junction is effected with the Great Central Company's existing line. Mr. E. Parry, of Nottingham, is the engineer for this portion of the work, Messrs. Logan & Hemingway being the contractors. The southern division—that between Rugby and London—is under the engineering supervision of Sir Douglas Fox and Messrs. Francis & Douglas Fox, of Westminster, and the contractors are Messrs. Oliver & Son and Messrs. Walter Scott & Co. Ninety-one miles from Annesley, along the route of the new line, at

Quinton Road, the Great Central trains will pass on to the Metropolitan Railway Company's system, and travel thereover for a distance of about forty miles, branching off at Finchley Road, and taking an independent course for a little less than three miles, thence to the metropolitan terminus adjoining the Marylebone Road. That portion of the undertaking which lies in London is being carried out by Mr. Firbank, the contractor, under the direction of Mr. E. Wragge, the resident engineer.

Along the section from Annesley to East Leake the contractors have made good progress. Especially is this so in regard to the extensive works which are being executed in the city of Nottingham. For the purposes of the New Central Station a vast amount of property has been demolished, and several of the oldest streets in the borough have thus disappeared. A number of steam navvies have been utilised for some months past excavating on the site of the New Central Station. The Great Northern Company's extension from their present terminus in London Road to the New Central Station, a distance of some 600 yards, is in a forward state. The line runs under a covered way along Thurland Street, emerging at Weekday Cross, the site of the old Town Hall. Thence the metals are carried over a viaduct to the Midland station, which is crossed by means of massive iron girders. The viaduct extends from here to the river Trent, traversing the densely populated Meadows district, the river being spanned by a handsome bridge. From the Trent to the village of Wilford a huge embankment has been constructed, on which the permanent way is laid, and thence to East Leake the line passes through a fairly hilly district. The company have had to erect a large number of artisans' dwellings on the northern side of the Central Station in Nottingham, and others will be built in due course. The goods yards in the Meadows are being speedily formed, and at the Carrington end of the city gasworks are being constructed. Considerable activity prevails at the present time in the neighbourhood of Loughborough. On the site of the town station several hundred men are engaged, whilst at Leicester and Rugby satisfactory progress is being made with the line.

In relation to the southern section of the undertaking, a considerable amount of earthwork has had to be done. At the present time about one-half of the permanent way has been laid. Five lines of metals will run into the passenger terminal station, which is being constructed on an extensive scale. A goods warehouse is being erected, with a floor space of about

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11½ acres. Commodious engine works, a shunting shed, and numerous sidings are in course of construction at Neasden. The damage which it had been feared would be caused to Lord's Cricket Ground by the new line has been averted, and, indeed, the M.C.C. have greatly benefited as a consequence of the undertaking. More than half of the 3,960 yards of the new railway at the metropolitan end lies below the ground. The longest tunnel which is being made within the London area will be 37 chains in length. The establishment of a connection with the East and West Junction Railway at Byfield, and the construction of a branch line from Woodford to Banbury in conjunction with the Great Western Railway, will increase materially the facilities afforded by the new line. The company have had to erect artisans' dwellings to accommodate 3,000 people displaced by the operations of the contractors.

NEW GASWORKS FOR EDINBURGH AND LEITH.

At a special meeting of the Edinburgh and Leith Gas Commission a report was submitted of the works committee with regard to a site for the proposed new gasworks. Since 1888, when the Gas Commissioners took over the undertaking, their administration had been most successful. Everything had gone on smilingly, and they were now brought to the position of requiring to look beyond the capacity of their present works, and consider what the future administration in respect to the supply of gas to Edinburgh and Leith would be. There was immediate necessity of increasing the present storage plant, as it was worked to its utmost capacity. The introduction of the electric light had accelerated rather than decreased the demand for gas, and the experience of Edinburgh in this respect was the same as other large towns in the United Kingdom. The physical conditions rendered an extension of the Edinburgh works impossible, and the structural conditions of the Leith works required immediate and thorough reconstruction; but even though the available land at Leith was used and the works remodelled, the output could not be largely increased there. Their eminent engineer, Mr. Herring, had indicated the necessity of transferring the present works to one centre of operations. This principle had been approved, and it was remitted to the works committee to recommend suitable sites. The committee had had ten sites under consideration, four of which were considered unsuitable owing to the impos-

sibility of getting both systems of railway—viz. the Caledonian and North British—into communication with them. The other six were personally visited, and two of these, Granton West and Fillyside, were considered eminently suitable sites. After further consideration, the Granton site was looked upon as the best in several respects. The land was to the west of Granton Harbour. They had connection with both railway systems, and Leith Harbour would be at their service to compete with the Granton Harbour. These were a combination of circumstances which could not be rivalled. There was a tip for the refuse, which would last for a period of ten years and probably more, and the money value of that represented a considerable sum. There would be no nuisance to the public. The North British Company realised that they would be a good deal out of their way if they were absent from New Street, Edinburgh, in respect that the gasworks trains were shunted in the Waverley Station. Therefore they had promised to continue the present rate charged to Leith and to Edinburgh when they were removed to Granton, although the mileage was somewhat greater. The sub-committee had adjusted all conditions before approaching the price, and they had made very satisfactory terms with the Duke of Buccleuch. Apart from the monetary advantages which would accrue from the railway competition and the carriage by water, the facilities they would have in the export of coke and similar products, it was most satisfactory to confirm the original statement that the saving on production in the new works with modern plant would be sufficient to pay interest and sinking fund charges upon the capital outlay once the works were put into operation. The financial calculations were based on the present quantity of gas manufactured, without taking into consideration any increase whatever. They must be kept in mind that ultimately they had a very valuable asset in the sites of the present undertakings, and he was misinformed as to values if the value of these was not quite equal to the price they were paying for Granton. The purchase price was 124,000*l.* The area of the land to be acquired was 106½ acres, which worked out at a rate of 1,167*l.* per acre. In addition to that, they had power to reclaim from the foreshore something like 4½ acres. There would be a little cost involved there, but they had secured that right, and it would be valuable in many respects. The increase in the capital expenditure since the Commission was formed was 118,121*l.*; 90,476*l.* had been expended on new main pipes, service pipes and meters, leaving only 27,645*l.* of an increase of capital expenditure, pertaining particularly to the works at New Street. At any rate,

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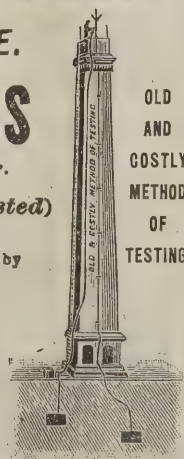
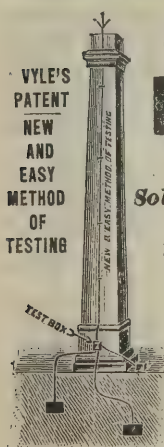
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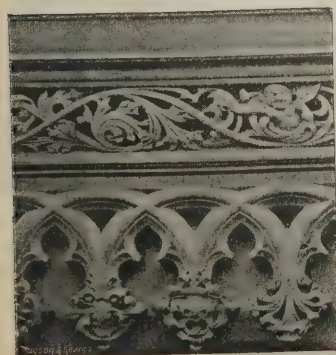
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they had got ten years out of it; and as it would likely be ten years before they could be removed, they would have recovered the value of a good deal of that. They would run down the plant gradually, consistent with working and safety, and they would take as much out of the old works as possible before leaving them.

UNIFORM SAFE LOADS FOR BUILDING FLOORS.*

SOME time ago I received a letter from your secretary requesting me to prepare a paper on the "Uniformity of Safe Loads for Building Floors," which should contain my views on this subject, and as it is one on which I have decided opinions, I am pleased to accept the invitation, and if my paper shall be of any help to you I shall feel fully repaid for my pains.

I may say in the beginning that I believe that our building regulations should be as definite as it is possible to make them, so that the architect can know just how to prepare his plans to comply with the ordinance and obtain a permit, and that those provisions which apply to the strength of the building should be both definite and reasonable. There should be no chance for dispute, in the average building at least, as to the necessary size of beams, girders, columns and piers to meet the legal requirements, neither should these requirements be so unreasonable that it is impracticable to enforce them. It also seems desirable that the requirements for safe loads, &c., be uniform throughout the country. In this respect, more than in any others, the conditions are the same in all localities. Our people live in the same way and weigh practically the same in one city as in another; a bale of merchandise weighs as much in a store in Denver as in Boston, and timber and metal does not lose its strength by being transported from one State to another; hence there is no reason why a floor that is to be used for a given purpose should not have the same strength in Chicago as in New York.

But when we compare our building laws we find that no two have exactly the same requirements. In fact, it has been within a very few years that the matter of floor loads and the strength of materials has been given the consideration in building regulations that their importance demands, and I

* A paper read by Mr. F. E. Kidder before the convention of the International Association of Building Inspectors, held at Detroit, Mich., and published in *Architecture and Building*.

wish to say here that the two subjects cannot well be considered separately, as both must be considered in determining the size of floor beams. The early New York and Boston building laws did, indeed, specify certain minimum floor loads, but as no unit strains were fixed the laws in this respect were inoperative, and my own observation has been that little attention was paid to the requirements. I consider that the present ordinance of the city of Chicago was the first in which the floor loads and unit strains were fixed on a basis where they could be enforced with anything like justice to the owners, and even this law I believe could be improved. The present New York law on these matters is absurd and not in compliance with the practice of our best structural engineers, and the Boston law is far stricter in its requirements for wooden floors than the safety of the building demands.

I believe that the minimum loads for floors should be sufficient to meet any probable or reasonably possible loading, but it is not just to go beyond this, and, as I have said, where the requirements are unreasonable it is very difficult to enforce them.

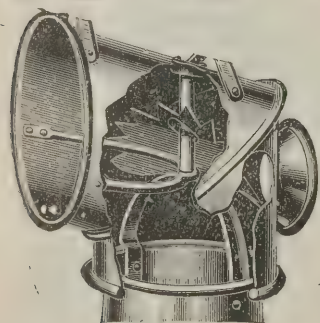
It is rarely, if ever, that the floors of a dwelling, tenement or lodging-house, or the rooms in a hotel, are loaded to more than 20 lbs. per square foot for the entire area, and a minimum load of 40 lbs. per square foot should provide for all possible contingencies, especially as the beams, if proportioned by the unit strains now generally used, would carry twice their calculated loads for a considerable time without falling.

The same floor loads that are fixed for dwellings should obviously be sufficient for floors of sleeping rooms, whether in dwellings, lodging-houses, or hotels; in fact, the purpose for which a building is to be used should determine its construction rather than the name by which it is classified.

The floors of offices are, as a rule, not more heavily loaded than dwellings, but the possibilities for increased loads in the way of safes and heavy furniture, and possibly of a more compact crowd of people, are greater, so that the minimum floor load for offices should be somewhat increased. You, gentlemen, are acquainted, I presume, with the investigations of Messrs. Blackall & Everett, of Boston, in which they found that the average live load in 210 offices, in three prominent office buildings, was between 16 and 17 lbs., while the average load for the ten heaviest offices was 33 lbs. As such loads, however, are not usually evenly distributed, some portions of the floor being generally much more heavily loaded than the others, it would not appear to be safe to use the aver-

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age above determined for determining the strength of floor beams and arches, although it would probably answer for the columns. There seems to be considerable difference of opinion among the leading architects and structural engineers as to just what allowance should be made for office floors. In the Mills building in San Francisco the live loads were assumed at 40 lbs. per square foot for all floors above the first; in the Venetian building, Chicago, the second, third and fourth floors were calculated for 60 lbs. and the upper floors for 35 lbs. live load per square foot, while in the Old Colony and Fort Dearborn buildings in Chicago the live loads on the floor beams were assumed at 70 lbs., in accordance with the building ordinance.

Apparently, however, the provisions of the building ordinance in this respect do not have much effect with the architects of our tall buildings.

The building laws of Boston and New York require a minimum live load of 100 lbs. per square foot, which is obviously excessive. A minimum live load of 60 or 70 lbs. for the floor beams would seem more equitable and perfectly safe, at least for the upper floors, and 80 lbs. for the first and second floors, unless used for stores.

The loads for the floors of schools, churches and theatres have also been very much overestimated in the older building laws, which, for the last two classes of buildings, fixed a minimum live load of 120 lbs.

The average size for a schoolroom is about 28 by 32 feet, and these usually contain seats for fifty-six scholars and the teacher. Assuming the average weight of each scholar at 120 lbs., we have for the average live load, including ten visiting adults and the desks and furniture, 13 lbs. per square foot. Even supposing that the scholars of two rooms were united for some special occasion, we would have but 21 lbs. per square foot, and this is as great a load as it is possible to imagine in such a room, as the fixed desks prevent the crowding together of the scholars except at the sides of the room. From this reasoning therefore a minimum load for the schoolrooms of 50 lbs. per square foot would appear abundant.

As a matter of fact 3 by 14-inch Georgia pine beams, 16 inches on centres and 28 feet span, have been used for schoolroom floors for years, and no practical person would doubt their safety, but such beams, if calculated by the formula for stiffness as herein recommended, would only support a live load of 56 lbs.

The minimum floor-space allotted to a single seat in

theatres is 4 square feet, while the average is about 5 square feet. Assuming the weight of an opera chair at 35 lbs., and of the average adult at 140 lbs. (a liberal allowance), we have an average of 44 lbs. per square foot of floor. A minimum of 80 lbs. would therefore seem to provide for any possible crowding during a panic except in the corridors. It has been shown several times that it is possible to pack able-bodied men so as to produce a load of just 120 lbs. per square foot, and I believe that this should be the minimum for assembly halls, without fixed desks, and also for the corridors of all public buildings. For armouries the minimum load should be increased on account of the vibration produced.

The average floor loads for stores has also been greatly overestimated. Mr. W. L. B. Jenney found that the average load on the floors of the wholesale warehouse of Marshall, Field & Co., in Chicago, was but 50 lbs. per square foot, and very few retail stores will average over 80 lbs. An allowance of 120 lbs. is sufficient for any ordinary retail store, with the possible exception of hardware stores.

Warehouses, on the other hand, may be very heavily loaded, and special provisions should be made for them.

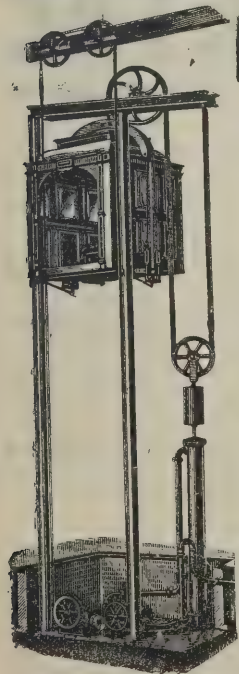
I have now, in a general way, given my opinion on this subject, and I will conclude with a summary drawn up in the shape of a section to a building ordinance, which I believe combines absolute safety with proper allowance for economy. I will further add that I am strongly of the opinion that no city has a moral or legal right to require a greater use of materials than these provisions call for, and if included in a law I believe that they could and should be enforced.

Summary.

"Sec. —. The floors of all buildings shall be designed and constructed in such a manner as to be capable of supporting in all their parts, in addition to the weight of partitions and permanent fixtures and mechanism that may be set upon the same, the following minimum live loads for every square foot of surface of such floors:—

	Lbs.
For dwellings, sleeping and lodging-rooms	40
„ schoolrooms	50
„ offices (upper storeys)	60
„ stables and carriage houses	65
„ banking rooms, churches and theatres	80
„ assembly halls, dancing halls and the corridors of all public buildings, including hotels	120
„ drill-rooms	150

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"Floors constructed for the above loads shall not be used for heavier purposes except upon permit obtained from the building inspector.

"Any floor or portion of floors in any building intended for heavier floor loads or concentrated loads shall be constructed to support the loads for which they are intended."

For the unit strains for the strength of wooden beams and posts, I believe those contained in the Buffalo building ordinance are as nearly perfect, all things considered, as can be laid down.

In some localities, however, other woods are used for framing timbers, and should be included in any standard which your association may choose to adopt. For some of these woods I give the values which would correspond to those fixed for hard pine, white pine and spruce :—

	Posts.	Beams.
Oregon pine	900	180
Texas (hard) pine	850	180
Redwood	625	120

I also believe that the sizes of wooden floor beams for buildings in which the live loads are assumed at less than 80 lbs. should be determined by the formula for stiffness. The draft for a new building ordinance for the city of Denver contains the following section, which I believe is a very important supplement to the usual provisions for the strength of floors :—

Sec. —. All wooden floor beams in buildings of Classes II., III. and IV. shall not have a greater span than that determined by the following formula, and no floor beam over 12 inches in depth shall be less than 2½ inches thick :—

$$L = \sqrt[3]{\frac{8BD^3e}{5WS}}$$

L=maximum span in feet.
 B= breadth of beam in inches.
 D= depth of beam in inches.
 S= spacing of beams from centres in feet.
 W= combined weight of floor and load per square foot.

e = { 125 for Texas pine.
 110 for Oregon pine.
 81 for Colorado or Mexican pine.

This formula will require about the same size of floor beams as the formula for strength up to a span of about twelve times the depth of the beam, but as the proportion of the span to the depth of the beam increases the sizes determined by this formula increase materially.

PATENTS.

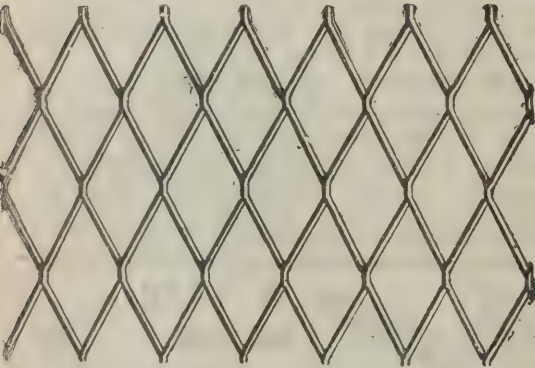
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

- 25252. Richmond & Co., Limited, and Edmond Walter Tyrrell Richmond, for "Improvements in or connected with heating apparatus."
- 25259. Jacob Grossman, for "Improved method of treating sewage."
- 25685. Arthur Kupper, for "Improvements in manufacturing hollow building blocks or artificial stones, and in apparatus employed in their manufacture."
- 25702. Clifford Lax, for "Improvements in strainers for sinks, baths, lavatory basins and the like."
- 25705. Alfred Henry Weston and John Gregory Webb, for "Improved runner appliance for supporting curtains and screens on cornice and like poles."
- 25709. Samuel Cash Shewell and William Richard Clark, for "Improved inlet ventilator for drains and sewer pipes."
- 25780. John William Witter, for "Improved flushing apparatus for urinals, water-closets and the like."
- 25802. John Edwin Place, for "Improved means for connecting sanitary pipes."

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Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

**** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

NEW READING CASE.

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For Advertisement Scale, see page xv.

COMPETITIONS OPEN.

BELPER.—May 1, 1898.—The Belper Urban District Council offer premiums of 50 guineas and 25 guineas for the two best schemes of sewage disposal. Mr. Joseph Pym, Urban District Council Offices, Belper.

BOOTLE.—Dec. 31.—The Corporation invite competitive designs of a central fire station, firemen's dwellings and district police station. Mr. J. A. Crowther, borough engineer, Bootle.

CARDIFF.—Dec. 4.—The Corporation offer premiums of 500*l.*, 300*l.* and 200*l.* respectively for the three best designs for a new town hall, law courts, &c. Mr. W. Harpur, Town Hall, Cardiff.

DORKING.—Dec. 15.—Competitive designs and plan, with descriptive report thereon and approximate estimates, are invited for erection of infirmary upon workhouse grounds. Mr. George Scales, 35 High Street, Dorking.

SOMERSET.—Nov. 30.—The Council invite competitive plans for large hall, with cloakrooms and retiring-rooms over present post office, market house and fire-engine house communicating with the town hall, and for conversion of market house, &c., on ground-floor. Premiums of 25*l.*, 15*l.* and 10*l.* will be awarded. Mr. Regd. L. Foster, town clerk, 1 Cathedral Green, Wells.

CONTRACTS OPEN.

ABERYSTWITH.—Dec. 4.—For completion of the building of the chancel and vestries of the Holy Trinity Church. Rev. Prebendary Williams, Abergeldie House.

ASTLEY.—For erection of a small house. Mr. John R. Withers, architect, Shrewsbury.

BARROW-IN-FURNESS.—Dec. 4.—For erection of stores in Hindpool Road. Mr. John Butler, architect, Cornwallis Street, Barrow-in-Furness.

BELFAST.—For erection of three terrace houses at Whitehead. Mr. Henry T. Fulton, architect, 91 Donegall Street, Belfast.

BLACKPOOL.—For erection of four large detached houses in Lytham Road. Messrs. Goldsmith & Son, architects, 63 Faulkner Street, Manchester.

BODMIN.—For erection of isolation hospital on grounds of county asylum. Mr. Silvanus Trevail, architect, Truro.

BRADFORD.—For plastering seven houses at Undercliffe. Messrs. Wm. Totty & Sons, Undercliffe.

BRAEMAR.—Nov. 30.—For additions and alterations to Fife Arms Hotel. Mr. A. Marshall Mackenzie, architect, 1 Bon Accord Street, Aberdeen.

BRIDLINGTON QUAY.—Nov. 30.—For erection of dwelling-house, conservatory and premises. Mr. J. Earnshaw, architect, Bridlington Quay.

BRISTOL.—Nov. 29.—For erection of a pupil teachers' centre in Broad Weir. Messrs. La Trobe & Weston, architects, 20 Clare Street, Bristol.

CASTLEFORD.—For erection of Victoria Hotel, Allerton Bywater. Mr. Arthur Hartley, architect and surveyor, Carlton Chambers, Castleford.

CHRISTCHURCH.—Dec. 4.—For erection of lying-in ward and addition to infirmary at workhouse, Fairmile. Mr. E. H. Burton, architect, Bournemouth.

CLAYTON.—Dec. 8.—For erection of eleven terrace houses at Chrisarben Park. Mr. Sam Spencer, architect, &c., 344 Great Horton Road, Great Horton.

COUPAR ANGUS.—Dec. 4.—For farmhouse at West Haugh Farm. Mr. Reid, architect, Cupar Angus.

CUMBERLAND.—For heightening and repairing wall near post office, Lazonby. Mr. James, Silloth.

DARTFORD.—Dec. 1.—For erection of the brick retaining wall on East Hill, from nearly opposite Great Queen Street to the entrance to East Hill House; also the laying of Guernsey granite channelling from Darenth Road to a point opposite St. Albans Road. Mr. W. Harston, surveyor, High Street, Dartford.

DEAL.—Nov. 29.—For construction of an underground convenience near the South Parade. Mr. Thos. C. Golder, surveyor, 16 High Street, Deal.

DUBLIN.—Nov. 29.—For alterations at Aldborough House. Mr. H. Williams, secretary, Office of Public Works, Dublin.

ENFIELD.—Dec. 2.—For erection of a junior mixed department at Chesterfield Road school, Enfield Lock. Mr. G. E. T. Laurence, architect, 181 Queen Victoria Street, London, E.C.

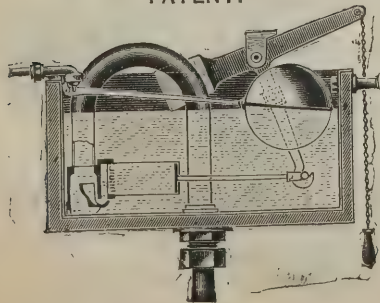
ESSEX.—For addition to The Cedars, Great Horkesley. Mr. Chas. E. Butcher, architect and surveyor, 3 Queen Street, Colchester.

FALKIRK.—Nov. 29.—For erection of additional cells at Falkirk County Buildings. Messrs. A. & W. Black, architects, Falkirk.

GLASGOW.—Nov. 30.—For erection of three tenements at the corner of Gallowgate and Bain Square. Mr. J. D. Marwick, town clerk, City Chambers, Glasgow.

ARCHITECTS PLEASE NOTE.

PATENT.



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GRANGEMOUTH.—Dec. 11.—For erection of two blocks of dwelling-houses, containing twelve and four houses respectively, in Marshall Street. Mr. G. Deas Page, architect, Old Glebe Chambers, Falkirk.

GREAT YARMOUTH.—Dec. 8.—For additions to the isolation hospital. Mr. J. W. Cockrill, borough surveyor, Town Hall, Great Yarmouth.

HADLEIGH.—For erection of two villas in Hadleigh. Mr. A. Morling, Hadleigh.

HALIFAX.—Dec. 9.—For erection of police station, court-house, stables and coachhouse and appurtenances thereto. Messrs. George Buckley & Son, architects, Tower Chambers, Halifax.

HAMPTON-ON-THAMES.—Dec. 4.—For erection of semi-detached villas. Mr. Fredk. G. Hughes, architect, Hampton-on-Thames.

HARROGATE.—For alterations and additions to the George Hotel. Mr. Arthur G. Gibson, architect, 8 Cambridge Crescent, Harrogate.

HARROGATE.—Nov. 29.—For erection of sanitary accommodation near the Bogs Field. Mr. Samuel Stead, borough surveyor, Municipal Offices, Harrogate.

KENDAL.—Dec. 1.—For remodelling the White Hart Hotel, &c. Mr. Stephen Shaw, architect, Kendal.

KILKENNY.—Dec. 9.—For erecting forty houses and repairing twenty-four houses. Mr. William K. Cleere, executive sanitary officer, Kilkenny.

LAUNCESTON.—Dec. 1.—For erection of a caretaker's cottage, wall, gates, &c., at the sewage-disposal works. Mr. A. J. P. Cotterell, engineer, Baldwin Street, Bristol.

LIVERPOOL.—Nov. 29.—For erection of St. Faith's Church (to seat over 900), Crosby, near Liverpool. Messrs. Grayson & Ould, architects, 31 James Street, Liverpool.

LLANDUDNO.—Dec. 6.—For erection of municipal buildings in Lloyd Street, Llandudno. Messrs. Silcock & Reay, architects, Octagon Chambers, Milsom Street, Bath.

LONDONDERRY.—Nov. 30.—For erection of three houses on Northland Road. Mr. Wm. Barker, architect, 3 Richmond Street, Londonderry.

LONDONDERRY.—Nov. 30.—For erection of six dwelling-houses in Benvarden Avenue and Upper Violet Street. Mr. Wm. Barker, architect, Richmond Street, Londonderry.

LOSSIEMOUTH.—Dec. 4.—For erection of a villa at Stotfield Mr. R. B. Pratt, County Bank House, Elgin.

NEATH.—Dec. 8.—For erection of schools at Herbert Road, Melincrythan, near Neath. Mr. J. Cook Rees, architect, St. Thomas Chambers, Church Place, Neath.

NEWQUAY.—Dec. 9.—For erection of a villa on the Tolcarne Building Estate. Mr. William Square, architect, Tavistock.

PLYMOUTH.—Dec. 2.—For erection of electricity works at Prince Rock. Mr. James Paton, engineer and surveyor, Municipal Offices, Plymouth.

PLYMOUTH.—Dec. 2.—For construction of six underground transformer chambers in various parts of the borough, in connection with the electricity works of the Corporation. Mr. John H. Rider, borough electrical engineer, East Street, Plymouth.

PONTEFRAC.—Dec. 4.—For erection of an infectious disease hospital. Messrs. Tennant & Bagley, architects, Pontefract.

REDDISH.—Dec. 6.—For erection of goods warehouse and extension of platforms at station. Mr. Oliver S. Holt, secretary, S. & M. Railway, London Road station, Manchester.

ROWLEY REGIS.—Dec. 6.—For erection of additional accommodation for infants at Blackheath Board school and alteration to the girls' and infants' department there. Mr. J. T. Meredith, architect, Kidderminster.

SCOTLAND.—Nov. 30.—For erection of a post office at Forfar, for the Commissioners of H.M. Works and Public Buildings. Mr. George Morham, 39 George Street, Edinburgh.

SCOTLAND.—Dec. 4.—For erection of writing chambers in Baron Street, Buckie. Mr. James Perry, architect, 44 East Church Street, Buckie.

SHEFFIELD.—For plastering sixty houses at Attercliffe. Foreman, W. Frobisher, Shirland Lane, Attercliffe.

SHIBDEN.—Dec. 6.—For erection of a semi-detached house in Kell Lane. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

STROUD.—Dec. 6.—For building a Board school, with work incidental thereto, at Rodborough. Mr. W. H. C. Fisher, architect, 6 Rowcroft, Stroud.

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SHEFFIELD.—Dec. 4.—For construction of a concrete retaining wall (brick faced), also pits for engine, breaker, &c., in connection with new coal sidings at their Grimesthorpe station, for the Sheffield United Gaslight Company. Mr. Hanbury Thomas, Commercial Street, Sheffield.

SWINTON.—Dec. 1.—For erection of a cottage home. Mr. A. Murgatroyd, architect, 23 Strutt Street, Manchester.

THANET.—Dec. 1.—For erection of a wall and entrance gates on the south side of the new burial-ground at Hereson. Messrs. Langham & Cole, 70 High Street, Ramsgate.

TIPPERARY.—Dec. 13.—For alterations and repairs to St. Johnstown's Castle. Mr. E. A. Hackett, architect and civil engineer, Clonmel.

ULVERSTON.—For re erection of part of the Furness Paper Mills destroyed by fire. Messrs. Settle & Farmer, architects, Ulverston.

ULVERSTON.—Nov. 30.—For erection of stabling, carriage-house, covered yard, &c., to the County Hotel. Messrs. J. W. Grundy & Son, architects, Victoria Buildings, Ulverston.

WALSALL.—Dec. 3.—For erection of two blocks of three almshouses each at Aldridge. The Rectory, Aldridge.

WINCHMORE HILL.—Dec. 8.—For erection of a nurses' home and an isolation pavilion at the Northern Hospital. Messrs. Pennington & Son, architects, Hastings House, Norfolk Street, W.C.

WOKING.—Dec. 7.—For erection of public offices near station, for the Woking Urban District Council. Mr. G. J. Wooldridge, surveyor, Bank Chambers, Woking.

WOLVERHAMPTON.—For pulling-down old buildings in Canal Street. Mr. Fred T. Beck, architect, Darlington Street, Wolverhampton.

A NEW ballet is in active preparation at the Alhambra for production at Christmas. It is on the good old subject of "Beauty and the Beast," and is expected to establish a new record for gorgeousness of scenery and costume. Signor Edgar Rossi has been especially engaged for a leading part, and Mlle. Cecilia Cerri, who achieved well-deserved popularity here a year or two since, has also been allotted a prominent rôle.

TENDERS.

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H. Archbold	31	2	6

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G. Martin	178	0	2
A. Waiting*	155	4	3
Surveyor's estimate	173	8	6

* Accepted subject to due confirmation of Council.

BRADFORD.

For erection of a terrace of six houses at Undercliffe. Messrs. EMPSALL & CLARKSON, architects, 7 The Exchange, Bradford.

Accepted tenders.

T. Robinson, mason and bricklayer.
Spencer & Briggs, carpenter and joiner.
Willes & Ross, plumber and glazier.
A. Taylor, plasterer and concreter.
W. Thornton, slater.
T. H. Hewitt, painter and decorator.

BRAINTREE.

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J. Jackson	£320	0	0
Glenny	262	0	0
Double	256	10	0
Grounds & Newton	210	0	0
Brewer	186	10	0
Surveyor's estimate	191	10	0

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W. Brown & Son	£2,614	0	0
J. Longley & Co.	2,582	0	0
C. E. Kemp	2,481	0	0
P. Peters & Son	2,350	0	0
W. Field & Co.	2,336	0	0
G. R. Lockyer	2,252	15	0
Sattin & Evershed	2,238	0	0

BROMLEY.

For rebuilding house, High Street. Messrs. FOULSHAM & HERBERT RICHES, joint architects, 3 Crooked Lane, King William Street, E.C., and Bromley-by-Bow, E.

J. T. Robey	£724	0	0
S. Salt	705	0	0
J. C. Edmunds	682	0	0
Howlett & Son	665	0	0
A. J. Sheffield	650	0	0
T. OSBORN & SONS (accepted)	598	0	0

CARDIFF.

For erecting villa residence and stabling at Rumney. Mr. S. ROONEY, architect, 9 Quay Street, Cardiff.

Evans & Owen	£1,528	19	6
Cadwallader & Hockridge	1,525	0	0
S. Lewis	1,510	0	0
J. T. Hampson & Co.	1,500	14	0
Knox & Wells	1,450	0	0
W. H. Ingleson	1,335	10	0
S. Davies	1,290	0	0
Hanford & Elsworthy	1,240	0	0
R. COX & BARDO, Cardiff (accepted)	1,215	0	0
T. H. Venning	1,180	0	0
Powell & Mansfield	1,170	0	0

CERNE ABBAS (DORSET).

For sanitary works at the police station.

Rendell & Co.	£129	15	0
Barrett & Son	110	8	0
A. Atkins	109	17	0
W. J. Mitchell	105	15	6
A. B. HARVEY, Charminster, Dorset (accepted)	93	17	8

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For new fittings, &c., to shops, High Street. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, London, E.C.

Hall Bros.	£347	0	0
Calnan & Co.	285	0	0
Spreckley & Co.	275	0	0
W. PECK & Co. (accepted)	232	0	0

DEVONPORT.

For constructing sewers for the diversion of drainage from the Raglan Barracks. Mr. JOHN F. BURNS, surveyor.

J. Shaddock	£2,027	0	0
T. Lang & Sons	1,825	0	0
H. E. Skinner	1,735	0	0
C. L. Duke	1,590	0	0
A. Thomas	1,472	0	0
T. SHADDOCK, Plymouth (accepted)	1,445	0	0

DURHAM.

For construction of 222 lineal yards of 6-inch pipe sewer, with manhole, lamphole, flushing shaft, &c., and a small settling tank, with filter-beds and fence around the same, at Wooley Colliery. Mr. GEORGE GREGSON, surveyor, 43 Western Hill, Durham.

J. Manners	£102	0	10
G. T. Manners	88	0	0
J. Carrick	79	4	5
R. Snowdon, jun.	69	16	8
R. OLIVER, Durham (accepted)	65	0	0

FALMOUTH.

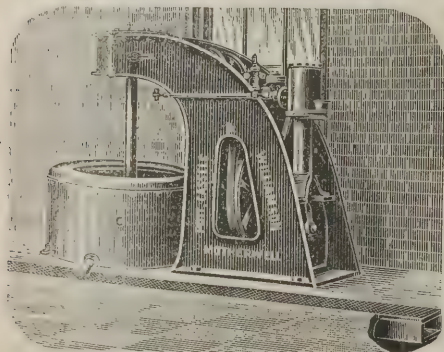
For erection of a new infirmary at the workhouse.

S. Trehane	£2,400	0	0
T. RICHARDS, Penrhyn (accepted)	1,980	0	0

HACKNEY.

For part rebuilding and alterations to the Sebright Arms public-house. Messrs. FOULSHAM & HERBERT RICHES, joint architects, 3 Crooked Lane, King William Street, E.C., and Bromley-by-Bow, E.

F. & F. J. Wood	£1,460	0	0
S. R. Lamble	1,453	0	0
J. Anley	1,434	0	0
G. E. Todd & Co.	1,367	0	0
G. A. MARKHAM & SON (accepted)	1,171	0	0
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W. Griffiths 1,550 0 0
T. Adams 1,419 0 0
G. BELL, Tottenham (*accepted*) 1,266 0 0

HULL.

For erection of shop and dwelling-house in Hessle Road. Mr. E. WHITLOCK, architect, 26 Scale Lane, Hull.

Accepted tenders.

J. R. Woods, bricklayer and plasterer £266 11 0
Maltby & Lison, joiner 240 0 0
Allon, plumber 81 18 0
Sweeting, mason 31 7 6
Smith & Hunter, slater 30 10 0
Collier & Hohenrein, painter 20 5 0

ILFORD.

For pulling down and rebuilding front portion and for bar fittings, &c., at the Rose and Crown. Messrs. FOULSHAM & HERBERT RICHES, joint architects, 3 Crooked Lane, King William Street, E.C., and Bromley-by-Bow, E.

T. E. Mitchell £3,133 0 0
W. Shurmur 2,930 0 0
J. & H. Cocks 2,923 0 0
W. WATSON (*accepted*) 2,870 0 0

ISLINGTON.

For new shop front to shop, Chapel Street. Mr. HERBERT RICHES, 3 Crooked Lane, King William Street, London, E.C.

G. Lyford £281 0 0
Spreckley & Co. 216 0 0
W. PECK & CO. (*accepted*) 177 0 0

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For supplying and erecting an oil-engine and pump in connection with the Kildare Waterworks. Mr. F. BERGIN, engineer, Kildare.

KENNAN & SON, Fishamble Street, Dublin (*accepted*) £119 17 6

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Snwin Bros. & Co. 2,790 0 0
G. Barker 2,755 0 0
Johnson & Co. 2,675 0 0
W. SHURMUR (*accepted*) 2,484 0 0

OSSETT.

For erection of a shop and warehouse for the Co-operative Society. Messrs. JOHN KIRK & SONS, architects, Dewsbury.

Accepted tenders.

R. Tolson & Sons, mason and bricklayer.
Horsnell & Heald, carpenter and joiner.
J. Shepley, plumber and glazier.
W. R. Thompson, slater.
H. Sanderson, plasterer.
C. A. Kershaw & Son, painter.
J. Moss & Sons, ironfounder.

PLYMOUTH.

For erection of the poultry, fruit, vegetable and fish market, &c. Messrs. KING & LISTER, architects, 8 Princess Square, Plymouth.

J. Finch £12,939 0 0
A. W. Coles 11,932 0 0
Matcham & Co. 11,410 0 0
J. Goad & Son 11,149 0 0
P. Blowey 11,063 0 0
A. R. Lethbridge & Son 10,549 0 0
W. TREVENA, Batley House Building Yard, Plymouth (*accepted*) 10,289 0 0

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For erection of a vestry, with furnace-room under, at St. John's Church. Messrs. LEE & PAIN, architects, 63 Lincoln's Inn Fields, W.C.

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Greenfield	372 0 0
Christmas	349 10 6
H. G. Nesmyth	340 0 0
R. J. HUNT, Chertsey (accepted)	330 0 0
Architect's estimate	325 0 0

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For supply of 300 cast-iron sink boxes, with perforated hinged covers. Mr. R. P. HIRST, borough surveyor.

J. Ball & Co.	£47 10 0
J. Robinson	45 0 0
Sheepbridge Coal and Iron Co.	43 0 0
G. Harvey & Co.	40 0 0
T. Howden & Sons	36 11 0
Douglas Forge Company	36 10 0
Newton, Chambers & Co.	32 10 0
Griffiths & Co.	31 13 0
Foster Bros. & Co.	30 0 0
Exors. of D. Clarke	30 0 0
T. Ashworth	29 0 6
T. Burnett	26 17 6
J. Needham	25 10 0
T. WINTER & Co., Blackburn (accepted)	23 10 0

For supply and delivery at the highway yard, Southport, of 500 cast-iron circular sink boxes, 8½ inches diameter, with loose perforated lids and inside pipe. Mr. RICHD. P. HIRST, borough surveyor.

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J. Robinson	45 0 0
G. Harvey & Co.	43 0 0
Sheepbridge Coal and Iron Company	43 0 0
Griffiths & Co.	39 7 0
T. Howden & Son, Union Foundry	37 19 0
Foster Bros. & Co.	37 10 0
Exors. of D. Clarke	30 0 0
T. Winter & Co.	30 0 0
T. Burnett	29 0 0
J. NEEDHAM, Millgate Foundry, Stockport (accepted)	26 15 9

SOUTHPORT—continued.

For delivery on trucks at Southport of 100 cast-iron hinged gully grids and frames. Mr. R. P. HIRST, borough surveyor.

Sheepbridge Coal and Iron Company	£88 0 0
Newton, Chambers & Co.	74 10 0
T. Burnett	63 15 0
Douglas Forge Company	60 0 0
H. J. E. Treharne	58 15 0
Griffiths & Co.	58 12 1
G. Harvey & Co.	58 0 0
Foster Bros. & Co.	55 16 4
T. Howden & Son	55 15 8
J. Robinson	55 0 0
T. Ashworth	50 9 5
J. Needham	47 16 3
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J. Ball & Co.	45 0 0
A. Balmforth	40 0 0
T. Winter & Co.	40 0 0
W. HALSTEAD & SON, Rochdale (accepted)	38 0 0

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For repairs to the Prince of Wales. Messrs. FOULSHAM & HERBERT RICHES, joint architects, 3 Crooked Lane, King William Street, E.C., and Bromley-by-Bow, E.

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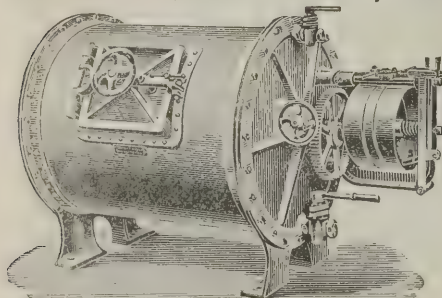
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Merryweather & Co.	144 10 0
Barton & Co.	124 7 6
PORTWAY & Co., Sudbury (accepted)	115 0 0

THORNE.

For renovation of Wesleyan chapel. Mr. J. WILLS, architect, Derby.

H. Kelsey & Son	£995 0 0
Thompson & Shearsmith	975 0 0
Sprakes & Sons	950 0 0
W. Barton & W. H. Smith	869 10 0
W. Featherston	860 0 0
Myers & J. Smith	856 0 0
D. GILL & SON, Doncaster (accepted)	828 0 0
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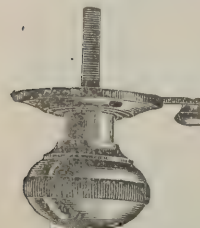
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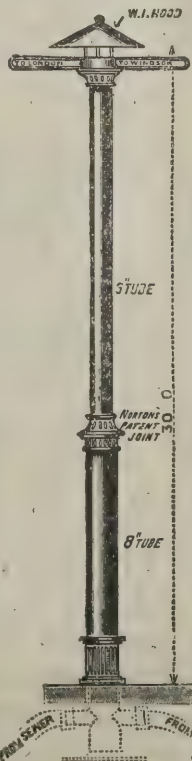
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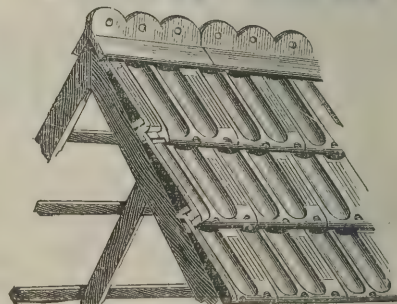
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R. Hopkinson	8,024	0	0
J. Keighley	7,777	14	9
R. W. Ibbotson	7,016	0	0
J. Holmes	7,000	0	0
J. Akeroyd & Son	6,860	0	0
E. Kellett	6,858	0	0
J. Slinger & Sons	6,700	0	0
M. Hall & Sons	6,685	0	0
W. Brigg	6,450	0	0
F. ROBINSON, Thornton (accepted)	5,850	0	0

WREXHAM.

For erection of latrines at the boys' school. Messrs. J. MORISON & SON, architects, 10 King Street, Wrexham.

B. Owen	£157	0	0
W. Owen	156	0	0
Davies Bros.	143	16	0
TURNER BROS. (accepted)	138	0	0

VARIETIES.

THE Methodist New Connexion's new hall, at the corner of Camden Street, Newcastle, adjoining the Salem Chapel, was opened on the 17th inst.

SOME alarm has been aroused amongst the residents in the vicinity of St. Thomas's Church and Bridge Street, Batley, owing to what is considered to be unmistakable evidence that a gradual subsidence is taking place.

THE Surveyors' Institution have decided upon a new departure. They have adopted the idea of holding country meetings, and the first of such gatherings is to be held in Manchester next April.

THE London and India Docks joint committee have decided not only to considerably increase their warehousing accommodation at the Royal Victoria Dock for frozen produce, but also to give special facilities for the discharge of the meat direct from the refrigerating chambers of the steamers to the cold-air stores on the dock quay, thus obviating any injury to the meat from exposure, as at present, during the discharge of the ship.

It has been decided to put new roofs on the nave and north and south aisles of Wolvey (near Nuneaton) parish church, at a cost of about 600*l*. The old church dates back to the days of Edward the Confessor. The oldest part of the present building which can be verified is the south doorway of 1150, and there are several other Saxon remains to be found in the structure.

THE new Sunday-school built by the Primitive Methodists of Wortley was recently opened. The school, which has been erected at a cost of about 1,000*l*., is a plain structure, consisting of central hall, three classrooms, kitchens, heating apparatus and conveniences. The architect was Mr. Thomas Howdill, of Albion Street, Leeds.

A MEMORIAL-STONE will shortly be placed at Sandal, near Wakefield, to mark the exact spot where it is said that Richard, Duke of York, fell at the Battle of Wakefield during the Wars of the Roses. The inscription is as follows:—"Richard Plantagenet, Duke of York, fell on this spot in the Battle of Wakefield, December 30, 1460. This stone is erected in 1897 by some who wish to preserve the traditional site."

A NUMBER of large Gothic villa residences are in course of erection in the Woodbourne Road, Edgbaston, Birmingham, on the building estate of the Right Hon. Lord Calthorpe. The contractor is Mr. Edward Airey, of Gillott Road, Birmingham. At the village of Knowle, about 9 miles from Birmingham, a number of old cottages belonging to Mr. Samuel Scoltock, having a frontage of about 70 feet, have been entirely remodelled. The whole of the internal portion has been "guttered," the building raised several feet, and the front elevation, Gothic in style, brought up to date by the insertion of bay and two-light windows, porch, shop front, ornamental cornice, chimney-caps, moulded barge-boards, &c. The facing and ornamental bricks were supplied by Mr. Loughton, of Garrison Lane; the grates, chimneypieces, &c., by Councillor Smith, of Smethwick; and the ornamental woodwork by

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Messrs. Parker, the well-known joinery manufacturers, of Conybere Street, Birmingham. The contractor was Mr. S. Needle, of Knowle; and the architect Mr. J. Statham Davis, of Sparkbrook, Birmingham.

A TERRIBLE fatality recently occurred at Trevvado Viaduct, on the Cornwall Railway, between Liskeard and Menheniot. A new five-arch viaduct of granite is being built to take the place of the present wooden structure, and wooden ribs were being fixed upon which the brickwork of the arch would afterwards rest. It was while one of the ribs of the fourth arch was being placed in position that the guy rope—a 4-inch Manila cable—by which it was being steadied snapped, precipitating William Cotton and Richard Toms to the ground, nearly 80 feet. Cotton, who is sixteen years of age, was killed instantly. Toms, an ex-naval seaman, aged thirty-two, residing with his sister at Menheniot, was alive and conscious, although his left thigh was broken in several places and he had sustained severe internal injuries, but he died almost immediately. Trevvado Viaduct is only one mile from Coldrenick, the scene of the terrible accident last February, when twelve men were killed.

A MEETING of the sub-committee of the Glasgow Corporation parks committee has been held to consider an outline of the scheme proposed for the sculpture and carved work of the new Art Galleries. The following chief carvers were recommended:—North façade, William Shireffs, 287 West Campbell Street; south façade, J. C. Young, 197 Dumbarton Road; east and west façades, William Vickers, 221 West Regent Street; bronze figures on towers and north porch, A. M.F. Shannon, 7 Scott Street, Garnethill; central hall, R. A. M'Gilvray & Ferris, 129 West Regent Street; and east and west courts, James M. Sheriff, 20 Canning Place. It is estimated that the work will cost 15,644l. There is a provisional sum of 5,000l. included in existing contracts which is available towards the proposed expenditure. The sub-committee adjourned consideration of the scheme in order that more information might be laid before them as to the cost of the sculpture work.

The additions which it was found necessary to make at Ibrox United Presbyterian church have been completed, and the church has again been opened for public worship. Accommodation is now provided for about 250 additional sittings. This has been secured by the erection of transepts to the east and west sides of the church, and of a large chancel to the north, in which are placed the choir seats, and a double-manual organ supplied with hydraulic power. The organ has

been presented to the congregation by Mr. Thomas Mason, D.L. The transepts are divided from the nave of the church by Early English Gothic arches, elaborately moulded, and three-light windows filled in with Flamboyant tracery, and glazed with cathedral-tinted glass of antique design. The roofs are treated with hammer-beam couples, and the spandrels and apex are filled in with carved tracery of ornate design. The chancel is divided from the nave by a richly-moulded arch springing from clustered columns, having moulded bases and capitals resting on carved brackets. A handsome octagonal pulpit of wainscot oak has been placed on the east side of the chancel, having carved panels and string-course and buttresses resting on a corbelled pedestal with fret rail of wainscot oak. In front of the organ are choir seats, having ornate carved and moulded ends, with pillars and bases richly moulded in wainscot oak. There has also been added a new communion table and chair and a baptismal font, all in wainscot oak. The extension has greatly improved the appearance of the building both externally and internally, as well as the acoustics, heating and ventilation. Altogether the church is now more in keeping with modern ideas. The hall accommodation under the church has also been enlarged. Suites of rooms and cloak-rooms have been provided, and the heating and ventilation rearranged. All this will give greater facility for the working of the various undertakings in which the congregation is engaged. The whole work has been carried out from plans prepared by Messrs. Bruce & Hay, architects, West George Street.

THE new St. John's Roman Catholic church, which has been erected in Portugal Street, South Side, Glasgow, was opened on Sunday last. The new church, which takes the place of an old and well-known edifice, is a plain but substantial and rather handsome building. It is in the Early Decorated style, is built of Giffnock stone, and consists of chancel, side chapels, nave, aisles, sacristies, &c. The nave is divided into six bays. There is a four-light traceried window in each bay of the clerestory, which is carried by an arcading dividing nave from the aisle, each bay of which is pierced with two two-light windows. The west wall of the nave (the gable of which is pierced with a fine rose window) is supported on three arches opening into choir and organ chamber, which is approached from the porch by a stone staircase. The internal length of the church is 148 feet and the total width is 64 feet. The nave is 28 feet wide and the height to apex of roof is 60 feet. The altar, with superaltar and tabernacle, are of Caen stone. The canopy is of wood gilt. Curtains are suspended from richly-

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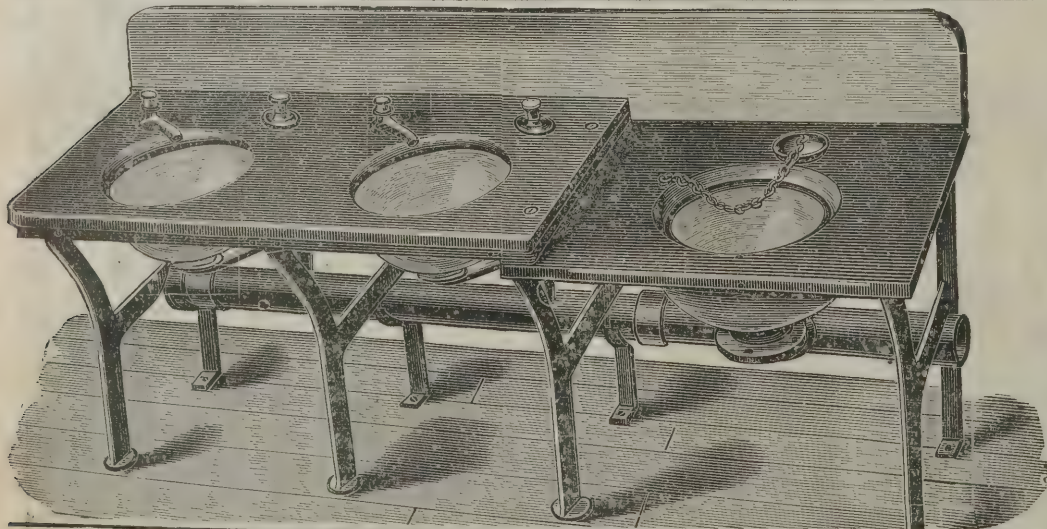
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wrought metal-work starting on each side of the canopy and continuing the whole length of the altar. The whole has been designed and carried out under the direction of the architects, Messrs. Pugin & Pugin, of London.

WHEN in South Staffordshire the other day we had occasion to visit the well-known brickworks and sand quarry adjoining the Birmingham Canal at Morley, near Wednesbury, for many years carried on by the late Mr. Thomas Bromley, and since by Mr. W. R. Price. We were at once struck with the great improvements that have recently taken place. Here is to be found a wonderful supply of all sorts of sand, including the noted fine loam sand used by brass-casters and malleable iron-founders. Above this sand lies a rich clay, from which a good common red brick is made, and it is in this department where the present owner has developed the undertaking. A new machine supplied by Mr. Cox, of West Bromwich, capable of turning out 100,000 a week, and driven by a powerful engine, has been laid down, and, together with drying stoves and four large modern kilns, is producing a much improved and sound brick. As a convenience for catering with local builders there is the advantage of lime being burnt on the spot. It is contemplated turning out a pressed facing brick, and from what we saw of the raw material and appliances at hand we feel sure a good brick will be forthcoming. Mr. R. J. Price is the owner of some fifteen acres of contiguous land, and we trust that the enterprising spirit shown by him since taking on the business of his father, Mr. W. R. Price, whose death occurred twelve months ago, and in whose name he trades, will prove successful and be a source of remuneration for many years to come.

THE large and handsome new club premises in connection with the Skipton Liberal Association are now completed, and were informally opened on Monday evening. The total cost of the premises will amount to nearly 5,000/. The building fronts to Keighley Road and Sackville Street. On the ground floor there are six large lock-up shops, near the centre of which is the main entrance to the club, above these being a wide staircase and corridors leading to all the rooms. On the first floor there are smoke-room, reading-room and library, and the two former are connected by sliding doors, so that they can be made into one room to seat at least 150 people. There are three other rooms on the same floor, besides bath-rooms, &c. On the second floor there are two recreation-rooms and curator's private room. On this floor there is a very large billiard-room, 52 feet by 32 feet 6 inches, containing three full-sized tables.

Adjoining this is a private billiard-room. The top floor also contains the curator's living rooms. The heating is done from a cellar under the staircase. The whole arrangements are elaborate and up to date, and are admirably adapted to the requirements of the Liberals in the town and district. Mr. James Ledingham, of Bradford, was the architect.

THE Elland Sewage Works were, on the 13th inst., publicly opened by the chairman of the Council, Mr. Mackrill, who gave a brief history and description of the scheme. The works consist of outfall and other sewers, settling tanks holding 600,000 gallons, with the buildings and necessary machinery and 12 acres of gravelly land laid out for filtration. Many difficulties had to be overcome, including cast-iron pipe sewer across the canal and the river Calder and also along the river bed. The scheme provides for the treatment of a present flow of 600,000 gallons of sewage and trade refuse from woolleh mills and dye-works, &c. The works were designed and carried out under Mr. Malcolm Paterson, M.Inst.C.E., at a cost of about 13,500/., exclusive of land, the contractors being Messrs. A. Graham & Sons, sewers and tanks, Wm. Foster, land filtration works, and Jno. Wolstenholme, machinery. The Council have decided to admit all trade liquid refuse to the sewers, and the chemical treatment before filtration will be by lime and alumino-ferric.

A SERIES of renovations and alterations have been effected in connection with Deane (Yorks) parish church, which result in a great improvement. In the interior of the venerable edifice the clergy and choir vestry has been made more convenient, the old roof having been taken away, and a new one of lead has been substituted at a greater altitude. Hot-water apparatus for warming the vestry has also been put in, and this apartment has been connected by a doorway with another vestry in the tower, underneath the belfry, and the two vestries can be used simultaneously. Over the principal vestry a muniment-room, for the safe keeping of parish ecclesiastical documents, has been provided; new windows, for which some old stonework belonging to the church has been utilised, have been placed in the vestry, this part of the church having been now made to correspond with the other part of the north aisle. A new peal-board has been affixed in the belfry, and this will be of great advantage. Dry-rot having shown itself in various parts of the church, all the old woodwork has been removed and fresh flooring, &c., put down. New gas standards have been affixed in the Hulton Chapel, and new gaslights have likewise been introduced into the opposite side of the church.

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A HOUSE in one of the courts off Bedfordbury, close to Charing Cross, collapsed on the 18th inst., rendering between twenty and thirty people homeless. The house was under repair at the rear, the walls of the staircases having been removed six months ago and the stairs propped up with wooden supports. The walls facing the court, however, proved to be more unsafe than the supports, and about three o'clock in the morning the wall on the top floor of the three-storey building gave way. The roof also collapsed. Fortunately, before this happened the people who had been sleeping on the top floor made their escape. There were three or four families occupying rooms on the various floors, and these made their escape before further damage was done.

THE newly erected additions to the Aston Workhouse have been formally opened. They consist of a block of buildings providing accommodation for aged married couples, who are proved to have led respectable lives, and another building for male vagrants, containing sufficient room to enable the guardians to detain the professional tramps two nights, instead of only one as is at present the case, whereby it is expected to greatly reduce the number of vagrants calling at the house, who owing to the considerate treatment they have received at the Aston Workhouse have during the last few years increased in number to an alarming degree. Wherever the system of detaining the vagrants two nights has been put in force the numbers have decreased by half. The new works also include several other minor alterations and improvements, and have been carried out at a cost of 5,803*l.* by Mr. W. S. Seamark, and according to the plans of Mr. C. Whitwell, architect. The aged people's quarters consist of a two-storey building, which is fitted up with every comfort. Accommodation is provided for ten couples, five on each floor. The approach to the upper rooms is by a stone staircase, which gives access to a verandah, on to which the doors of the apartments open, and from which the outlook is most pleasant. An excellently fitted-up bathroom is also provided. The building for the vagrants is situated on the south side of the workhouse, and contains twenty-six separate sleeping cells and thirteen stone-breaking cells, a large bath-room, day-room and attendants' room, and a very comfortable house for the occupation of the labour master has been erected near. Iron staircases have been erected outside certain departments of the house for purposes of escape in case of fire, and new heating apparatus fitted up.

ILLUSTRATIONS.

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CAN BUILDINGS BE MADE FIREPROOF?

At a meeting of the American Society of Civil Engineers on November 3 Mr. Corydon T. Purdy, M.Am.Soc.C.E., presented a paper entitled "Can Buildings be made Fireproof?" basing his remarks largely upon the much-discussed Pittsburg fire which occurred on May 3. The Horne store was provided with the hard tile side construction system, the Horne office building with the porous tile-end construction, and the Methodist Book Concern with 6-inch concrete floors reinforced with wires and gas-pipe. In the former buildings tile partitions founded upon a wooden frame were used. Expanded metal nailed to wooden joists supported the plaster on the partitions in the Book Concern building.

After an elaborate description of the building, Mr. Purdy, says the *Engineering Record*, criticises the construction evidently in the belief that if the columns, beams and girders had been more securely tied together the water-tank, which fell during the fire, would not have caused as much damage to the steel frame as occurred. He condemned the use of wooden joists in partitions, and advocated some form of protection for the large windows which were necessary to obtain sufficient light. Sprinklers, he said, might be devised as a special protection for store windows. The author stated that, however perfect a scheme can be worked out for fire protection by the use of water, the importance of separating floors from each other, at least in an emergency and when not in use, and, indeed, separating stores into parts in the same way, would still be vitally important.

In speaking of the action of the fireproofing in the buildings Mr. Purdy continued in parts as follows:—

The fire teaches nothing as to the real fireproof qualities of good concrete in floor construction, for the floors in the Methodist building were not subjected to a real test, as the heat on the outside of the building was only a fraction of what

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it was on the other buildings, as testified to by the firemen and by the fact that the stone trimmings in the exterior walls exposed to the heat were injured in only three small places, while the fire on the inside was confined to an area entirely controlled by the fire department. Whether ordinary concrete, or, for that matter, concrete of any kind, will resist more fire and cold water than brickwork or other forms of burnt clay, is undetermined and debatable. Certainly this fire does not prove that it will or that it will not.

As between the burned material and the porous, however, the superiority of the latter as now manufactured and used was clearly illustrated. The author ventures the definite statement that partitions of 4-inch hollow, porous material made of sawdust and clay properly manufactured and properly put in place, column covering made in the same way at least 3 inches thick, and floor arches of the same material deep enough for flush ceilings, with properly designed skewbacks and beam-flange protection, will stand any possible combination of heat and water without material injury.

The same thing cannot be said, however, in regard to hard-burned clay material, as it is now manufactured, especially in the West, where, in the interest of economy, it has been made lighter than in the East, though in theory it ought to make satisfactory resistance to fire, for it is incombustible and hardened with heat, and brick which is made in the same way can be relied on to stop a fire. Yet not this fire alone, but others have demonstrated that the hard material will crack and fall to pieces under great heat even if it is not suddenly cooled with water thrown upon it.

The fireproofing work in the store, both in the arches and around the columns, was erected well. Indeed, it was probably erected better than in the average New York building, and the damage to the fireproofing in that building is primarily due to its being hard material instead of porous. The covering of the girders and beams which projected below the ceiling line was pretty generally broken, and this must have been due in a large measure to the fact that the ceiling was not a level surface, though the loss was, without doubt, increased on account of the very few divisions in the tile and the very thin walls. The material used in New York is all thicker and heavier than this was, and on that account would probably stand a fire better. That the damage to the fireproofing is primarily due to its being hard tile instead of porous is, however, shown by a comparison between the two Horne buildings. In both cases the ceiling was panelled. In the store building the bottom of the

hard tile arches was broken by the fire, whereas in the office building there was scarcely any injury of that kind. The insurance adjusters state that there is only a salvage of 16 per cent. in the fireproofing of the store building, but that they believe if the tank had not fallen the salvage would have been at least 50 per cent.

A satisfactory fireproofing material when properly constructed in all its details should not suffer a loss of more than 1 or 2 per cent. at the most.

The fireproofing in the office building suffered much more than this, but in every case there is a special cause for the injury, entirely independent of the quality or texture of the material. The adjusters report 43 per cent. loss on the partitions, and this is low when it is remembered that every partition in the building was left unsupported by the burning out of the wooden frame. The column covering resisted the fire unexpectedly well, but the single thickness of material makes a wretched covering, and it should all be replaced with hollow blocks. In places the skewbacks covering the beams projecting below the arches suffered severely. If the insurance companies were required to replace all these broken pieces, it would necessitate the removal of arches which were entirely uninjured. The author has not been able to account for the large percentage of damage allowed by the adjusters on this part of the fireproofing, 33 per cent., on any other supposition, for in his examination he found practically none of the arches injured, and the contractors in rebuilding have furnished only 300 feet of new arches, while there are 40,000 feet in the building.

Besides this, which is perhaps the most important observation in regard to the fireproofing, the following conclusions seem also to be warranted:—

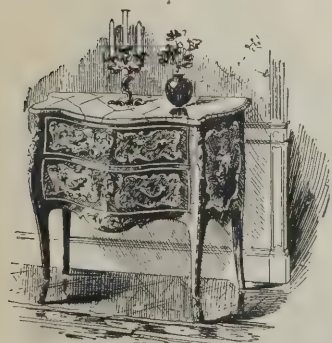
The breaking of the hard tile arches on the bottom is due to the inability of the materials to withstand inequalities of contraction and expansion, and it breaks in the corners both because the strain is greatest and the tile is weakest there. There is an inequality of expansion because it is heated only on one side. The strain is greatest in the corners because the expansion of one side tends to shear that side from the adjoining ones, and it is weakest at the corners because if there is any initial stress in the material it would more naturally occur there than elsewhere, while the very fact that it breaks in that particular place more than anywhere else indicates that it is lacking in strength along the edges. The report of the board of expert engineers appointed by the appraisers furnishes some valuable facts, but some of their observations seem to the

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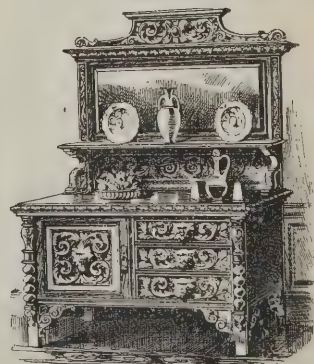
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author extremely fallacious, and quite so in regard to this point. They state in effect that the scaling off of the lower web of the floor arches is due to the lateral motion of the ironwork caused by the heat of the fire. A panel surrounded by iron will enlarge in area if the iron expands, and if it is true, as they claim, that the iron expands more than the arches, the process of expansion would seem to relieve the arch, in whole or in part, instead of bringing any strain to bear upon it tending to its destruction. The damage to the tile is also not due to the subsequent process of construction, for, as a matter of fact, the damage to the tile occurs during the fire and not after it.

The tendency of the times is to make the material too light. If the walls of the material were made thicker, it certainly would add strength. Possibly also if the angles on the inside were rounded more, the strength of the corners would be increased. Checks and cracks in the corners of the blocks as delivered from the factory may not be particularly objectionable, so far as support to the floor is concerned, but they are objectionable in resisting fire effects, and such tile will go to pieces sooner than that which is free from such imperfections.

Possibly some clays of which hard-burned fireproofing material are made have more strength than others, and on this account alone the effect of the fire in one case can be no certain criterion of what the exact effect will be in another case, and the thickness of the walls and the various parts of the material might possibly be lighter with some clays than with others.

(To be concluded.)

TRADE NOTES.

THE Corporation Hospital, Birkenhead, is being warmed and ventilated by means of Shorland's patent double-fronted Manchester stoves with descending smoke flues

MR. EDWARD P. BOVEY, builder and contractor, of Forwood Street, Torquay, has taken up the agency for Torquay and district of Mr. L. Nicklin's Soho ventilating cowl.

MR. LOUIS HARPER, A.M.I.C.E., Aberdeen, has just supplied one of his steel rope suspension bridges, 200 feet span by 8 feet wide, to the order of the Agent-General for the Cape of Good Hope, to be erected over the Tsomo River, Cape Colony.

WE have received from Messrs. W. Davis & Sons, of Edgbaston Street, Birmingham, their price list of window-

blinds, picture-frames, mouldings, &c. This list will be found very explicit and comprehensive, and the prices will at least bear favourable comparison with those of other manufacturers.

MESSRS. CHAS. CARR of Smethwick, who have received no fewer than twelve gold medals for their bells, have been this year, and still are, exceptionally busy owing to the number of contracts they have been entrusted with for the rehanging and recasting of peals of bells in commemoration of the Diamond Jubilee, and they inform us that they have taken into their employ John Buffery (twenty-three years member of St. Martin's Society, Birmingham), the well-known and efficient bell hanger of the Midland and Northern Counties and North and South Wales.

ELECTRIC NOTES.

THE Edison & Swan Company are about to place on the market a new lamp. The chief feature of the new lamp is that it is capable of being run at a very high efficiency. This is decidedly a step in the direction of the fulfilment of Mr. Preece's prophecy that the electric light will be "the poor-man's light." On circuits, when the pressure is steady, an economy of at least 25 per cent. can be effected by the use of the new Ediswan lamp.

In addition to the arc lamps in and about the market-place and Westgate, Dewsbury, and to those intended to be placed in the new thoroughfare leading from and opposite the Great Northern Railway station to the foot of Bond Street, the Corporation lighting committee have resolved to erect additional arc lamps, and central positions have been chosen. These include Church Street and Vicarage Road, Bradford Road, near the viaduct of the London and North-Western Railway Company, Northgate, at the terminus of the Dewsbury, Batley and Birstall Tramway, Wellington Road, Daisy Hill, Nelson and Wellington Streets and Halifax Road. The paving of New Bridge Street with jarrah wood is now completed, and next week steps will be taken for erecting powerful electric lamps on both sides.

It was agreed on Wednesday at the St. Pancras Vestry's meeting to light by means of electric-arc lamps the Prince of Wales Road, Malden Road, Queen's Crescent and Ferdinand Street (from Chalk Farm to Mother Shipton), and to provide private lighting mains in these localities, at a total estimated cost of 5,422*l*.

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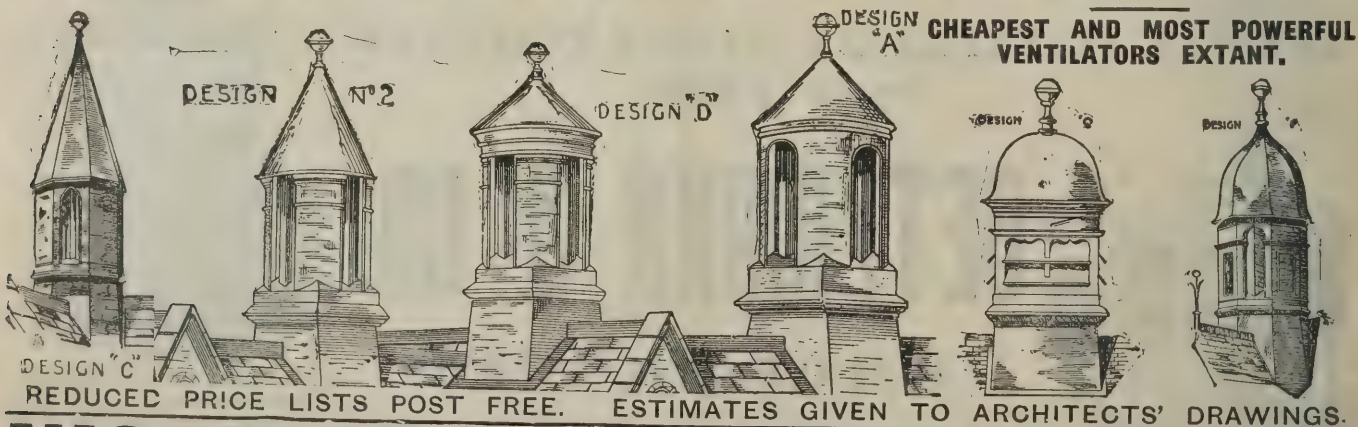
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BUILDING AND BUILDERS.

THE foundation-stone of the new parish church halls at Springburn, N.B., was formally laid on the 20th inst.

THE plans, specifications and estimates for the building of a church at New Lanark have been passed by the Home Mission committee, and the necessary grant given.

THE foundation-stone of a new infirmary for males in connection with the Kingston-on-Thames workhouse was laid on Wednesday last. The infirmary, with a nurses' home and other buildings, is to be erected at a cost of over 18,000*l*.

A SERIOUS accident occurred last week at a brickwork near Rugby. Seven truck loads of bricks, weighing 14 tons, were being run down a patent drying tunnel, which was being used for the first time, when the load overpowered the men in charge, and the waggons ran down the incline. The foreman, Joseph Negus, and a workman named William Watts, happened to be in front, and were crushed against the wall. Negus expired shortly afterwards, and Watts is seriously injured.

THE foundation-stone of a boys' new department, which is being erected in connection with the Erdington Board schools, was laid on the 16th inst., and at the same time a medallion of the Queen, which has been let into the wall in commemoration of Her Majesty's Diamond Jubilee, was unveiled. The buildings in course of erection comprise a boys' department to contain 310 scholars, a large room or workshop for manual instruction and a cookery centre. As soon as these are ready for occupation the present boys' school is to be extended so as to accommodate 120 additional scholars, and it will then be used as a girls' school. New teachers' rooms are also to be added and additional cloak-rooms formed. The amount of the builder's contract (inclusive of boundary-walls, outbuildings, forming playground, warming, &c.) is 5,629*l*.

THE attractions of Harrogate are to be enhanced by a handsome and extensive hotel, which is to be built on a site which adjoins the Spa Estate. The new Palace Hotel, which is to be erected upon the most improved principles, and fitted up with all the best and latest necessities and requirements, is to have 300 bedrooms. The area set apart for the building and the grounds will be nearly seven acres, and the elevation of the hotel will be to Ripon Road, Spring Bank Avenue and the Spa grounds, with the principal façade in the direction of the new Royal Baths. The main entrance will be directly opposite Swan Lane, but a short cut will be available with an outlet at

the lower corner of the estate, close to the old skating-rink and opposite the George Hotel, where an entrance lodge will be erected. This arrangement will give a nearer approach to the town. The work of erecting this large establishment is to be commenced in the early spring, but already the surveying of the land has been taken in hand, and London architects, conversant with the class of building required, will be invited to send in competitive designs.

THE foundation-stone of new Roman Catholic schools in Levenson Street, Willenhall, was laid on Saturday last. The Roman Catholics of the town have had day schools for about forty years in connection with their church in Hall Street, but the requirements of the Education Department have compelled them to erect new buildings. These will accommodate about 270 children, or 110 more than the existing structure. The building will be of Gothic design, and the front will consist of best red bricks relieved with Hollington stone.

COUNTY COUNCIL ESTIMATING.

SOME weeks ago several tenders were received by the Council for enlarging and altering the Hampstead fire-engine station. The architect's estimate for the work was 4,170*l*., and the lowest tender received was 4,955*l*., the excess of tender over estimate being 785*l*. The estimate was originally referred to the manager of the Works Department with a view to the work being carried out by the Department. The manager, however, reported that he was not satisfied with the estimate, and consequently the work was put out to tender. The fire-brigade committee recommended the Council to accept neither of the tenders, but their recommendation was referred back, with instructions to present a further report showing in detail the causes which had resulted in the lowest tender exceeding the estimate by so large a sum, and the amount for which the manager of the Works Department was prepared to carry out the work. The committee have now issued a further report which gives an extract from a report made to them by the architect. In this he states that the chief cause for the discrepancy arose from the fact that his estimate was made at the beginning of May last, while the tenders were received on October 26. Six months had therefore elapsed, during which time the labourers' wages and the prices of certain materials had increased. For that and other reasons it had

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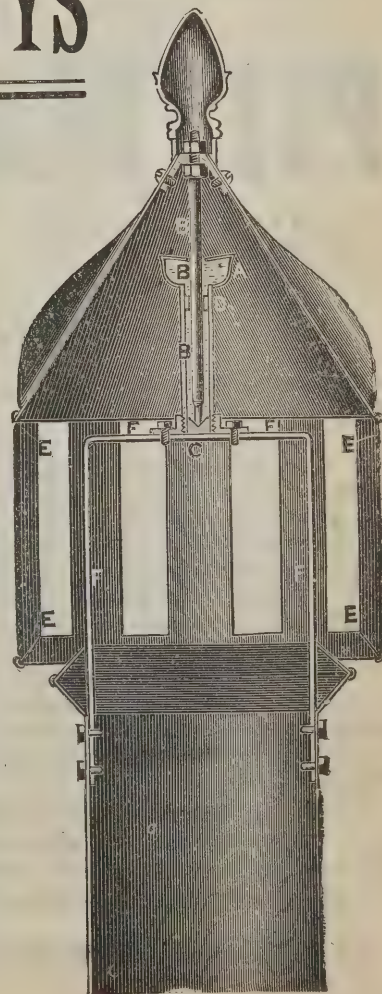
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gradually become more difficult to get tenders from responsible contractors. Having looked over his estimate again, he considered that not less than 367% of the difference now in question was due to the rise in labourers' wages and materials after his estimate was made, to the fact that the work would now have to be done in the winter and other ordinary contingencies. That still left a difference of 418% to be accounted for, which he had no doubt was largely due to the unwillingness of responsible contractors to tender for the Council's work under the existing conditions of contract. In fact, the lowest tenderers stated that if the conditions were made similar to those of the Royal Institute of British Architects they would reduce their tender by about 5 per cent, or 250%. It was quite possible that other tenderers and persons who were deterred from tendering by the Council's conditions would reduce their estimates by an amount even greater than that. The committee further state that they had communicated with the manager of the Works Department, and had ascertained that his estimate for the work was 4,800%. They proposed at a subsequent date to recommend that the work should be entrusted to the manager, provided he was satisfied with the revised estimate submitted to him. The committee again recommended that none of the tenders should be accepted. After discussion, this course was agreed to at the meeting on Tuesday.

After a discussion on Mr. J. B. Piggitt's paper, "Some Improvements in Safety Lamps," on the proposition of the President, seconded by Mr. Treece, a vote of thanks was accorded the writer.

Mr. R. H. F. Hepplewhite read a paper entitled "Some Gases met with in Coal Mines." An interesting debate on the various properties and peculiarities of the gases most frequently met with in colliery workings ensued, in which Messrs. Hewitt, Hardy, Percy, Treece, Heald, Latham and Lodge took part. The further discussion was adjourned.

GREENWICH TUNNEL.

DURING the last session of Parliament the London County Council obtained powers to construct under the river at Greenwich a tunnel for foot passengers. The sum which the Council is authorised by the Act to expend on the work is 70,000%. When the matter was before Parliament certain compensation clauses were inserted, but the estimated cost was not altered to meet the varied circumstances. The bridges committee of the Council have now had an amended estimate of the cost submitted to them, and they are advised that it is necessary to provide for an increased sum of 30,000%. They accordingly communicated with the finance committee on the subject, and they have suggested that the carrying out of the scheme should be postponed until Parliament has sanctioned the further expenditure, as they have been advised by the Council's parliamentary agent that it would be more expedient to defer the work until the judgment of Parliament has been obtained on the increased estimate, and that the commencement of the work in the present circumstances involves at least the theoretical risk that large expenditure may be made and heavy liabilities incurred, while the Council has no statutory power to raise the money estimated as required to carry the work to its completion. The bridges committee state that the case is different from one in which, after the commencement and partial execution of the work, unforeseen difficulties occur, increasing the cost above the original estimate, and they point out that the matter does not permit of delay, as the inhabitants of Greenwich and the surrounding localities have pressed for a speedy completion of the work. Moreover, they do not think that the Council will be compromised if they proceed with so much of the work as will involve an expenditure not exceeding the sum mentioned in the Act, and in the meantime Par-

NOTTINGHAM SOCIETY OF JUNIOR ENGINEERS.

A MEETING of the above Society was held on the 13th inst. at the Nottingham University College. Mr. Charles Latham presided over a large attendance of members, including Messrs. H. R. Hewitt, H.M. Inspector of Mines; R. H. F. Hepplewhite, Awsworth; R. F. Percy, Nottingham; V. Greensmith, Newstead; Rigby, Stanton, Heald, Nottingham; and J. B. Piggitt, secretary.

The President, in his opening remarks, alluded to the loss which the mining community of the district was sustaining by Dr. Clowes leaving the college. Dr. Clowes had generously offered the Society the loan of his transactions of the Federated Institution of Engineers from the commencement to the present time, an offer which he (Mr. Latham) was going to supplement by the loan of his own transactions as they came out. Mr. R. F. Percy also offered the Society the four volumes of coal mining by André, thus forming the nucleus of a useful reference library for the members.

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liamentary sanction can be obtained for the further amount of 30,000*l.* They have reason to believe that if the work were to be advertised at an early date, the cost would be less than if the carrying out of it were postponed until the latter part of next year. The further expenditure is, in their opinion, problematical, but it has to be provided in consequence of the action of Parliament in inserting the clauses for compensation to persons interested in the existing ferry rights and ferry.

SPELDHURST CHURCH.

ON Friday last Dr. Tristram, Q.C., as Chancellor of the Diocese of Canterbury, accompanied by Sir John Hassard, as registrar of the diocese, visited Speldhurst, four miles from Tunbridge Wells, and held a Court in the parish church there to hear a petition from the rector, the Rev. Donald Mackinnon, and the churchwardens for the building of a new vestry, arching over eight graves with concrete and with ventilation-chamber for the parish church, and for removing the central north aisle (memorial) window into the proposed new vestry. Speldhurst Church was destroyed by lightning in 1791, and the church which followed was entirely rebuilt in 1871 from designs by Sir Gilbert Scott, with the exception of the base of the old tower. The whole of the windows on the north and south sides of the church, with the exception of the memorial window referred to above, are from designs by Sir E. Burne-Jones, and the object of removing the memorial window is to introduce a final window by Sir E. Burne-Jones and to bring the whole church into harmony. Several witnesses were examined and the ground was carefully inspected by the Chancellor. The Court sat for two hours. The sum of 700*l.* is to be expended on the works.

THE LONDON BUILDING ACT.

THE London County Council have determined, upon the recommendation of the Building Act committee, to apply to Parliament next session for some important amendments in the London Building Act, 1894. In a report upon the matter the committee point out that recent decisions in the High Court as to the construction to be put upon certain sections of the Act are such as appear to render the working of the Act as it stands very difficult. The first point in which amendment is desired

is with reference to the procedure in the case of dangerous structures. Some delay appears to have occurred owing to a recent decision of one of the magistrates as to the service of the necessary summonses, in which he held that service by affixing a copy upon the premises was not sufficient unless the Council had, after some reasonable inquiry, failed to find the owner. The High Court, when applied to for a mandamus to the magistrate to hear the summons with which he had declined to proceed, decided that if the Council had made reasonable inquiry, and could not discover the owner, a summons could be served by affixing a copy on the premises, but discharged the mandamus on the technical ground that no evidence was given before the magistrate that such inquiry had been made. The committee think that that decision will put a serious difficulty in the way of proceedings, as it must involve in each case a search for documentary proof of the ownership of premises before a summons can be taken out, as without evidence of ownership—to get which evidence must, in many cases, be impossible—the case might be dismissed, with costs against the Council. They consider it essential that structures certified to be in a dangerous state should be dealt with with the utmost promptitude, and this will, they say, be impossible if such inquiries, which have never hitherto been required, have to be made. In illustration of the necessity for swift action, they state that only a very short time since, owing to a magistrate having refused to adjudicate upon a case in consequence of a point raised as to the service of the summonses, two men narrowly escaped being crushed through the falling down of part of a structure certified to be dangerous. The committee are of opinion that the section of the London Building Act dealing with the matter should be so amended as to make it clear that in all cases of dangerous structures all documents in proceedings may always be served on some person on the premises to whom such documents relate, or, if no person be found on the premises, by affixing such documents thereto. An amendment of section 14 of the Act is also to be asked for, in order to make it clear that no part of any new building shall be erected with its boundary fence or wall at less than the prescribed distance from the centre of the road. An amendment of another section is desired to make it clear that no working-class dwelling shall be erected within 20 feet from the centre of the street or way on which it abuts. Amendments are also to be asked for in relation to the clauses providing that penalties for certain offences under the Act can only be enforced when an order of the magistrates is not complied with.

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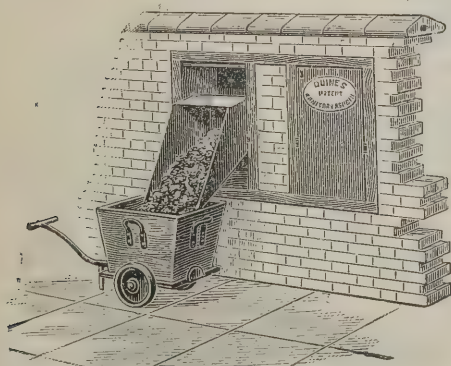
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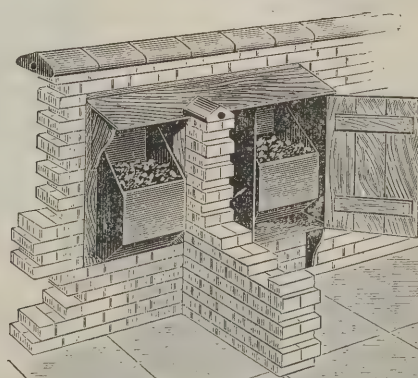
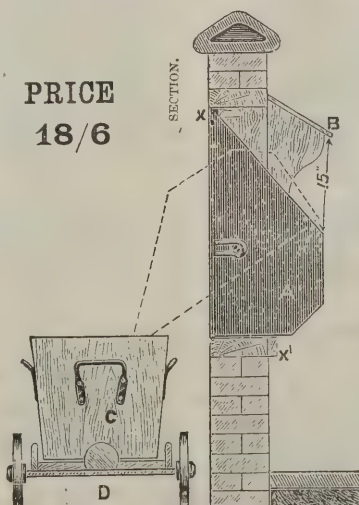
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METROPOLITAN WATER SUPPLY.

ON Monday, the 22nd inst., the Royal Commission appointed to inquire and report upon the water supply of the metropolis held their first sitting. The terms of reference are as follows:—"To inquire—(1) Whether, having regard to financial considerations and to present and prospective requirements as regards water supply in the districts within the limits of supply of the metropolitan water companies, it is desirable in the interests of the ratepayers and water consumers in those districts that the undertakings of the water companies should be acquired and managed either (a) by one authority, or (b) by several authorities, and, if so, what should be such authority or authorities; to what extent physical severance of the works and other property and sources of supply of the several companies, and the division thereof between different local authorities within the limits of supply are practicable and desirable; and what are the legal powers necessary to give effect to any such arrangements. (2) If the undertakings are not so acquired, whether additional powers of control should be exercised by local or other authorities; and, if so, what those powers should be. (3) Whether it is practicable to connect any two or more of the different systems of supply now administered by the eight metropolitan companies; and, if so, by whom, and in what proportion, should the cost of connecting them be borne, and what are the legal powers necessary to give effect to any such arrangement."

Lord Llandaff presided, and the other members of the Commission present were Sir John Dorington, M.P., Sir George Barclay Bruce, Mr. Alfred de Bock Porter, Major-General Alexander de Courcy Scott, Mr. H. W. Cripps, Q.C., and Mr. Robert Lewis, the only absentee being Mr. J. W. Mellor, Q.C., M.P. Mr. Cecil Owen attended in his capacity of secretary.

Mr. H. L. Cripps, the parliamentary agent of the London County Council, stated that he was cognisant of all the parliamentary proceedings of that body in relation to the water companies, and that he was fully acquainted with the views of the County Council upon the subject of the water supply of the metropolis.

The Chairman: Do you represent the views of the County Council?—I come here on their behalf and at their request to give to the Commission such information as they may think relevant to this matter. The views of the County Council as a corporate body are expressed in their own resolutions.

The Chairman: I gather that the Council are in favour of

solving the question of the metropolitan water supply by purchase of the existing undertakings?

Witness: Their views in that respect were embodied in the Bills submitted to Parliament in 1895 and 1897, upon which, however, there was considerable division of opinion. The latest decision of the Council upon the point was, first, that the undertakings of the companies should forthwith be purchased at a fair and reasonable value, regard being had to the rights, special circumstances and obligations of the company. A resolution to that effect was carried without a division after an amendment declaring that, since the purchase of the undertakings of the water companies would probably increase the cost of water to the public, the Council should not express an opinion in favour of purchase pending inquiry by the Royal Commission had been defeated by 53 to 37. In the alternative it was resolved, secondly, that the management of the water supply should be effected either by the London County Council supplying its own area directly and supplying the outside authorities with water in bulk at a fixed price; or, thirdly, that the London County Council should supply their own area, and that the outside bodies should supply their own areas. A fourth alternative recommending the establishment of a new body supplying the whole area, both within and without the county of London, was negatived. In view of the declared policy of Parliament and the example of other towns, a large majority on the County Council were in favour of immediate purchase, and they were fortified in that determination by the recommendations of the committees presided over by Sir William Harcourt and Sir Matthew White Ridley respectively. It was considered that mere regulation would not be at all likely to afford a final settlement of the question.

The Chairman: In the report of Sir William Harcourt's committee no preference is given to purchase over regulation, and, moreover, the view is expressed that a new water supply could be obtained at much less cost than the price that would have to be given for the existing water undertakings. I do not gather any declaration of the clear policy of Parliament in favour of purchase from the report of Sir William Harcourt's committee.

Witness: The clear policy of Parliament is expressed in nearly all the Water Acts which have been passed since 1880.

The Chairman: You allude, I presume, to the reservations which have been made in the event of purchase taking place?

Witness: I do. In the case of the Bills introduced by the water companies since 1880 the view taken by the committees

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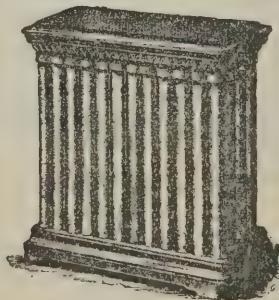
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to which they have been referred has been that the water companies should not obtain to the full the powers for which they were asking, on the ground that such large additional powers might in their turn have to be the subject of purchase ultimately. Proceeding, witness pointed out that Sir Matthew White Ridley's committee proceeded from the outset on the assumption that there should be a single water authority for London, and, having regard to all the circumstances of the case, the County Council were of opinion that it would be fairer to the water companies to purchase their undertakings. The great difficulty of the County Council had been to get a hearing for its proposals. In 1895, for the first and only time, a definite scheme for the compulsory purchase of the London water companies was embodied in a Bill, to which a second reading was accorded by the House of Commons. That Bill went before a committee, of which Mr. David Plunket (now Lord Rathmore) was chairman, and although the Council were unable to get that Bill passed in consequence of a dissolution of Parliament, they felt assured from indications which fell from the committee from time to time, that they had satisfied that tribunal upon the question of purchase. As distinguished from provincial towns, there were special reasons why purchase was expedient and desirable in the case of London. In the first place, all the powers which the London water companies had obtained as the foundation of their present charters were obtained at a time previous to 1855, when no local authority existed which was competent to protect the consumers of water, whereas in the case of provincial towns there were the corporations and local boards. If there had been such an authority in London, probably the earlier statutes of the companies would have been very materially altered. The Metropolitan Board of Works had very limited powers, especially with regard to water, and it was not until 1888 that the London County Council was established.

The Chairman: Then you do not treat the Corporation of London as in any sense representing the county of London?

Witness: I regard the Corporation of London as a very important body, but it represents a comparatively small part of the administrative county of London from whichever point of view you regard it. For instance, it only represents about a 140th part of the resident population.

The Chairman: Do you suggest that the City is not really identical in interests with the rest of London?

Witness: The interests of the City are not only not identical

but adverse to the interests of the rest of London with regard to water supply because of the much greater rateable value of premises in the City as compared with the resident population.

The Chairman: I should have thought that would have made the City more anxious for a cheap water supply.

Witness: The policy of the City is to have a supply of water by meter so that they may only pay for the actual quantity which the population consumes, and not according to the rateable value as in the rest of London. Proceeding to give other special reasons in favour of purchase in the case of London, witness pointed out that London was supplied by eight different companies, whilst in all other cities and towns where the policy of purchase had been successfully carried out there had only been one company supplying the area, and that company having a practical monopoly, its position was quite clear and intelligible. In London, on the other hand, the confusion and difficulty arising from there being eight companies had always been very considerable. Then again, in London the rateable value of the premises supplied had outgrown the rateable value at the time when the water rates were originally fixed to a much larger extent than in provincial towns. Another special point was that in many provincial towns a large expenditure had been incurred in obtaining a water supply from a distant source, whereas in the case of London, although, undoubtedly, it would be necessary to obtain a supply from a distant source in the future, the expenditure at present incurred by the water companies was simply the expenditure involved in distributing the water of the Thames and the Lea. Nevertheless, the charges made for water in provincial towns were practically the same as or lower than in London. Then, with regard to the system of departmental control, the audit of the accounts of the London water companies was conducted by an auditor paid by the companies, whose power of enforcing his decisions was limited by the obligation to pay the cost of any legal proceedings out of his own salary. In London, again, the burden of the water rates fell more heavily upon the occupiers of the smaller houses than upon the richer classes. Elsewhere, too, the water companies were under obligation to supply water up to the topmost storeys of the houses, and, owing to special exemptions which were granted to some of the metropolitan water companies, there were some portions of London in which the inhabitants, almost alone amongst civilised communities, had no means of getting water supplied to the tops of their houses. Analysing the published accounts of the London water companies, witness

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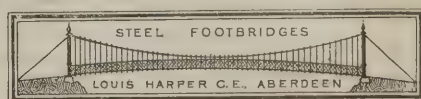
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pointed out that whereas in 1895 the net profits available for distribution were 838,000*l.*, the amount actually divided was 913,000*l.*, which was accounted for by the fact that the credit balance carried forward at the end of the year was less than in the previous one. The net profit available for dividend by the eight companies in 1896, upon an ordinary capital of 10,288,410*l.* was 952,000*l.*, but inasmuch as it was provided for the first time in 1894 that additional capital should be raised by the issue of stock redeemable in twenty-five years, the companies would be precluded from claiming anything in respect of this extra capital in case of purchase. The immense cost of the parliamentary proceedings, both on the part of the Council and the companies, would also be saved in the case of purchase, but in addition to the maximum dividends there would be a claim for back dividends, except in the case of the West Middlesex, who had already paid off their back dividends, and in the case of the Kent and Chelsea companies, who were in course of paying them off. The probability of the other companies ever arriving at that stage was too remote to be worth considering.

The Commission adjourned until Monday, December 6.

HISTORY OF MUNICIPAL ENGINEERS.

At the first sessional meeting of the Gloucestershire Engineering Society the president, Mr. R. Read, city surveyor, read a paper on "Municipal Engineering."

In the course of his address, according to the *Gloucestershire Chronicle*, Mr. Read said the history of municipal engineering was bound up with that of the growth of towns during the century now drawing to a close, and more especially with that of the wonderful development of the last sixty years. A century ago the population of the rural districts exceeded that of the towns, but now the total population of the towns was two and a half times that of the country. The growth commenced with the improvement of the steam-engine by James Watt, improvements in spinning machinery by Hargreaves and Arkwright, and of weaving machinery by Jacquard. The results which followed were a rush to the towns and great commercial progress, accompanied by overcrowding, drink, dirt and disease. In 1839, in consequence of reports by Drs. Arnot, Kay and South-

wood Smith to the Poor Law Commissioners in reference to the poor in the East End of London, a Royal Commission was appointed to inquire into the sanitary condition of the labouring classes throughout England and Wales, and afterwards Scotland. They presented their report in 1842. The report showed that in 1838 56,000 people died from epidemic diseases in England and Wales, and that in Liverpool nearly 40,000 persons lived in 8,000 cellars below the street level, nearly 3,000 of which were stated to be wet and filthy, and the other large towns were in a similar condition. Epidemics of cholera and typhus were of frequent occurrence, there being no organised system of drainage or water supply in the towns. The sanitary laws were badly administered by the poor-law guardians or the overseers of the parishes, but in London commissioners of sewers had recently been appointed. The general death-rate in towns ranged from 30 to 50 per 1,000, and in Manchester 57 per cent. of the children born died before they attained the age of five years, and "the average duration of life of mechanics, labourers and their families was seventeen years; tradesmen and their families, twenty years; professional persons and the gentry and their families, thirty-eight years." In Liverpool 1 in 25 of the population was said to be annually attacked with fever of some kind or another. In 1838 throughout England and Wales 43,000 widows and 112,000 children were relieved by the guardians of the poor, the husbands and fathers having all died under the age of forty-five years. The roads and footpaths were neglected, scavenging was left to the dogs, or when it was contracted for the contractors seldom carried out their contracts; the water supply was derived either from polluted streams or surface wells generally in close proximity to cesspools; the cesspools were leaky and seldom emptied, and the slops thrown into the streets, and the condition of towns generally was deplorable. The result of the report of the Royal Commission was the Public Health Act, 1848, which was drafted after considerable labour and the investigation of evidence from doctors and all kinds of people, including that of Mr. John Rowe, who was the surveyor of the parish of Finsbury, in London, the inventor of the egg-shaped section of sewers. Under the powers of that Act a general board of health was established in London, with Mr. Austin, C.E., as its chief engineering adviser, and corporations were made local boards of health, with power to appoint fit and proper persons to act as surveyors. This created a demand for a class of men who did not exist, and a very curious lot of appointments were made; amongst others a bankrupt draper of his native town on the ground that he was "accustomed

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to measuring." A great many towns were sewered under the powers of that Act, Gloucester being amongst the number in 1852. Mr. Read gave a description of the sewers which were then in use, and also the part which the members of the Institution of Civil Engineers took in the matter, and remarked that at the present time the majority of surveyors of large towns were civil engineers by profession. He went on to say that the duties of a municipal engineer were very varied. He had first of all to make himself acquainted with his town or district, its physical, geological and meteorological conditions. As regarded the roads and footways, he had to consider the local materials which might be available for their construction or repairs, and failing these, to select the most suitable and economical materials from other places. In the old times, when each owner of property built according to his own sweet will, each trying to come beyond his neighbour, some would aspire to build high above ground, and others, less ambitious or more economical, would keep the floors below the levels of the streets. All old towns suffered to this day from these irregularities of line and level, and in many cases the one side of a street would be found much lower than the other for no apparent reason than the vagaries of the builders of a past generation. In constructing the carriage-way of a street its real stability depended upon its foundation. The materials with which the surface was finished varied with the kind of traffic it had to bear, and might be either hard broken stone, familiarly known as macadam, granite or other stone setts, wood blocks or asphalt, while in America bricks were being used. Macadam was the cheapest in first cost, but the most expensive in maintenance. Stone setts were most expensive in first cost, but the cheapest in maintenance. The old idea that the streets of London and other large towns were paved with gold was now almost literally true, for miles of them had cost at least 1*l.* per square yard to construct, and yet the cyclist was not happy or satisfied. The smoother and better a road was for traction the worse foothold it gave to horses, and these two requirements were so opposed to each other that it appeared to him (Mr. Read) that a perfect road from a cyclist's point of view could only be obtained after an improved method of shoeing horses had been discovered to enable them to draw loads on a perfectly smooth road, or horses would have to be superseded by motor cars. Mr. Read went on to describe the construction of footways and scavenging and cleansing operations, and contrasted the present system with that of the olden times, when the

system of sewerage was adopted to avoid the expense of sewers. He said that in designing a system of sewers for a town, the municipal engineer was faced with a very complicated problem. The system in general use might be divided into two classes: first, the combined system, which took both sewage and rain-fall; and, secondly, the separate system, which might be again subdivided into two methods—(1) which provided two distinct sets of sewers, one for foul water and the other for rain water, and (2) a small single system of sewers, upon which the flood water was allowed to overflow weirs placed at intervals in the sewers down other natural channels or brooks into the rivers. As long as sewage was delivered straight into the rivers, whether tidal or not, there was no necessity for separating the rain water from the sewage, but when the sewage had to be dealt with and purified before the effluent was allowed to go into the river, then the question of quantity became very important, especially when, as was generally the case, the whole of the sewage had to be pumped in order to deal with it. He proceeded to say that the difficulties which surrounded the subject of sewerage and its disposal were not only scientific but legal, and the sewage and drainage system of a town was necessarily the growth of years, and was seldom carried out on one complete system or by one individual. After describing the experiments which have been made in the disposal of sewage matter, Mr. Read passed on to the consideration of the water supply. He said that it was clear that the water-carriage system could not be carried out without an abundant water supply under pressure, and this necessitated the bringing in of a supply from a distance or pumping and purification of river water, or the sinking of wells, which of course again entailed pumping. Originally the supplies for most towns were taken from rivers, London being the chief example of this method; in fact, the rivers mainly determined the position of the towns. These supplies were usually in the hands of companies, there being eight separate companies supplying London from the River Thames and Lea. As London increased the intakes of the water companies were shifted higher up the river, most of them now being above Hampton and Kingston. As the rivers became more and more polluted new supplies were looked for upon any available high ground within reasonable distance from the town, and as these were not always obtainable many of the larger towns have had to go very long distances for their water supply, notably Glasgow 30 miles, to Loch Katrine, Manchester to Thirlmere, in Cumberland, about 120 miles, Liverpool to head waters of the Severn at

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Vyrnwy, and Birmingham, the latest example, to the head waters of the Wye in North Wales. Some of these works have cost from 6,000,000*l.* to 8,000,000*l.* Water from the hills is simply impounded by throwing a watertight bank of clay across the narrowest part of the valley, thus forming an artificial lake; and from thence conveying it in pipes by gravitation to the towns. Next to impounding, pumping from a river was the least expensive, but as a river naturally drains a large extent of country more or less thickly inhabited, the waters of a river are always more or less polluted, and great expense has always to be gone to deal with the water before use; or it might be necessary to go so far up the river that the cost equals the third method—that of sinking wells—the most costly of all, as the well has to be sunk either throughout the whole or a greater part of its depth in the water-bearing strata, and large temporary pumping plant sufficient to deal with the maximum quantity of water has to be kept continually working while the well was being sunk, and when this is finished the well-water might or not require filtering according to the circumstances and position in which the well is sunk. It had also to be pumped out of the well into a reservoir on high ground in order to obtain sufficient pressure. The Witcomb supply was an example of the impounding and gravitation method, and the Newent supply of that from the wells. A vast improvement in the health of town populations had resulted from the vast works which have been executed, as now the general death-rate of the United Kingdom had been reduced to 18 per 1,000, and the zymotic death-rate to $2\frac{1}{4}$ per 1,000. In addition to the duty of designing, executing and maintaining works which he had mentioned, a municipal engineer had to lay out parks, cemeteries, markets, &c., and to advise the Corporation on such questions as acquiring gasworks and tramways, and lately he had to make himself familiar with the latest developments of refuse-destructors and electric-lighting plant. The furnace for the destruction of dust or house-refuse was a comparatively modern development of corporation work on behalf of the individual, who could easily dispose of the bulk of his house refuse in the kitchen fire if it was done daily. The earlier furnaces were designed merely to get rid of the refuse, but the more recent forms use the heat generated by raising steam for various purposes, chiefly for producing electric light. Taking a low estimate of the value of the refuse 1 lb. would evaporate 1 lb. of water into steam, which meant that the house refuse of Gloucester was equal to producing from 100 to 180 horse-power available for electrical lighting or other

purposes. Mr. Read concluded an interesting address by saying that in future there was no doubt that the duties of a municipal engineer might be further extended, as the tendency of the age was, like *Oliver Twist*, to still ask for more, and the duty of satisfying these requirements devolved more and more upon public authorities, and the State in preference to individuals, but as long as this work is carried out in obedience to the natural laws so long will it be successful, and the great source of power in nature be converted, adapted and applied for the use and convenience of man.

PATENTS.

[*This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.*]

APPLICATIONS FOR PATENTS.

26092. Peter Arthur Tofft, for "Improvements in portable houses."

26093. Frances May Hamilton and Carleton Gilbert, for "Improvements in firebox partitions for cooking-stoves and ranges."

23168. John Holmes Sutton, for "Improvements in or connected with pipes and pipe joints."

26258. Charles Greenhalgh, for "Improvements in or applicable to waste water-closets."

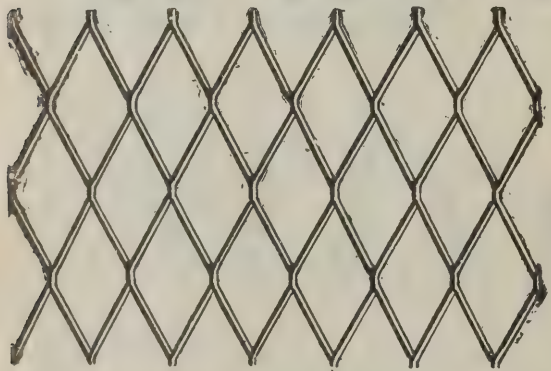
26262. John Johnston Green and Charles Leslie Stiff, for "A new and improved method of forming the joints in earthenware and other pipes."

26443. Florimond Dumay, for "Improvements in or relating to earth closets."

26450. Joseph Hall, for "Improvements in stoneware and metal pipe-joints."

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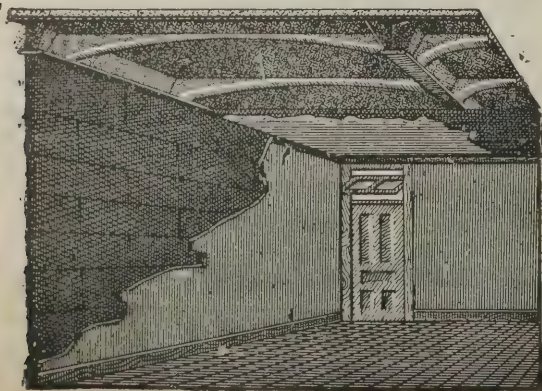
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Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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COMPETITIONS OPEN.

BELPER.—Jan. 8, 1898.—The Belper Rural District Council offer premiums of 15 guineas and five guineas for the two best sets of plans and reports for Crich water supply. Mr. Joseph Pym, clerk, Belper.

BELPER.—May 1, 1898.—The Belper Urban District Council offer premiums of 50 guineas and 25 guineas for the two best schemes of sewage disposal. Mr. Joseph Pym, Urban District Council Offices, Belper.

BOOTLE.—Dec. 31.—The Corporation invite competitive designs of a central fire station, firemen's dwellings and district police station. Mr. J. A. Crowther, borough engineer, Bootle.

DORKING.—Dec. 15.—Competitive designs and plan, with descriptive report thereon and approximate estimates, are invited for erection of infirmary upon workhouse grounds. Mr. George Scales, 35 High Street, Dorking.

PORT ELIZABETH.—Feb. 15, 1898.—The public library committee offer prizes of 100 guineas and 50 guineas for designs for a new library building. Messrs. Wm. Savage & Sons, 85 London Wall, London, E.C.

CONTRACTS OPEN.

BARNSELY.—Dec. 6.—For erection of eight cottages in St. George's Road. 9 Park Grove, Barnsley.

BARROW-IN-FURNESS.—Dec. 15.—For erection of electric-lighting station, Buccleuch Street. Borough engineer, Town Hall, Barrow-in-Furness.

BELFAST.—Dec. 7.—For erection of hospital within the walls of Her Majesty's prison. Mr. S. H. Douglas, secretary, General Prisons Board, Dublin Castle.

BRADFORD.—For erection of offices and storerooms in Duke Street and Upper Piccadilly. Mr. C. H. Hargreaves, architect, 18 and 20 New Corridor, Exchange Buildings, Bradford.

BRADFORD.—Dec. 7.—For new window to shop 108 Godwin Street. Mr. George McGuire, town clerk, Bradford.

BRADFORD.—Dec. 17.—For erection of herring-curing establishment, stabling and other works in Buck Street. Messrs. Hodgson & Farrar, architects, Old Bank Chambers, Bradford.

BRANKSOME.—Dec. 7.—For new bathroom, &c., at Ringwood Road isolation hospital. Mr. S. J. Newman, surveyor, 3 Tennyson Buildings, Ashley Road.

BRIDLINGTON.—Dec. 7.—For erection of a dwelling-house, stable and coach-house, Carlton Street. Mr. Samuel Dyer, Quay Road, Bridlington Quay.

CHORLEY.—Dec. 16.—For erection of a free library. Messrs. Jolly & Buckley, architects, High Street, Chorley.

CHORLEY.—Dec. 11.—For erection of infectious wards, administrative block, &c., in Heath Charnock. Messrs. Jolly & Buckley, architects, High Street, Chorley.

CLAYTON.—Dec. 8.—For erection of eleven terrace houses at Chisharben Park. Mr. Sam Spencer, architect, &c., 344 Great Horton Road, Great Horton.

CORK.—For building a room and other work at Fota. Mr. Arthur Hill, architect, 22 George's Street, Cork.

CANTERBURY.—Dec. 14.—For erection of a schoolroom at Upstreet. Mr. F. Heath, Westbere Court.

CORNWALL.—Dec. 15.—For erection of a piggery and other work at Eglosmerther Farm. Mr. George Gow, Tregothnan Office, Truro.

CORNWALL.—Dec. 6.—For taking-down the tower and spire of St. Peter's Church, Mithian. Mr. Wm. Swift, architect, 23 Lemon Street, Truro.

CRICKHOWELL.—Dec. 13.—For alterations and additions to the National Schools, Llangynidr, near Crickhowell, Breconshire. Mr. F. Baldwin, architect, 8 Lion Street, Brecon.

CUMBERLAND.—Dec. 6.—For erection of six dwelling-houses at Silloth. Mr. J. M. Thompson, 13 Esk Street, Silloth.

DARFIELD.—Dec. 11.—For erection of ten houses. Mr. A. B. Linford, architect, Kelvin Cottage, Wombwell.

DERBYSHIRE.—Dec. 6.—For alterations and extensions of the head school, Abbotsholme. Messrs. Wm. Sugden & Son, architects, Leek and Hanley.

DEVON.—Dec. 14.—For erection of cottages at Loddiswell and Gara Bridge Stations, on the Kingsbridge Branch, Devonshire, for the Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station, London.

DURHAM.—For erection of the superstructure and other works of a private asylum at Middleton-St.-George. Mr. John W. Dyson, architect, 67 Grey Street, Newcastle.

DURHAM.—Dec. 3.—For erection of a Board school at Trimdon Foundry. Mr. James Garry, architect, 27 Church Street, West Hartlepool.

FELTWELL FEN.—For erection of a cottage at Anchor Drove, Feltwell Fen, near to St. John's, Little Ouse. Messrs. Bidwell & Sons, land agents, 11 Bene't Street, Cambridge.



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GRANGEMOUTH.—Dec. 11.—For erection of two blocks of dwelling-houses, containing twelve and four houses respectively, in Marshall Street. Mr. G. Deas Page, architect, Old Glebe Chambers, Falkirk.

GREAT HORKESLEY.—For an addition to The Cedars. Mr. Chas. E. Butcher, architect, 3 Queen Street, Colchester.

GREAT YARMOUTH.—Dec. 8.—For additions to the isolation hospital. Mr. J. W. Cockrill, borough surveyor, Town Hall, Great Yarmouth.

GUILDFORD.—Dec. 13.—For extension of produce shed in the cattle market. Mr. C. G. Mason, borough surveyor, Tuns Gate, Guildford.

GUILDFORD.—Dec. 14.—For additions to the administration block and block B at the isolation hospital at Woodbridge. Mr. Edward L. Lunn, 36 High Street, Guildford.

HALIFAX.—Dec. 9.—For erection of police station, court-house, stables and coachhouse and appurtenances thereto. Messrs. George Buckley & Son, architects, Tower Chambers, Halifax.

HARROGATE.—For taking-down the old Crown Villa, West Park, and erection of a new one. Mr. Arthur A. Gibson, architect, 8 Cambridge Crescent, Harrogate.

HARROGATE.—For erection of a pair of semi-detached villas in Park Drive. Mr. J. F. Royce, 9 Station Square, Harrogate.

HARTBURN.—Dec. 15.—For erection of a billiard-room and other additions to Landieu. Mr. E. A. Whipham, architect, 59 High Street, Stockton-on-Tees.

HATFIELD.—Dec. 11.—For erection of a mortuary. Mr. A. Whitby, assistant overseer, North Road, Hatfield.

HOLBECK.—For rebuilding the Old Queen Anne Inn. Mr. A. D. Kaye, architect, 71 Albion Street, Leeds.

KEIGHLEY.—Dec. 9.—For erection of thirty-five houses, off Fell Lane. Mr. John Haggas, architect, North Street, Keighley.

KEIGHLEY.—Dec. 9.—For various works required in erection of the Lees and Cross Roads Institute at Lees. Messrs. John Judson & Moore, architects, York Chambers, Keighley.

KENDAL.—Dec. 10.—For erection of ten dwelling-houses in Captain French Lane. Mr. John Stalker, architect, 57 Highgate, Kendal.

KILKENNY.—Dec. 9.—For erecting forty houses and repairing twenty-four houses. Mr. William K. Cleere, executive sanitary officer, Kilkenny.

KIRKSTALL.—For erection of three pairs semi-detached villas, Victoria Park Estate. Mr. John Jackson, architect and surveyor, Barry Street, Bradford.

LANCHESTER.—For plastering, including concrete floors, or two houses. Mr. F. W. Buckham, Sawmills, Lanchester.

LEEDS.—Dec. 6.—For alterations to Cricketers' Arms, Dewsbury Road. Mr. Wm. N. Wynn, 10 Livingstone Street, Roundhay Road, Leeds.

LOWESTOFT.—Dec. 15.—For erection of a house, &c., Blundeston. Mr. Sidney Rivett, architect, 3 South Quay, Great Yarmouth.

MACCLESFIELD.—Dec. 11.—For construction of vaults and in entombments at the cemetery for three years. Mr. W. Fred Taylor, town clerk.

MALLOW.—Dec. 10.—For alterations to the female school at the workhouse, and the drainage of the Mallow new cemetery. Mr. Morris Regan, clerk, Poor Law Office, Mallow.

MANCHESTER.—Dec. 10.—For roofing, ironwork and columns to screening chamber at the sewage outfall works, Davyhulme. The city surveyor, Manchester.

MERTHYR TYDFIL.—Dec. 17.—For erection of a library, dwelling-house, &c., at Cefn Coed. Mr. R. C. Jenkins, surveyor, Cefn Coed.

MORECAMBE.—For erection of four dwelling-houses, Balmoral Road. Mr. Harry Eastwood, 19 Regent Road.

MORECAMBE.—Dec. 6.—For erection of one dwelling-house and three lock-up shops in Margaret Street. Mr. Jas. Marshall, architect, Back Crescent, Morecambe.

NEATH.—Dec. 8.—For erection of schools at Herbert Road, Melincrythan, near Neath. Mr. J. Cook Rees, architect, St. Thomas Chambers, Church Place, Neath.

NEWHAVEN.—Dec. 8.—For erection of an infirmary on land adjoining the workhouse. Messrs. Clayton & Black, architects, 152 North Street, Brighton.

NEWQUAY.—Dec. 9.—For erection of a villa on the Tolcarne Building Estate. Mr. William Square, architect, Tavistock.

NEWTON ABBOT.—Dec. 7.—For erection of a labour shed, boiler-house stack, bakehouse, &c., at the workhouse. Mr. S. Segar, architect, Union Street, Newton Abbot.

NEYLAND.—Dec. 11.—For erection of Baptist chapel at Neyland, Pembrokeshire. Mr. S. Wilson Edwards, architect, Beach Mount Villa, Mumbles.

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NOTTINGHAM.—Dec. 13.—For additions to lunatic asylum. Mr. G. T. Hine, architect, 35 Parliament Street, Westminster, S.W.

PICKERING.—Dec. 6.—For erection of a Wesleyan chapel and schoolroom at Great Barugh, near Pickering. Mr. Edward Taylor, architect, 7 Stonegate, York.

RAVENSCAR.—For erection of two villas. Estate office, Ravenscar, Scarborough.

RUGBY.—For erection of the citadel buildings in Castle Street. Mr. Alexander Gordon, architect, 10 Queen Victoria Street, E.C.

SCOTLAND.—Dec. 7.—For removal and re-erection of a temporary hospital at workhouse, Campbeltown. Mr. James Fullarton, Campbeltown.

TIPPERARY.—Dec. 13.—For alterations and repairs to St. Johnstown's Castle. Mr. E. A. Hackett, architect and civil engineer, Clonmel.

TORRISHOLME.—For erection of three houses. Mr. James Curwen, Torrisholme.

WALES.—Dec. 6.—For erection of superstructure of the Royal Victoria Hotel, Prestatyn. Mr. Richard E. Hughes, architect, 10 Abbey Street, Rhyl.

WALES.—Dec. 13.—For erection of a Congregational chapel, with vestry and boundary walls, at Gelli, Rhondda. Messrs. Griffiths & Jones, architects, Town Hall, Tonypandy and Pontypridd.

WALTON-UPON-THAMES.—Dec. 13.—For supplying cast-iron pipes. Mr. W. H. Radford, Angel Row, Nottingham.

WESTON-SUPER-MARE.—Dec. 9.—For construction of shop front and other works. Mr. S. J. Wilde, architect, Boulevard Chambers, Weston-super-Mare.

WETHERBY.—For erection of a tall chimney at the Wharfedale Brewery. Mr. T. A. Buttery, architect, Queen Street, Morley.

WIGAN.—For rebuilding the Clarence Hotel, Wallgate. Mr. W. E. V. Crompton, architect, Moot Hall Chambers, Wigan.

WINCHESTER.—For erection of six cottages. Mr. J. Ashton-Sawyer, surveyor, 62 High Street, Winchester.

WINDHOLM.—Dec. 8.—For erection of a nurses' home and an isolation pavilion at the Northern Hospital. Messrs. Pennington & Son, architects, Hastings House, Norfolk Street, W.C.

WOKING.—Dec. 7.—For erection of public offices near station, for the Woking Urban District Council. Mr. G. J. Wooldridge, surveyor, Bank Chambers, Woking.

YORK.—Dec. 15.—For extending carriage-building shops for the North-Eastern Railway Company. Mr. William Bell, the company's architect, at York.

TENDERS.

BARNESLEY.

For erection of house and shops, &c., at Stairfoot. Mr. HERBERT CRAWSHAW, architect, 13 Regent Street, Barnsley.

Accepted tenders.

G. Haigh, mason.
E. Ashworth, joiner.
M. Fleming, slater.
J. Shaw, plasterer.
H. Ashworth, plumber.
E. R. Fletcher, painter.

BRENTWOOD.

For extension of the clerk's offices at the Asylum. ROGERS & ROBSON, Brentwood (accepted).

BRADFORD.

For two steel lattice footbridges at the workhouse. Mr. FRED. HOLLAND, engineer, &c., 11 Parkinson's Chambers, Hustlergate, Bradford.

J. BAGSHAW & SONS, LIMITED, Batley (accepted) £514 16 0

For erection of stabling for twenty-five horses, Manchester Road. Mr. ABM. SHARP, architect, Albany Buildings, Market Street, Bradford.

Accepted tenders.

W. R. Booth, contractor.
Crabtree & Thornton, joiner.
G. Jackson, plumber.
J. & W. Bates, plasterer.
J. H. Lawson, painter.
J. Smithies, slater.

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Accepted tenders.

A. Gardam, Bridlington Quay, Contract No. 1 . £624 8 0
Hick & Hobson, York, Contract No. 2 . 260 0 0

For erection of four dwelling-houses and two shops at Hildershorpe. Mr. J. EARNSHAW, architect, Bridlington Quay.
J. LAWDON, Bridlington (*accepted*) . £1,610 0 0

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For alteration and enlargement of Queen's Park School. Messrs. THOS. SIMPSON & SON, architects, 16 Ship Street, Brighton.

W. Brown & Son £2,614 0 0
J. Longley & Co. 2,582 0 0
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J. RAYNER, East Hanningfield (*accepted*) . £375 0 0

COLCHESTER.

For pulling-down and rebuilding the Fountain Inn. Mr. G. H. PAGE, architect, Colchester.

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A. E. Diss 3,279 0 0
G. Beaumont 3,150 0 0
A. DISS, Stanwell Street, Colchester (*accepted*) 2,970 0 0

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G. BLOICE, Winchester Road (*accepted*) . 16 10 0

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T. LEDGER, Moss, Doncaster (*accepted*) . 35 0 0

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For erection of stabling, coach-house, &c., at Ravenswood, Savile Park, Halifax. Mr. S. WILKINSON, architect, Sowerby Bridge.

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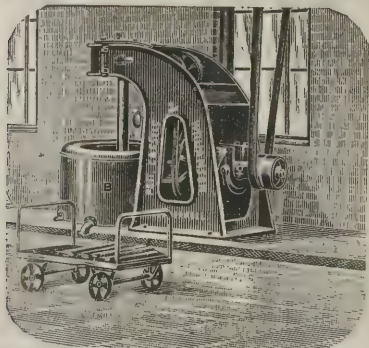
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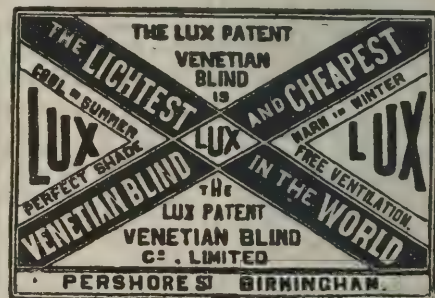
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B. Winchcombe	730	8	0
W. H. SMITH & SON, Bristol (accepted)	700	0	0

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For providing and laying 872 yards of 3-inch cast-iron socketed water-main. Mr. W. F. TOLLIT, borough surveyor, Gate House, Totnes.

J. & H. Roberts	£300	0	0
Chenhall Bros.	281	5	0
Hawkings & Best	190	19	0
E. DISTIN & SON, Totnes (accepted)	182	0	0

TRURO.

For erection of malting and other premises at Walsingham Place. Mr. WM. SWIFT, architect, 23 Lemon Street, Truro.

H. Tippet	£796	0	0
Dyer & Tippet	735	0	0
J. & C. Harris	659	0	0
R. H. TONKIN, Tregoney (accepted)	650	0	0

WALES.

For erection at Coelbren of school buildings, with cloak-rooms, &c., and boundary walls, for the Ystradgynlais Higher School Board.

H. Jones	£832	10	0
E. Thomas	790	0	0
D. Rees	750	0	0
W. Daniel, jun.	741	0	0
J. J. LEWIS, Abercrove, Ystradgynlais (accepted)	700	0	0

WALES—continued.

For enlargement of Gorseinon School, for Llandilo-Talybont School Board. Mr. J. B. MORGAN, M.S.A., architect, Llanelly.

D. JENKINS, Swansea (accepted)	£797	0	0
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For erection of a shop and cafe in Skinner Street. Mr. EDWARD H. SMALES, architect, 5 Flowergate, Whitby.

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T. Fletcher	2,183	0	0
A. Palframan	2,176	16	0
J. BRAIM, Silver Street (accepted)	2,070	0	0
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For construction of a storage reservoir, supply and delivery mains, alterations to filters and other works connected therewith, at the Worcester County and City Lunatic Asylum, Powick. Mr. E. B. MARTEN, engineer, Church Street Chambers, Stourbridge.

G. Law	£1,678	17	4
J. Biggs	1,582	0	0
J. Mackay	1,363	5	2
C. B. Williamson & Co.	1,290	2	8
T. Vale	1,240	0	0
J. Holmes	1,191	5	1
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members of the Institution to the Company for their kindness in affording year after year the use of their fine hall, and in giving them a substantial annual donation. The Company were also to be congratulated on the excellent technical work they were doing in connection with the building and kindred trades.

Mr. J. C. Preston (senior warden) returned thanks. The Company were always glad to lend their hall for such a purpose as this, and it was a pleasure to see around him gentlemen whose names had been household words to many of them for years past.

Mr. T. F. Rider proposed the toast of "The President" in his usual humorous manner. The President of an institution like this, he contended, should be a genial man, a jovial man and a generous man. Everyone, he believed, would admit the geniality of the President, they acknowledged his joviality, and they could all bear testimony to his generosity. It was unnecessary to add a single word to commend this toast.

The toast was very cordially received.

The President, in replying, said he considered it a privilege to be at the head of an Institution like this, and he hoped that as time went on the younger builders would be encouraged to do what they could for the Institution. He could not sit down without referring to the good work that Mr. George Plucknett (the treasurer), who was prevented from being present, had for so long done for the Institution.

Mr. J. Howard Colls, in proposing "The Architects and Surveyors," said that in his opinion the two bodies should be as distinct as possible. If there was anything worse than architects' quantities it was quantity surveyors' architecture.

Mr. W. B. Church, in replying for the architects, said that they always endeavoured to do what was right as between client and builder. An architect's position nowadays was not altogether a bed of roses, for with so many new materials and new ideas he had to be a sort of walking encyclopædia.

Mr. Northcroft replied for the surveyors, and referred to the fact that linendrapers and upholsterers now dubbed themselves builders. If a man liked to be a retail tradesman, he had every right to sell laces behind his counter, but he had no business to interfere with the legitimate trade of a builder, and too often with the unfortunate results he had sometimes met with in his experience.

Mr. H. Holloway gave the last toast, "The Vice-Presidents, Committee and Stewards," which was replied to by Mr. Ritchie for the vice-presidents, and Mr. J. T. Bolding for the committee and the stewards.

In the course of the evening Major Brutton announced the list of subscriptions, which showed total donations amounting to 741*l.*, with 12*s.* of new annual subscriptions. The President's list showed a total of 599*l.* 14*s.*, including a donation of 100 guineas from the President himself.

An excellent programme was performed by students of the Guildhall School of Music.

THE CRIPPLEGATE FIRE.

THE City of London, under a special Act of Parliament, possesses the power to hold what is described as a fire inquest on the occasion of the outbreak of any large conflagration, and the City coroner (Mr. Langham) proposes to exercise this right at the Guildhall, on Monday, at 11.30, in connection with the recent disastrous fire in Cripplegate. The coroner, acting under this Act, has absolute power to prosecute full inquiries into the cause of any outbreak, the means taken for its extinction and the methods which may be taken for the prevention of a similar occurrence. Several fire inquests have been held within the City, it being the revival of an old civic custom which had long prevailed in the interests of the citizens. The City coroner decides whether the fire inquest shall be held or not, unless he is required to do so by the Lord Mayor of the City, the Lord Chief Justice of England or by one of Her Majesty's principal Secretaries of State. The importance and rapid development of the recent great conflagration leave no doubt as to the desirability of a public inquiry in the interests of all concerned. It may not be generally known that the coroner at a fire inquest possesses similar powers to those exercised by a coroner investigating a cause of death. If evidence is given pointing to arson the coroner's jury can return a verdict to that effect, while if the persons implicated are present they can be arrested on the coroner's warrant. If they are not present warrants may be issued against them, and they may be prosecuted at the Mansion House or Guildhall Police Courts. In the present instance the City solicitor (Mr. H. Homewood Crawford) has been specially instructed to represent the Corporation and the Commissioner of City Police (Sir Henry Smith, K.C.B.), while evidence will be given by Commander Wells (the chief of the Metropolitan Fire Brigade), Major Fox (the chief officer of the London Salvage Corps), and by many other witnesses, including some of those whose business premises have been destroyed.

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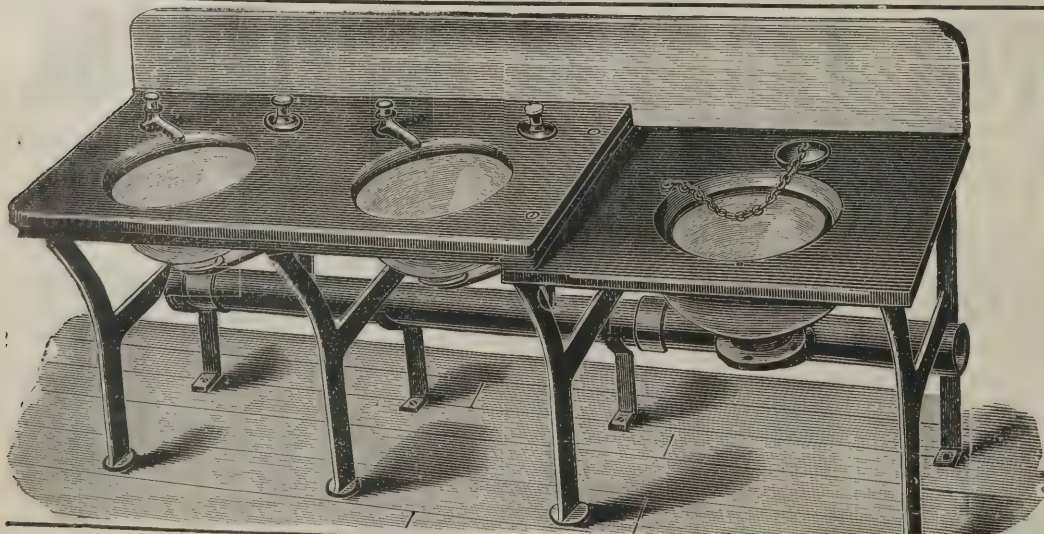
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ANNAN ENGINEERING WORKS.

For some time negotiations have been in progress between Messrs. Cochran & Co., engineers and ironfounders, of Birkenhead, and the representatives of Mr. Mackenzie, of Newbie, for a site at Annan to establish engineering works on a large scale. The negotiations have now, it is understood, been all satisfactorily arranged and settled as between the firm and the proprietor of Newbie estate. Messrs. Cochran & Co. have decided to remove their entire works from Birkenhead to Annan. The site selected is practically the harbour at the mouth of the river Annan, and opens right into the Solway Firth. The land marked out for the works extends to 13½ acres, and lies on the west side of the river. During the high tides iron ships of large tonnage can be launched and floated. A railway siding at present connects the projected works, and joins the main line of the Glasgow and South-Western Railway at a point half a mile to the west of the railway station at Annan. Ships of medium tonnage can at present load and discharge opposite the site of the proposed ironworks. The Board of Trade have just granted powers to the harbour trustees to convert the harbour into a public port. The establishing of large ironworks and shipbuilding will undoubtedly cause a large development of trade between larger towns in England and the south of Scotland. At present the firm employ some hundreds of engineers at Birkenhead, and it is their intention to further increase their business at Annan and employ a larger staff. Two hundred dwelling-houses are to be immediately erected at the works for the accommodation of the employes of the firm. It is understood that the works have to be pushed forward with all haste.

THE MANCHESTER CULVERT SCHEME.

At the opening meeting of the Manchester Association of Students, in connection with the Institute of Civil Engineers, the president, Mr. W. B. Worthington, chief engineer of the Lancashire and Yorkshire Railway, delivered his inaugural address, in which he discussed the subject of design in relation to maintenance. He pointed out that in designing a structure the engineer must comply with three conditions, first, that the structure should be strong enough to fulfil the purpose for which it was intended; secondly, that it must be capable of being maintained in good order by the class of labour and with the

material and appliances available at a reasonable expense; and thirdly, it must be constructed at the minimum cost consistently with fulfilling the two conditions already laid down, and any other special conditions that might be imposed. The second of the three conditions, he urged, was of the greatest importance, and could not be too often or too strongly insisted upon. The disregard of it arose from two main causes—ignorance of maintenance requirements and desire to save first cost. They had in the city of Manchester a remarkable illustration of the points he desired to make. The rivers committee of the Corporation, who had for a long time past anxiously considered the matter in all its bearings, advised by the city surveyor and supported by practically the whole Council, decided that the sewage of Manchester could be more economically and satisfactorily dealt with by means of a culvert to carry off the effluent from the sewage works to the tidal waters of the Mersey estuary than by treating the sewage at the sewage works in such a manner as to produce an effluent which would satisfy the requirements of the Mersey and Irwell joint committee, and discharging that effluent into the Ship Canal. The whole matter practically turned upon the maintenance question. The Council having all the facts before them and having, by their committee, gone fully into the first cost and cost of maintenance of the rival schemes, decided that it would be cheapest and best for the city to take the effluent to the sea. The citizens, when called upon to vote in confirmation of that, had gone contrary to the opinion of their representatives and skilled advisers, and had done so, no doubt, in part owing to the mass of voters not being sufficiently informed on the merits to appreciate the importance of the second consideration which he had put forward, which required that the work should be able to be maintained at a reasonable cost. They understood that the culvert scheme involved a large initial outlay, and in seeking to avoid that they overlooked the fact that it would, if carried out, save their pockets by relieving them of the necessity of the heavy annual outlay which the alternative scheme involved.

FASHIONABLE Folkestone is very indignant at the proposal of two distinct companies to run electric trams along the main thoroughfares of the town and district. The adjoining towns of Sandgate, Hythe and Cheriton are all in favour of the scheme, which also finds support from the middle classes in Folkestone.

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PETRIFITE.

WE have in a recent number given a full report of a paper that was read before the Architectural Association by Mr. H. D. Searles-Wood, F.R.I.B.A., past president, and subsequently discussed by members who were present. We are reminded that at one of our building exhibitions we were interested and surprised at specimens that were then brought under our notice, and we have been waiting to see the invention brought out on mercantile lines, for a delay not unnaturally suggests that there are practical difficulties still to be overcome.

However, from facts that have been put before us from a reliable source we are satisfied that the proprietors have exercised a wise discretion in not "rushing" the business, as the delay has enabled them to secure an additional 4,000 acres of rich magnesite mines with an almost inexhaustible supply. The petrified cement in our opinion (which, of course, is largely based upon the reliable test of Messrs. Kirkaldy & Sons, published *in extenso* in ours of November 13) is likely to be of great value in utilising waste products; in other words, converting what is now an expense and a nuisance into a saleable and valuable manufacture. We have just seen a convincing illustration of this in connection with the plate and glass manufacture. The sand used by one firm in the North every week necessitates 500 tons to be carted or barged away at a heavy cost, and will probably by means of petrified be converted into a valuable building stone that will command a good price. As in this same town there are not less than 2,000 tons weekly to be thus dealt with, the introduction of petrified promises to be a great boon to this cognate manufacture. We are informed that a strong company is now being formed to manufacture and otherwise develop this new industry. During this and the next week specimens will be exhibited at 10 Walbrook, indicating what has already been effected by petrified with unwashed sea-sand, common earth, sawdust, slag, slate and brick *débris* and town refuse.

BIRMINGHAM MASTER BUILDERS' ASSOCIATION.

THE annual meeting of the Birmingham Master Builders' Association was held on the 25th ult. at the Grand Hotel; Mr. B. Whitehouse presided. The committee, in their report for 1897, said they were pleased to record the continuance of the improvement in the general state of trade of the country referred to in their last report. The building trade had to some extent

participated in that improvement; but contractors had been seriously handicapped by the increased prices of all materials. In November last notices were received for alterations in the rules from the carpenters, bricklayers, masons, plumbers, plasterers and labourers, the labourers being the only branch asking for an increase in wages. A general meeting of employers and operatives was held on January 13, to endeavour to make the notices received as to hours of work and pay-time uniform. That end was practically attained, and it was strongly felt that uniformity on those two points was imperative. Notices had again been received from the carpenters, masons, plasterers, plumbers and labourers, asking for alterations of rules and a considerable advance of wages. These notices would receive the careful consideration of the committee. The Workmen's Compensation Act would throw serious responsibilities on employers, and a circular would be issued to architects suggesting the addition to bills of quantities of a clause making provision to cover the enormous risks incurred by contractors under the Act which will come into force next year. The balance-sheet showed total receipts for the year 130*l.* 4*s.* 6*d.*, which, with the balance from last year, made a total of 270*l.* 3*s.* 7*d.*; and the various disbursements, including secretary's salary, were 117*l.* 7*s.*, leaving a sum of 152*l.* 16*s.* 7*d.* to the credit of the Association.

In moving the adoption of the report and balance-sheet, the Chairman said they had reason for congratulating themselves that the increased trade had kept up, and it was a source of pleasure to know the workmen had been fully employed. While they had endeavoured, on their part, to meet the demands made upon them by architects and clients, they had not only been seriously handicapped by the increased price of all materials, but by the difficulty in obtaining those materials. This had caused delay, and had made it next to impossible for them to calculate how long a job would take or to give an approximate estimate of the cost. The operatives and themselves had met and fully discussed the rules, and they really thought they had settled them for a considerable time. It seemed a pity that after having thrashed out most of the points as they did in the spring of this year they should come up again for further discussion. Whatever was said at the beginning of the year applied now, and he regretted that until the whole of the branches were unanimous in having one pay-time and one working-time, they should have been asked to reconsider the matter piecemeal. Referring to the Workmen's Compensation Act, he said that

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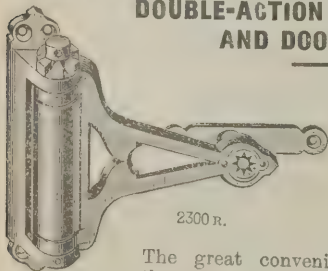
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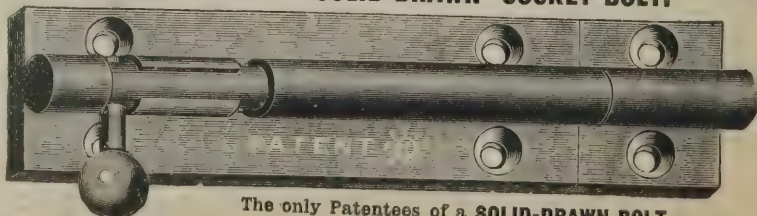
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personally he thought it was unjust in principle to the employers and the employed. In the first place, it threw the liability on employers for accidents over which they had no control; and, secondly, it pauperised the workmen, instead of encouraging them to thrift, because it promised them something for nothing. Under the provisions of the Act the employers might find themselves, after making every provision as far as insurance went, practically ruined, for the reason that an accident might occur that would disable a number of men to whom a legacy would have to be paid of 17. weekly. In the case of death there was a minimum compensation of 150%, which might be increased to 300%. He considered it wrong that the workmen should not be asked to contribute to an insurance fund. What the Government might have done was to have formed a national insurance company, to which employers should contribute, and to which the workmen should also pay a moiety, and not place the whole of the liability on the employer. It was a matter which deserved their consideration; and although the Act would come into force next year, and they would have to bow to it, he thought the time would come when it would have to be replaced by something more just, or swept away.

Mr. C. H. Barnsley seconded the motion, which was carried. On the proposition of the Chairman, seconded by Mr. Albert Smith, County Alderman J. Bowen was elected president for the ensuing year. Mr. F. G. Whittall was elected vice-president; Mr. G. Twigg, treasurer; Mr. E. J. Bigwood, secretary; and Messrs. T. Johnson and J. S. Surman, auditors.

Mr. Newell proposed "That the notices received from the various branches of the operatives be left in the hands of the committee to deal with."

Mr. Trentham seconded the resolution, which was carried without discussion.

Votes of thanks were passed to the retiring president and to Alderman Bowen.

THE closing services prior to the dismantling of the church were held on Sunday in Christ Church, New Street, Birmingham. The church is the only one in the city which is connected with the central telephonic exchanges, and not only was the church crowded, but all the wires connected with the church were in use for the benefit of subscribers who were unable to attend.

BUILDING AND BUILDERS.

A WOLVERHAMPTON builder has had to pay 187. 4s. fines and costs for not properly bonding the walls of two small houses.

THE new female seminary at Washington, Pa., has been designed by Miss Elsie Mercur, of Pittsburgh. The contractor is also a woman, Mrs. Clara Meade, of Chicago. There will be a lively time, says the *Canadian Architect*, when women also invade the ranks of the trades unions.

THE foundation-stone of the Goldfields Cathedral, which is to be erected at Coolgardie, was laid on Tuesday last with Masonic honours by Sir Gerard Smith, Governor of Western Australia.

THE Rev. J. Whiteside, vicar of Shap, Westmorland, has applied at the Carlisle Consistory Court for a faculty for the restoration of his church. It was stated that the cost of the work proposed to be done was estimated at 2,500l. to 2,700l.

THE foundation-stone was laid on Monday last of the new Primitive Methodist church and Sunday school in Crystal Palace Road, East Dulwich. The buildings, which will be in the centre of a dense working-class population, will accommodate 300 worshippers and the same number of Sunday-school children. The cost is estimated at 2,100l.

ON Monday afternoon Jeremiah Makinson, builder, of Leigh, and three of his men, Thomas Balmer, William Cleworth and John Langhorn, whilst winding up a girder at Peter's Corn Mill, Glazebury, accidentally caught another girder, weighing 7 cwt., which dropped upon them from the height of 10 feet. Makinson's back was injured, Balmer had his back cut, and all four were badly bruised and scarred.

THE memorial-stone of a new church which is being erected at the corner of Lawrence Street and Alexandra Street, Partick, for the congregation of the East U.P. church, was laid last Saturday. The style of the architecture of the building is thirteenth-century Gothic, with generally massive treatment and simple and severe detail. The central feature of the front is a lofty gable with broad buttresses at each side. A central buttress of lesser projection divides the gable, and in the lower portion are two four-light windows under the arches which spring from the buttresses on each side. Over these are two large triplet windows with cusped heads, occupying the whole space between the buttresses, and recessed under deeply moulded pointed arches. The apex of the gable, which rises over 70 feet above the street, is enriched with a moulded

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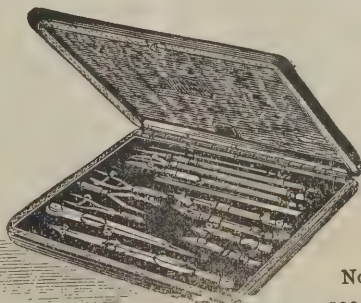
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niche and terminates in a foliated cross. A projecting porch at the south-east corner of the building forms the main entrance, and is more elaborately treated in detail, a very richly moulded archway giving access to the wide double doors which open into the inner vestibule. On the west side of the main gable is another doorway, which also forms the hall entrance, and between this and the hall gable, which fronts Lawrence Street, is an octagonal turret, quite plain in the lower portion, and with a series of traceried windows in the upper stage, forming the gallery and hall staircase. The halls and accessory-rooms are placed to the west side of the church, but are so arranged that independent use may be made of either, and are accessible from both streets. The side elevations of the church show a series of low four-light windows with square heads in the lower stage, and in each bay over these, divided by broad piers, are tall two-light windows of lancet shape, with moulded and cusped heads. The organ-chamber is projected in the chancel form to the north, and at the southern end is a tall narrow gable containing the gallery staircase. Internally the same massive and severe treatment is proposed. The nave is divided from the aisles by stone piers, one only on each side, springing from which are moulded arches of wide span. The stone piers are simply splayed, the gallery beams resting on projecting stone corbels, and the inner angles of the piers are carried up to the roof and form rests for the main roof timbers. The principal roof timbers will be shown, and the ceilings will be lined with wood panelling. The number of sittings provided is 840, and there are also halls for 400 and 200, classrooms, ladies' room, vestry, kitchen, &c. The total cost will be about 7,500*l.*, and it is hoped to open the church by next autumn. The architect is Mr. John B. Wilson, Glasgow.

SERIOUS subsidences are taking place in the township of Kinsley owing to the place being undermined through the operations of the new Hemsworth Colliery Company in working what is known as the Shafton Pit. The matter was reported at the meeting of the Hemsworth District Council a month ago, when it was stated that up to that time seventeen or eighteen houses had been rendered uninhabitable through the collapsing of the land, and that the whole drainage system was disorganised owing to the houses having sunk below the drains, and since then the damage is said to have considerably extended.

ILLUSTRATIONS.

CATHEDRAL SERIES.—CANTERBURY: SOUTH-WEST CORNER.

THE LIBRARY, INSTITUTE OF CIVIL ENGINEERS, WESTMINSTER.

WORKMEN'S HALL, CLUB, SAVINGS BANK AND OFFICES,
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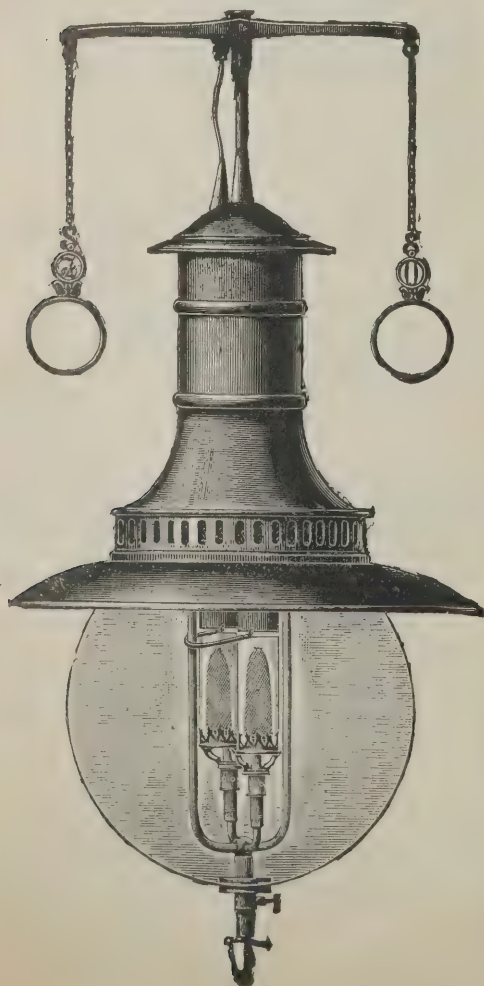
TRADE NOTES.

THE extension to the Toxteth Union Infirmary, Liverpool, is being warmed and ventilated by means of Shorland's patent double-fronted Manchester stoves with descending smoke flues, those previously supplied having given every satisfaction.

THE Reliance Lubricating Oil Company, of Water Lane, Great Tower Street, have sent us their price-list of engine and machinery oils for lubricating every kind of machinery from the typewriter to the locomotive or marine engine. The firm also supply illuminating oils, solidified oil for patent spring lubricators, belt syrup for softening driving belts and keeping them in good condition, &c.

A LARGE window has lately been placed in Slébech Church as a memorial to the late Miss Philipps, daughter of Sir Charles E. G. Philipps, of Picton Castle, Haverfordwest. Sir Charles Philipps has also beautified the large hall of Picton Castle by four large stained-glass heraldic windows, containing the family pedigree from the eleventh century to the present time, arranged by Sir Albert Woods, C.B., K.C.M.G. The whole of these works were executed by the well-known firm of Alexander Gibbs & Co., 10 Bloomsbury Street, London.

THE parish church of Hartlebury, near Kidderminster, has been recently enriched by the addition of two carved oak screens for the chancel aisle. They are executed in Austrian oak with traceried and carved panels, surmounted by a pierced cresting in the Late Decorated style of architecture. In the centre of one screen the royal coat-of-arms is tastefully carved on a ribbon as follows:—"To commemorate the Diamond Jubilee of Queen Victoria, this organ is offered for the service of Almighty God by the parishioners, June 20, 1897." The work was entrusted to Messrs. Jones & Willis, of Birmingham and London, who executed it in the most artistic manner.



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VARIETIES.

THE Council of the Iron and Steel Institute have accepted an invitation from the Association of Swedish Ironmasters to hold the autumn meeting of the Institute next year in Stockholm. The meeting will be held in August.

HER ROYAL HIGHNESS PRINCESS LOUISE, accompanied by the Marquis of Lorne, visited Paisley on Tuesday last, and, after formally opening the Brough Home for Nurses in Oakshaw, laid the memorial-stone of the new technical school in George Street.

MR. H. BUSHELL, F.S.I., read a paper before the Auctioneers' Institute last Tuesday on "The Practical Application of the Principles and Law of Dilapidations."

TOWARDS the widening of Westbourne Park Bridge the works committee of the Paddington Vestry recommend the latter to contribute a third of the 17,628*l.* estimated as required, providing the London County Council and the railways concerned defray the remaining two-thirds.

THE Nottingham Master Builders' Association have now permanent offices at Bentinck Buildings, Wheeler Gate, with a room set apart as committee and reading room, and are forming a library of books connected with trade matters and also of catalogues and price lists, &c., of all-goods, appliances, &c., used by the building trades.

THE Dudfield Memorial Hall and classrooms connected with the Lansdowne Place Ragged School and Mission, Tabard Street, New Kent Road, were opened on the 29th ult. The new buildings, erected at a cost of 1,000*l.*, consist of the hall, capable of holding 150 adults; an infants' room, to accommodate 200; and classrooms, capable of holding 100 adults.

THE new Lyric Hall, Belfast, was opened on the 26th ult., and highly favourable opinions were expressed by the large and fashionable audience which attended the inaugural concert. The hall is constructed to seat 1,500. The front portion of the area is fitted with handsomely upholstered armchairs. Behind this portion is the area, fitted with backed seats. An important point in the construction of the ground plan is the width of the side passages, which is ample to give easy access to the seats. The private boxes and balcony stalls are tastefully and comfortably decorated, and the ventilation is good.

AT a recent meeting of the directors of the Edinburgh Building Trades' Exchange the following motion was submitted:—"It being currently reported in building circles that

the estimates for the work at the New Royal Infirmary Pavilion have not been settled in a satisfactory manner, the directors of the Exchange take up the matter, and instruct their secretary to communicate with the secretary of the Infirmary, and ask him, for the satisfaction of the building trades, to forthwith publish a list of the estimates received."

DURING the thunderstorm on Sunday the tower of All Saints' Church, Nottingham, was struck by lightning. Big blocks of stone fell on the lawn of the vicarage, while others were thrown inside the church. Fortunately the service was over, and the church was closed.

IT has been resolved at a special meeting of the Workington Town Council to contribute 100,000*l.* towards the cost of the construction of a new deep-water dock on the south side of the existing harbour. Lord Lonsdale's interests are to be bought out, and traders connected with Cammell's, Moss Bay, Lowther and Workington hematite works are pledged to contribute not less than 75,000*l.* The estimated cost of the dock is 300,000*l.* A Bill will be deposited in the next session of Parliament and a public meeting of ratepayers will be held to confirm the Council's unanimous decision.

THE Duchess of Beaufort on Monday cut the first sod of the South Wales and Bristol Direct Railway, which the Great Western Company are constructing to shorten the distance between London and Newport. The new line will be 33 miles long, extending from Wootton Bassett, through Wilts and Gloucestershire, and the heart of the Badminton hunting country to Filton, where it connects with the Severn Tunnel Branch. It will cost a million sterling, and take 3½ years to construct. It will reduce the journey from London to Newport, *via* Bath and Bristol, by 11 miles, or *via* Gloucester by 26 miles. The ceremony took place at Chipping Sodbury, an old-fashioned Gloucestershire town.

THE work of reconstruction of Highgate Archway has now commenced. Several loads of timber have been placed on the Islington and London side, and stout piles have been erected on the Hornsey and Middlesex side. A temporary building has been erected at the Highgate end, and workmen will at once begin a difficult part of the work, diverting the mains of the New River Company. The footway will be maintained on the north side during the construction of the southern half, and a temporary footway will be formed on the south side while the northern position is being removed. Vehicular traffic will have to be diverted, but the date is not known when it will be stopped.

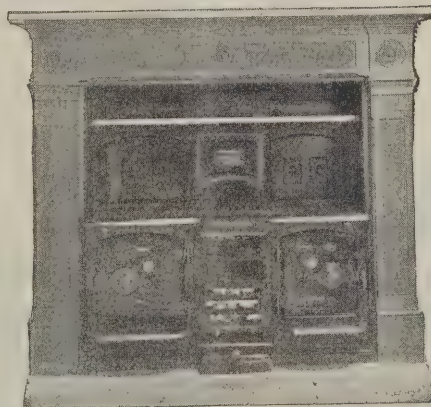
SANITARY CONGRESS, LEEDS, SEPTEMBER, 1897.

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ELECTRIC NOTES.

A SYNDICATE has been formed to promote the construction of an electric railway to the highest level of the Great Orme, and Mr. Enfield Taylor, engineer, Chester, at a special meeting of the Llandudno District Council, submitted plans for the proposed scheme. It is suggested that the line start from the site now occupied by the old Victoria Hotel, in Church Walks, and proceed along the road to St. Tudno Church, crossing some fields to the right of the church to a terminus not far from the old telegraph station and the Great Orme Lighthouse. The Council approved the scheme, with only one dissentient. Mr. Taylor said that the syndicate intended applying to Parliament for powers next session, and if obtained the company would be formed at once.

At the adjourned special meeting of the Huyton-with-Roby District Council, held on the 29th ult., the question of electric light for the district was again considered, and it was resolved that the Council should apply for a provisional order and that they endeavour to come to terms with the British Insulated Wire Company, with a view to withdrawing all opposition to the wire company's application for a provisional order.

At a special meeting of the Hereford Town Council it was decided that it was expedient that the Council apply to the Board of Trade for a provisional order under the Electric Lighting Acts 1882 and 1888, authorising them to supply electricity for all public and private purposes within the city. In the course of the discussion it was stated that the Council had no immediate intention of supplying the electric light, and the object of obtaining the order was to prevent any outside company stepping in. The resolution was carried unanimously. It was also decided that it be referred to the finance committee to prepare an estimate of the amount of capital required in connection with the undertaking.

ON Tuesday last Mr. Frederick H. Tulloch held an inquiry at Llandudno, on behalf of the Local Government Board, into an application by the Llandudno Urban District Council for powers to borrow a sum of 25,000*l.* for the erection of electric-lighting works and the provision of an electric refuse destructor. Mr. A. H. Preece, the engineer, explained the details of the electric-lighting works, which it was intended to erect near the present gasworks. The system to be adopted was that known as the three-wire system, and the scheme had been approved of by the Board of Trade. It was proposed to place thirty arc-lights on the promenade, extending as far as Penrhyn Crossing,

and twenty other arc lights in Mostyn Street and the streets crossing thence to the promenade, making fifty in all, each of 1,200 candle-power. The electric-lighting portion of the scheme would cost 15,300*l.*, and 1,000*l.* had been allowed for contingencies. Mr. Stephenson, the Council's engineer, explained the plans of the electric destructor, which would consume about 15 tons of refuse in 24 hours, the present average being about 30 tons per day. The estimate for the erection of this portion of the works was 8,591*l.*

At a meeting of the Liverpool Corporation lighting committee, held on Friday last, the engineer presented his periodical report. From this it appeared that the equivalent number of the candle-power lamps connected to the supply mains was for private lighting 55,895 and Corporation lighting 6,139, making a total of 62,034, being an increase of 1,584 for the month. The number of units supplied during the month of October to private consumers was 175,054, and to the Corporation 46,247, making a total of 221,301, as against 147,924 in the corresponding period of 1896. Authority was given for the extension of the mains in Whitechapel, Scotland Road, Everton Road, Aighburth Road and Brownlow Hill.

THE HULL DOCKS SCHEME.

THE proposals of the North-Eastern Railway Company in regard to the increase of dock facilities at Hull were the subject of several speeches delivered at the annual meeting of the Hull Chamber of Commerce and Shipping.

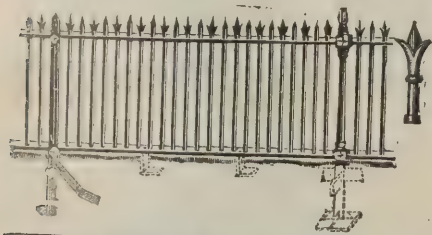
The President, in moving the adoption of the report, referred to the North-Eastern Railway Company's proposals. He said that Mr. Gibb and Sir John Wolfe Barry had invited them to inspect plans of their proposals with regard to the docks, and he would only remark that he was pleased to see that the plans provided for the accommodation of the railway and river craft. He hoped it would be such as met the views and requirements of those trades. As to the Hull and Barnsley Bill, he said if it would make that company more useful, it would have the support of that Chamber.

Mr. Arthur Wilson, in seconding the motion, also referred to the North-Eastern Railway Bill. He said the plans were practically the same as those of last year, with some considerable improvements, which he hoped might take away any feeling of opposition against them which had previously existed. The North-Eastern Railway Company had not been

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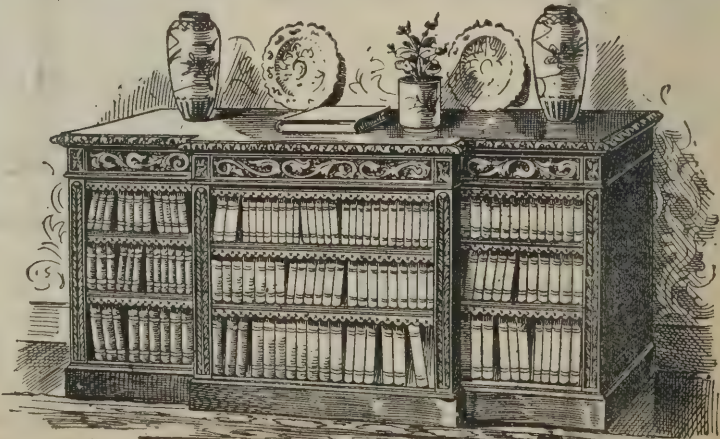
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satisfied with only going in for what they proposed to do last year, but were going in for a larger scheme, which, he was pleased to say, if carried out, would most materially benefit the timber trade. He hoped the representatives of that trade had seen the plans and agreed with their practicability, seeing that they would provide the facilities which were so urgently required for the carrying on of their large and particularly flourishing trade. There was one portion of the scheme which would come before the Hull Corporation. The North-Eastern Company had asked for what was called the Western Reservation, and the Hull and Barnsley had also asked for it. There came the difficulty of two people wanting the same thing. It was most important so far as the port was concerned, and its utilisation would facilitate the trade. There was not a doubt about the fact that it would not do the Hull and Barnsley Company the slightest harm if the North-Eastern Company got it. The Hull and Barnsley Company had any amount of land to the east of the Alexandra Dock, and they could go on extending their docks in that direction indefinitely, if they could find the money to enable them to do so. There was a legal question which it was unnecessary for him to refer to, and would be thrashed out in the House of Commons committee. He hoped that House would support them, for the extension of the timber trade was absolutely necessary. He was in this connection referring to the clause which was put into the Bill when the North-Eastern Company took over the docks. The trade of the port absolutely demanded that these facilities should be provided for, and he hoped that when the Bill came before Parliament that that great improvement would be carried. They could not expect to get such schemes as a tunnel under the Humber, which was one of the wild ideas that got into people's heads. Such things might come in forty or fifty years, but they would not, in his opinion, come in his day. If they got the present scheme carried it would be of immense benefit to the port. If the North-Eastern Company were allowed to carry out their plans, he had no hesitation in saying they would spend very nearly two millions of money in the various improvements for the benefit of the port, and what the Company most certainly expected was their cordial assistance in the carrying out of those schemes. He felt sure that the oil trade, the timber trade and the grain trade would do their best to carry the scheme through Parliament. He had given them not only his views, but those of his co-directors. In conclusion, he assured the meeting that the resolution to go on with the Bill, when it came before the Board, was agreed to unanimously;

there was not one dissentient. It was not true, as had been stated, that it was carried by only a small majority.

Mr. H. J. Farmer-Atkinson said he was glad to help the North-Eastern Railway Company to spend money, but he was not glad to help them to prevent the Hull and Barnsley spending money. They wanted every company to come to Hull to prosper, but not at the expense of Hull. At present they should hold their hands, only doing the best they could for the city, and taking care that the Hull and Barnsley was not swallowed up. The North-Eastern Railway Company was too big, but not too big if they used their power for the city. Mr. Farmer-Atkinson then advocated the formation of a dock trust, to take the control of all the docks in the port out of the hands of the two railway companies.

Mr. F. R. Pease said that both Mr. Wilson and himself had had great pleasure in going down to the Victoria Timber Dock some time ago as a deputation. They saw the great congestion there; in fact, there was an enormous congestion of timber in that portion of the dock. The result of that visit had been seen in the promotion of the Bill in Parliament to extend the dock accommodation of Hull. The North-Eastern Company were, indeed, desirous of getting on with the help they desired to extend to the port of Hull. It would be useless for him to go into the policy of the short traders and the docks. They had already provided in the Bill for the lighters and keels having a separate entrance. He could not help remembering that last year, in the House of Commons committee-room, a great deal was said of the long stretches of open water which it was said would result from alterations in the docks, but when the promoters said that this time the Corporation pier would be extended down the river, and that the Corporation tidal dock would have a separate entrance, he thought again the North-Eastern Company might be said to be doing their best for Hull. He hoped that, knowing the intention of the company to spend such an enormous sum of money in the improvements, they would have the earnest support of the Chamber in the promotion of the Bill in Parliament.

Mr. Frank Lambert (president of the Seed, Oil and Cake Association), speaking in support of the motion, said he thought the North-Eastern Railway Company had met every possible objection, and had remedied the defects of last year. They desired that the Bill should be passed, as it would be a great advantage to their commercial business.

The motion was then agreed to, and formal votes of thanks and the election of the Council closed the proceedings.

THE GREAT FIRE.

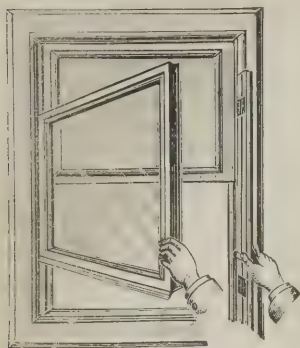
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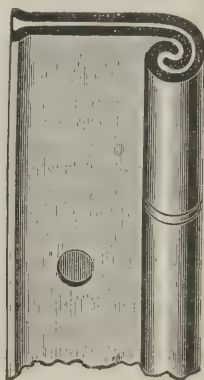
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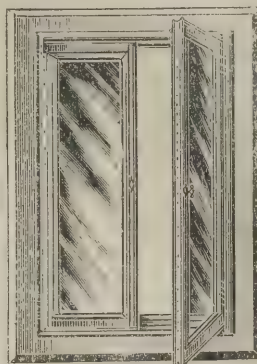
WINDOWS bring a great many fees to the Patent Office every year. They are always before the eyes of inventors, and it is difficult to look at any ordinary window without the conviction that several improvements are feasible. A glance over the index of a year's specifications of patents suggests how numerous are the efforts to realise ideas about lifts, weights, stays, pulleys, fastenings, guards, dust excluders, opening and closing apparatus, and so forth. The firm of Messrs. Tonks, Limited, is associated with window improvements as well as with many



Ordinary sash window with Nicol's fittings, showing batten rod hinged back to allow sashes to be brought into room.



Continuous hinge for use with casements.



Casement fitted complete.



Sectional elevation, showing scroll weather check at top and bottom.

other classes of aids to comfort and adornment in buildings, but their new series called "Nicol's Patent Safety Windows and Fittings" can be considered as accomplishing a revolution in the construction of windows. In a few words the invention may be described as the application of metal-work to windows in a manner which combines efficiency and strength without any heaviness. It is well to premise that in no degree need the character desired for a window by an architect be diminished by the improvements, which are applicable to cottage windows no less than to those in the largest mansions, schools, hospitals, and other public buildings. By means of the invention the difficulty and danger of cleaning windows need no longer trouble servants. Sashes can with little difficulty be turned as readily as any folding

screen, and washed within a room. All other operations are no less easy. This arises from what may be called the working parts of the woodwork being faced with metal sections, which allow of motion that would be impossible in any other way. The sections of beads, draught and dust protectors, weather-guards, &c., are made in lengths with counter-sunk screw holes 3 inches apart, and can be obtained in zinc or brass, bronzed or gilded.

Messrs. Tonks have arranged all the parts to work together for varieties of their patent slide hinge window and sash hinge window, and it is desirable that all parts should be obtained as contemplated by the inventor, but the separate fittings can be obtained; repairs are therefore easy. It must not be supposed that the improvements are only to be purchased at a price which is restrictive. The prices, as announced to the trade, are surprising by their moderation, especially when the character of the firm's metal-work is considered. This will be seen from the illustrated description of the improvements which we recommend all our readers to obtain. It may be anticipated

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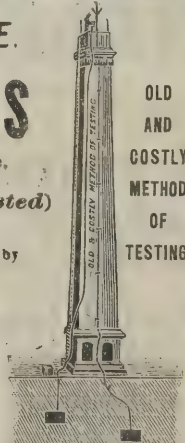
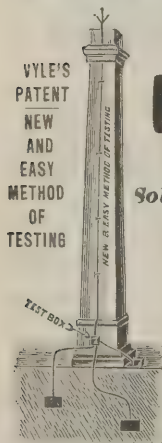
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THE LONDON COUNTY COUNCIL AND CONTRACTORS.

IN accordance with one of the recommendations of the special committee on the Works Department adopted by the London County Council, the general purposes committee of the Council have been considering what alterations should be made in the conditions which are imposed upon persons contracting for the Council's work. The committee have now concluded their labours and will shortly present to the Council a report upon the matter, in which they make a series of recommendations involving some important changes in the terms of contract. In their evidence before the special committee several contractors strongly objected to the words inserted in contracts compelling them to observe "the rates of wages and hours of labour recognised and in practice obtained by the various trade unions." The committee now recommend the Council to make the clause read "recognised by associations of employers and in practice obtained by the trade unions." Some objection was taken to the radius within which the regulation as to wages and

hours of labour operated. Under the old form of contract the radius is twenty miles, measured in a straight line from Charing Cross. The Institute of Builders have written suggesting that the radius should be altered to twelve miles, as that is the radius within which the agreement as to wages and hours of labour between the Central Association of Master Builders of London and the various unions operates. The committee have adopted the suggestion and recommend the Council to alter the radius to twelve miles. Objection was also taken to the provisions giving the clerk of the Council power to direct examination of the books of anyone contracting for the Council. The committee now recommend that the power of examination should be limited to the time and wages books and sheets of the contractor. At the same time they suggest that the money penalty clause for breach of this stipulation should be deleted. The committee further recommend that no alteration should be made in the clause relating to the employment of improvers and men with physical infirmities below the full rate of wages, but they express the opinion that in the event of a contractor employing a few of such men, and showing reasonable grounds for so doing, the Council would not press for penalties. No alteration is suggested in the clause with reference to the opening of priced bills of quantities, but the clause providing a penalty for the breach of the stipulation as to displaying at the works the schedule list of wages the committee suggest should be deleted. They also submit for the Council's approval a new arbitration clause. The committee express themselves as strongly of opinion that no outside arbitration should take place except after the completion of the works, and have drawn up a clause to carry out that opinion. Several other minor amendments, chiefly to give effect to the above recommendations, are also suggested.

THE LIFE-WORK OF THE LATE SIR HENRY DOULTON.

IN the "Journal of the Society of Arts" Sir George Birdwood has given the following eulogium on the late Sir Henry Doulton:—

May I be permitted to add to the obituary notice of the late Sir Henry Doulton in this week's "Journal" some supplementary remarks on the great and, in every sense, beneficent impulse given by his personal enthusiasm and public spirit to

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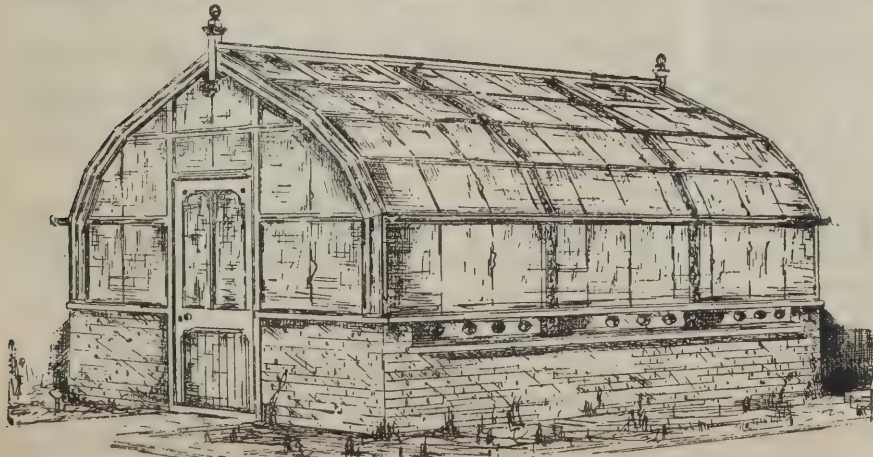
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he production of cheap art pottery in this country, by the revival in Lambeth since 1871 of the manufacture of ornamental salt-glazed stoneware, of the kind which has become popularly known as "Doulton ware," and since 1873 of under-glaze-painted earthenware, or, as it is now distinctively called, "Lambeth Faience."

The origin of the potteries at Lambeth can be traced back to the seventeenth century, when some Dutch immigrants settled in the parish and made it, what it has ever since remained, the *vicus ceramicus* or "potters' quarter," *par excellence*, of London. They carried on their art there after the manner in which they had carried it on for generations before in Holland, and so firmly rooted it both in Lambeth and Fulham, and also, through their success in these places, among the ancient tilewrights of Staffordshire, that within one hundred years the English manufacture of "Delft," or enamelled earthenware, had almost entirely extinguished that of Holland itself. Thus Macpherson, in his inexhaustible "Annals of Commerce," writes in 1765:—"Formerly we all took our meat off plates made at Delft, in Holland; now the Dutch generally use our Staffordshire ware."

Lambeth was indeed made altogether Dutch, and almost an architectural reproduction of the town of Delft itself, as will be acknowledged by all who can remember that picturesque line of quaint old buildings which once stretched along the Thames between the Archbishop's Palace and Vauxhall Bridge, before it was swept away to make room for the Albert Embankment. The Dutch also introduced into Lambeth the manufacture of salt-glazed stoneware, which had been known in England from the middle of the sixteenth century in the form of old jars and flagons popularly called "greybeards" and "bellarmine." The details of their decoration show them to have remotely been of Eastern origin, and our modern "Doulton ware" is, through the imitation of the early Dutch potters of Lambeth, indirectly derived from them.

Doulton's earliest artistic effort in salt-glazed stoneware was the well-known "Toby jug," which, modified from a Dutch original, had been made at Lambeth from the earliest years of potting there, and was still the typical example of "high art" in Lambeth and Fulham down to 1871. We may laugh at this homely old ale pot now, with its disjointed ornamentation of high-bellied toppers, windmills and hounds and huntsmen in chase of a stag, but it will always be dear to us of the passing generation from its associations with the days of our youth; and after all it is of an appropriate shape and a fine colour, and

it always has a better-proportioned and better-attached handle than is generally seen on our later modern English mugs and jugs, the handles of which are only too frequently undersized, badly modelled and most carelessly applied.

It was not, however, until 1855 when Sir Henry Doulton had completed his apprenticeship under his father, and began to take a leading part in the direction of the firm, that the first real and important advance was made in the artistic character of the work of the Lambeth potteries by the production of terracotta garden vases in both red and buff clay; and a little later attempts were made, on the suggestion of Mr. George Tinworth, to apply incised decoration to small salt-glazed stoneware articles for all kinds of minor uses. Very little progress was, however, made until 1871, when the collection of their work sent by the Messrs. Doulton to the exhibition held in that year at South Kensington took the town, as it were, by storm. Her Majesty the Queen bought half of the tall case of "Doulton ware" shown, and this was the beginning of the actual trade in the Lambeth art pottery.

Even so far the results were only tentative and uncertain. The body of the ware was still coarse, and the only two colours in use were wholly beyond control in the firing. To obtain purity, brilliance and variety of colour on so coarse a ground, and under the trying process of burning was indeed no easy task. But in the end all difficulties were overcome, and at the Vienna Exhibition of 1873 Messrs. Henry Doulton & Co. were able to contribute a series of examples of their artistic stoneware in the final maturity of form and incised sculpture in which we know it now. His success encouraged him to undertake the revival in Lambeth of the old local Dutch art of underglazed painting on "biscuit," which in the course of 150 years had become completely naturalised in England. As in the case of the "Doulton ware," lady artists were chiefly employed in the decoration of the new Lambeth faience, and by 1885, the last occasion on which I thoroughly went into the matter, close on 400 ladies were engaged in this way in the service of the firm.

These particulars will give some idea of the greatness to which "the Lambeth Potteries," under the administration of the late Sir Henry Doulton, have grown, and of their importance as sustaining the character and promoting the commerce of one of the greatest branches of British art industry. But it is not on this account that Sir Henry Doulton's life-work is chiefly deserving of recognition by his contemporaries; nor is it because of the opening he has made for the occupation of

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steadily increased numbers of women in a handicraft in which they are so happily fitted by nature to excel, and in a neighbourhood where such employment of female labour had been previously altogether unknown. What we are called upon to honour in him above everything else is, in my humble opinion, his sustained devotion to the principles on which he acted in organising the revival of the old ceramic craft of Lambeth, through the fruitful operation of which it has so rapidly assumed a genuinely indigenous and national—I should like to say folk—type. These simple principles are two—the first inspired by the love which Sir Henry Doulton acquired early in life for the use of the potter's wheel, being to make, so far as possible, every piece intended for decoration on the wheel; and the second, also derived from Sir Henry Doulton's personal experience, to give the utmost scope to the individuality of the designer into whose hands the piece, as thrown from the wheel in its soft state, is at once passed for decoration. The latter principle was altogether unknown, so far as my reading goes, in modern English commercial art until introduced into "the Lambeth Potteries" by Sir Henry Doulton. Previous manufacturers used to retain the services of a special designer, and when he left them the art of their wares departed with him, or was preserved only in weak and degraded mechanical reproductions. But every one of the 400—there are more now, I believe—artists of "the Lambeth Potteries," as I saw them in 1885, was an independent designer of more or less marked originality, strongly racy of the locality and representing every kind and degree of ability, which in one or two instances amounted to the creative power of the true artist. In fact we may say that there are 400 distinct styles in the Lambeth art pottery, although all are founded on the teaching of the Lambeth School of Art, under Mr. John Sparkes, the most perfect draughtsman of strictly conventional floral decoration of our generation. Each artist employed follows the style he or she naturally develops in the practice of the art; and all thus excel according to their capacity, producing that infinite variety of excellence which is the sure criterion of the spontaneous character and vitality of an art. Each artist also signs his or her own work, a most powerful incentive to daily progress in the development of natural gifts. It is in this way that Sir Henry Doulton succeeded in creating a most prolific school, or rather several schools, of English pottery, the influence of which has been felt in the revival of the ceramic arts in all the countries of the Old World, where they had become demoralised during the past fifty years by the prevailing use of machinery in their production.

The influence of Sir Henry Doulton's example in the United Kingdom has been quite marvellous, this country now producing—and it has all been done since 1871—the most artistic commercial pottery of any country in the world.

It is on these considerations that I venture to submit to you, with no more detail than is sufficient to justify it, this statement of the enduring claims of the late Sir Henry Doulton to the gratitude and reverence of his fellow-countrymen.

NEW SCHEMES FOR LONDON.

IN the course of about three weeks above forty Bills affecting the Metropolis will be deposited, says the *Standard*, at the House of Commons. Notice has already been given of these Bills in terms which disclose their general character. Among the projects of this nature coming before Parliament in the ensuing session the tramway projects of the London County Council form a distinguishing feature. These are embodied in two Bills, by one of which the Council seek authority to construct and work a tramway, commencing in Westminster Bridge Road by a junction with the existing line of the London Tramways Company, Limited, proceeding thence westward so as to pass over Westminster Bridge and on to the Victoria Embankment, traversing its entire length, so as to terminate in the precinct of Bridewell. Another tramway, entirely in the parish of Lambeth, is to be constructed by the Council so as to connect the aforesaid line with the system of the South London Tramways Company. The gauge of the proposed tramways will be 4 feet 8½ inches, and it is intended to employ animal power for moving the carriages or trucks. Power is sought whereby the Council will be enabled to enter into certain arrangements with the London Tramways Company, Limited, the London Southern Tramways Company, the South London Tramways Company, and any other company, corporation or persons for the maintenance and working of the whole or any part of the said tramways and for leasing the same by the Council. The Bill is to contain provisions as to the charging of any expenditure under the intended Act with reference to tramways either as a general or a special county purpose, and as to the application of any receipts or revenue arising from or in respect of the proposed tramways.

The other Tramway Bill for which the London County Council intend to make application in the coming session is to

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construct tramways in Holborn, Clerkenwell and Islington. One of these lines is to commence by a junction with the North Metropolitan Tramway in Clerkenwell Road, opposite the Holborn Town Hall, passing thence along Rosebery Avenue into and along St. John Street Road and High Street, Islington, terminating by a junction with the existing tramway opposite the north-east corner of the Angel Inn. Three junction tramways are to be formed in connection with this and existing tramways. There is also to be a second tramway, commencing by a junction with the existing North Metropolitan Tramway at its termination in Theobald's Road, and passing in a westerly direction, taking the south side of Bloomsbury Square, and terminating in Bury Street, near the west end of Silver Street. A third tramway is to commence by a junction with the existing North Metropolitan Line in High Street, Shoreditch, at or near the western end of Bethnal Green Road, and terminating in Cambridge Road by a junction with the existing tramway near the east end of the Bethnal Green Road. Power is to be sought for making agreements with companies and persons similar to those specified in respect to the Westminster Bridge and Victoria Embankment Tramways.

The London United Tramways Company intend to apply for leave to introduce a Bill by which they will be empowered to construct and work as many as eight tramways in the counties of London, Middlesex and Surrey. Some of these proposed lines, together with sundry junctions, are designed in connection with tramways already possessed by the company in the Uxbridge Road and the Kew Bridge Road. Either animal power or electrical power is to be employed, the latter to be on the overhead system or otherwise. Electrical depôts are proposed at Shepherd's Bush, Chiswick, Richmond and Acton. The Bill is to empower the Company on the one hand, and the Central London Railway Company on the other, or any other Company or authority, to enter into agreements for the supply of electrical energy.

Application is to be made to the Board of Trade for a provisional order to authorise the Woolwich and South-East London Tramways Company to construct certain tramways in Plumstead and Woolwich. Powers are sought to work the company's existing and new tramways by animal, electrical and other mechanical power.

Electric lighting is an essentially modern institution, and it is evidently destined to make further progress in the Metropolis, seven projects of this nature being now proposed. The Central Electric Supply Company (Limited) seek leave to bring in a

Bill for the exercise of power and the establishment of works in Marylebone, including a generating station or stations, the company to be authorised to supply electrical energy to any other company, body, or person authorised to supply electricity for any public or private purpose "within the county of London or the vicinity thereof." The Metropolitan Electric Supply Company (Limited) propose to bring in a Bill for establishing a generating station on lands in Willesden and Acton, cables and conduits being laid to the company's station at Amberley Road, in the parish of Paddington, which parish, it is stated, forms the area which the company are authorised to supply with electricity under a Lighting Order which the company obtained in 1895. The Chelsea Electricity Supply Company (Limited) give notice of a Bill by which they are to be empowered to purchase land in the parish of St. Luke, Chelsea, compulsorily, and to erect generating stations thereon. In four instances the notice has reference to an application to be made to the Board of Trade for a Provisional Order. The local authorities proceeding in this manner are the Vestry of Bermondsey, the Vestry of St. Marylebone and the Urban District Council of Barnes. An application by the Great Western Electric Light and Power Company has reference to the parish of Lewisham.

The railway Bills which are likely more or less to affect London, though in some cases in a very minor degree, are twenty-two in number. One of the most interesting is the Bill which the Metropolitan Railway Company propose to introduce. This is remarkable for the extent to which it provides for the ventilation of the line, and the introduction of electricity as the motive power. It is proposed to acquire certain lands, a term which includes houses and buildings, in order to make on such sites openings for the ventilation of the railway, the localities specified being situated in Paddington, the Marylebone Road, the vicinity of Upper Baker Street, Cleveland Street, the Finchley Road and numerous premises in the Euston Road. The company seek to be empowered to work by means of electricity the traffic on their existing railways, and to enter into agreements for working in like manner the traffic on the joint lines of the Company and the District Railway. It is contemplated to appropriate certain lands for the purpose of erecting stations for generating electrical energy, at a spot adjoining the company's Edgware Road Station.

Leave is to be asked to introduce a Bill incorporating a company which is to be empowered to construct a railway commencing in and under the High Street, in the borough of Southwark, and terminating in and under the road known as

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Brixton Hill. A subway, for passengers only, is to commence in and under the Kennington Park Road, forming a connection with the Oval Station of the existing City and South London Railway Company, and terminating under Brixton Road. The motive power to be employed on the proposed railway is to be electricity, cable, or other mechanical power except steam locomotives. The Bill is to authorise working and other arrangements with the City and South London Railway Company, who are also to be empowered to guarantee and subscribe capital. The City and South London Company are going to apply for a Bill giving an extension of time for the acquisition of lands, and empowering the Company to sell or lease a portion of their undertaking to the City and Brixton Company, or to any company to be authorised during the ensuing session to make a railway from the company's line to Brixton Hill.

Application is to be made for an Act to incorporate a company to construct an underground railway from Paddington to Charing Cross, the motive power to be electricity. The Charing Cross, Euston and Hampstead Railway Company are going to apply for a Bill authorising them to abandon a certain portion of their authorised railway, and to construct a new underground line, commencing by a junction with the railway authorised by their Act of 1893, at a point under the Charing Cross Road near the Garrick Theatre, and terminating at a point under or adjoining No. 23 Craven Street. Agreements are to be authorised with the South-Eastern Railway Company so as to provide means of communication between the stations at Charing Cross.

Notice is given of a Bill to incorporate a company for the purpose of constructing an underground railway extending from New Cross Road, under the Old Kent Road, New Kent Road and the Waterloo Road. Electric or cable power is to be employed, and working and other agreements are sought with the London and South-Western, the Baker Street and Waterloo, and the Waterloo and City Railway Companies.

The Bill to be introduced by the London, Tilbury and Southend Railway Company proposes the alteration of sundry bridges, roads and footpaths in West Ham, East Ham and Barking. Power is sought for the subscription of capital to the Whitechapel and Bow Railway. Also to require the Great Eastern Railway Company, or the London and Blackwall Railway Company, to give the Company additional facilities for the use of the Fenchurch Street Station, on the London and Blackwall Railway, and to provide that, in default of agreement

between the Companies concerned, the matters at issue shall be determined by arbitration. The Bill is further to subject the Great Eastern Railway Company, in default of their providing the facilities required, to penalties, or to make other provisions for enforcing and securing the same. The Whitechapel and Bow Railway Company give notice of an application to introduce a Bill giving power to the Metropolitan District Railway Company and the London, Tilbury and Southend Railway Company to subscribe capital and guarantee interest in respect to this undertaking.

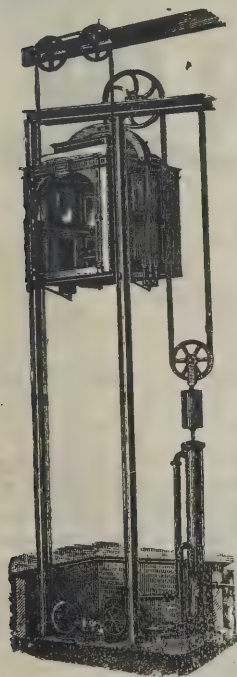
The Great Northern and City Railway Company seek leave to introduce a Bill for the extension of their authorised railway to Finsbury Park, whereby it will terminate at or near the Finsbury Park station of the Great Northern Railway. A railway is to be constructed in the parish of St. Mary, Islington, being a diversion of the existing Canonbury branch of the Great Northern Railway, and commencing by a junction with that branch near the northern end of the tunnel, and carrying the line under Highbury Fields, terminating by a junction with the branch railway.

Notice is given concerning two Bills under the title of the London, Walthamstow and Epping Forest Railway. One is for the abandonment of the railways and works authorised by Acts obtained in 1894 and 1895, and to provide for the winding-up and dissolution of the company. The other Bill is to revive and extend the period limited by the previous Acts for the taking of lands and completion of works. Further powers are sought in relation to capital and in respect to agreements with other companies.

The London and North-Western Railway Company give notice of application for a Bill which, so far as London is concerned, provides for the acquisition of certain lands in St. Pancras, and in the district of the Poplar Board of Works. The Midland and the North London Railway Companies are to be empowered, respectively, to apply to all or any of the purposes of the intended Act in which they are interested any capital or funds belonging to them.

The South-Eastern Railway Company give notice of an application to Parliament for power to construct several subsidiary railways, which, if carried out, may be expected to preclude many of the complaints now made as to the working of the company's suburban and other traffic. A railway is proposed to commence by a junction with the company's line in the parish of St. Paul, Deptford, and uniting with the Ladywell loop, in the parish of Lewisham. Another line, wholly

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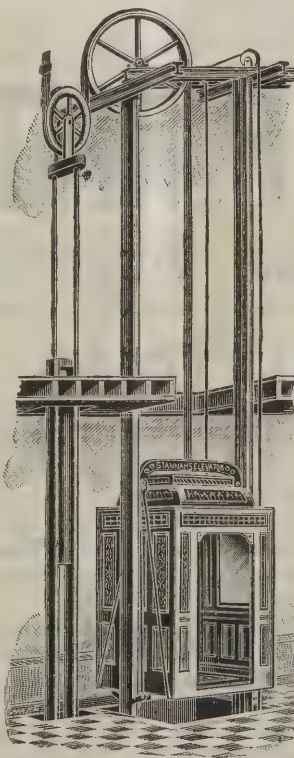
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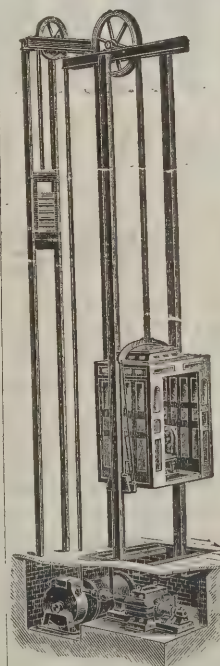
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in Lewisham, is to connect with the Dartford loop, near Manor Lane. A junction line and another railway are proposed in the same district. A railway commencing in the parish of Lee proceeds to Orpington. The Various Powers Bill of the London, Brighton and South Coast Railway Company includes the formation of a short railway in the parish of St. Paul, Deptford, and the widening of the company's railway from Victoria to Clapham Junction. The London and South-Western Railway Bill will include the widening and improvement of the main line in Lambeth.

The Great Central Railway Company intend promoting a Bill giving them power to purchase, by compulsion or agreement, lands, houses and buildings in Marylebone, three different sites being specified, such being required for purposes connected with the company's undertaking. The General Powers Bill of the Great Eastern Railway Company will be designed to cover a large number of operations, but the only apparent matter connected with the Metropolis consists in a proposal to convert a swing bridge at Bow Creek into a fixed bridge.

The Great Northern Railway Company seek power to construct two railways at Finsbury Park, in the parishes of St. Mary, Islington, and St. Mary, Hornsey. The General Powers Bill of the Great Western Company can hardly be said to affect the metropolitan area, although the administrative County of London is mentioned in the notice.

The Muswell Hill and Palace Railway Company propose the construction of certain railways, two of which are to be connected with the Enfield branch of the Great Northern Railway and a third with the Great Eastern. The Bill is also to authorise agreements with these companies. A Bill is to be introduced for a revival of powers in respect to the Latimer Road and Acton Railway, and to extend the time limited by the company's Act of 1895 for the completion of the works authorised by their Act of 1882.

The Midland Railway Company seek to introduce a Bill, concerning which they make a separate announcement to show how little it has to do with London, the only power to be exercised in the administrative county being that of stopping up and discontinuing as a public thoroughfare part of a public footpath known as Swallow's Gardens, intersecting and abutting upon lands belonging to the company fronting Royal Mint Street, Whitechapel.

In addition to their two tramway schemes, the London County Council give notice of three other Bills. One is for the amendment of the London Building Act, another is a General

Powers Bill, and the third has reference to the sewage of Acton. The General Powers Bill provides for several street improvements, among which are the widening of the York Road and the street called Albert Embankment, the reconstruction of the Rosemary Branch Bridge over the Regent's Canal, the removal of several gates, bars, posts and railings in Camberwell, in Duncan Terrace, Islington, in Nelson Square, Blackfriars Road, and in Long Street, Shoreditch. It is also proposed to remove a wall now blocking the northern end of Caesar Street, in Shoreditch.

The Corporation of London give notice of a Bill to provide for the extension and enlargement of the Foreign Cattle Market at Deptford, together with the construction of railways, a tramway, and other works in the parishes of St. Paul and St. Nicholas, Deptford. It is primarily intended that the tramway shall be worked by animal power, but provision is to be made in the Bill for substituting electricity, gas or cable power, as may be agreed upon between the Corporation and the local and road authorities; or, failing agreement, as may be determined by the Board of Trade.

Among the miscellaneous schemes to be brought before Parliament is one for the incorporation of a company to carry out an extension of the Victoria Embankment by a river wall and roadway along the foreshore of the Thames, commencing at or near the south-eastern corner of the Victoria Tower Gardens, adjoining the Houses of Parliament and terminating at the western end of Lambeth Bridge. Four new streets are proposed in the neighbourhood of the Horseferry Road, as also a widening of that thoroughfare, together with Marsham Street and Church Street. The Bill is likewise to confer authority on the Company to enter into agreements with the local Vestry and the London County Council, and to transfer certain powers to the latter body.

A Bill is proposed to empower the Trustees of the London Parochial Charities to sell, and the Postmaster-General to purchase by agreement, certain lands situated on the south side of Little Britain, adjoining the public gardens known as the Postmen's Park, the said lands to be an open space for the use and benefit of the public.

The Southwark and Vauxhall Water Company seek further powers to enable them to fulfil their statutory obligations in relation to the supply of water. They propose to construct two new storage reservoirs, one in the parish of Walton-upon-Thames, the other to be partly in that parish and partly in West Molesey. Further power is sought as to the quantity of

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water which the Company may take from the Thames in any day of twenty-four hours. The Staines reservoirs joint committee will apply for power to enlarge two reservoirs authorised by the Act of 1896. The Gaslight and Coke Company intend applying to Parliament for authority to consolidate their capital, which now consists of several classes, giving rise to much complexity. No power is sought to raise additional capital.

CAN BUILDINGS BE MADE FIREPROOF?

(Concluded from last week.)

UNBROKEN flat ceilings should always be preferred to panel work with its beams projecting below, no matter in what way they may be protected. This fire greatly emphasises this fact. The exposed area is increased when floors are built as they were in the Horne buildings, and, besides, the panel forms a pocket which confines the heat and makes it more effective. An even surface deflects heat as it does light, and if the surface is even, the covering of the beams where protection is most needed will not suffer the worst punishment as it did in the Horne buildings. The fact that the beams which were uncovered by the action of the fire were not deflected and ruined is no reason why they should not be covered so that the tile will not come off in any kind of fire.

The bottom of the arch should also be low enough under the beam to permit the bottom flange to be covered with a hollow tile, or, at least, with a solid tile having an open space between the covering and the beam. As the material is now manufactured, this is rarely accomplished, and the workmanship in putting the beam covers in place is often bad. It seems as if there might be an improvement in this direction, and that the material should be designed in such a way that it will not only be theoretically good, but so designed that the beam cover cannot possibly be improperly placed.

All partitions and all column covering should be built on the arches. Cinder concrete which will crumble away is not much better for support than wood which burns away. Builders may object to such a provision, but it would not be a great hardship or add materially to the cost.

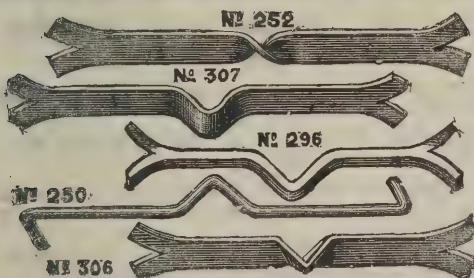
Wood should not be used in partitions in any way whatever. Iron should be used to frame all openings.

In conclusion, a recapitulation of the most important points intended to be brought out by this paper may not be out of

place. The best design, the best specifications and the best workmanship in every detail of the construction of a building are quite essential to making it a fireproof structure which can be depended upon in any emergency. The whole exterior of a building should be built of materials that will not be injured by heat. This fire would point to brickwork as the most desirable material, and without question threw terra-cotta under a cloud. This observation should cover the windows as well as the walls, and points to something new and better than has yet been used to any great extent in building operations. Large store buildings, open over entire floors and through all storeys, must always be a dangerous fire risk, and if it is important that large apartment stores should occupy such quarters during business hours, the only way to give them any satisfactory security against fire must be in subdivision of departments with fireproof curtains or some other movable divisions that can be quickly and easily operated. As now manufactured, porous tiles or terra-cotta fireproofing can be relied upon to protect the steel construction, while the hard-burned material cannot be depended upon with the same certainty. Woodwork covered with wire lath and plastering is not fireproof construction, and the efficiency of concrete in floors was not tested by this fire.

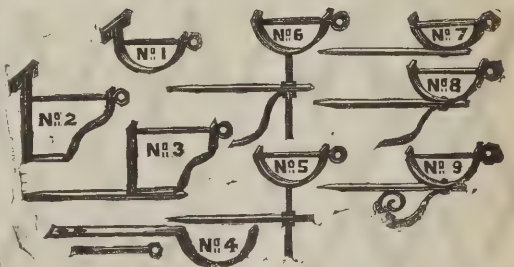
The discussion was opened by the reading of a written communication from Messrs. Gustave Kaufmann and Emil Swensson, who with Mr. F. L. Garlinghouse formed the board of experts who reported upon the effects of the fire to the insurance companies. These gentlemen strongly attacked some of the statements made by Mr. Purdy, asking how the author knew that the so-called cinder concrete laid above the floor arches had failed under the action of the heat, the experts evidently believing that the loose material found there by Mr. Purdy, and called by him cinder concrete was not concrete at all, but cinders with little or no cement in it. They also seemed to think that the Book Concern building was subjected to greater heat than it was credited with by Mr. Purdy, who based his opinion somewhat upon the condition of the exterior of the building. The Book Concern building, the experts said, was constructed of a stone that will stand the action of heat far better than the Horne building, for the front of which Indiana limestone was used, and it was therefore not fair to draw an inference upon that evidence. They again repeated their preference for concrete as a fireproofing material, basing their views upon the recent tests of concrete floor by the New York City Building Department, which have lately been described in these columns.

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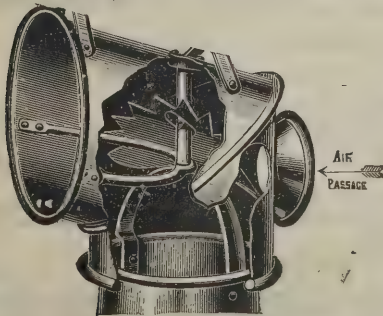
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Mr. Howard Constable, the next speaker, could not agree with Mr. Purdy that the temperature of the Pittsburg fire had no bearing upon the author's conclusions. He stated that in a room only 16 feet square he had found that there existed a difference in temperature in two localities of 1,000 degrees. He believed the word "fireproof" as applied to building material to be a misnomer, as the fire-resisting and water-resisting properties of a substance should both be considered, and pointed out that the shape of a material had everything to do with its value from these standpoints. He had made a number of experiments upon a material intended to withstand the action of fire and water and showed a number of specimens that had been subjected to test. The highest grades of Portland cement had in a number of instances not stood as well as cement of poorer quality. He also stated in response to a question that in one instance, where a 20-inch beam protected with 3 inches of concrete was subjected to an intense heat from below, the temperature of the upper flange of the beam after several hours only rose to 200 degrees.

Mr. John R. Freeman discussed Mr. Purdy's paper at considerable length, at first calling attention to the need in investigating fires of noting what metals had been melted as a means of estimating the temperature. He spoke very strongly in favour of automatic sprinklers, and said that if the Book Concern building had been protected by sprinklers the loss would have been inappreciable. In speaking of the relative value of different forms of construction as a means of preventing fire, that in the New England mills, which were almost invariably constructed with wooden columns, beams and floors, but which were provided with automatic sprinklers, that loss from fire did not exceed that of the mills in England, where iron columns and beams with brick arches was the usual form of construction. He referred to the shops of Brown & Sharpe, in Providence, which were built upon lines similar to the English mill practice at a cost of from 2 dols. to 3 dols. per yard, and he said that he did not consider them any more fireproof than if they had used the ordinary mill construction at a cost of 70 cents per yard, if equipped with sprinklers at an additional cost of from 2 to 3 cents per square yard. He believed that sprinklers should be used in all buildings tall enough so as to be beyond the reach of fire apparatus. He then referred to the relative values of cast-iron and steel as a material for building, and it had been his experience that cast-iron up to a certain temperature will carry its load well and will not crack as popularly supposed when subjected to heat

and then to cold water. He gave evidence to show the value of tin-clad shutters, and advocated the use of double fire doors in partition walls. Tin-clad wooden shutters permitted the transmission of heat more than iron shutters, and the nails used in making them should be long, for the reason that the outer end of the nail becomes hot by conduction and chars the wood.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

26575. George William Hitchen, for "An improved chimney-pot."

26626. Laura Sheppard, for "Safety smoke conductor for drain testers."

26645. John Price, for "Improvements in or relating to pipe joints."

26655. William Phillips Thompson, for "Improvements in fluted or ridged roofing and like tiles, and in their arrangement when covering in."

26905. Frederick Thomas Grant, for "Improvements in air inlets for drains."

26991. Joshua Binns, for "Improvements in or connected with hoists or lifts."

27018. Charl Oietrich, for "Improvements in and relating to hanging-brackets for line shafting."

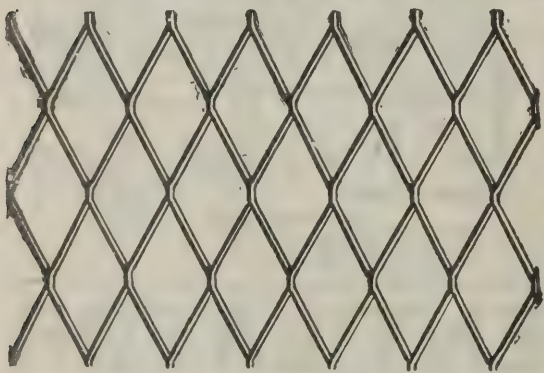
27162. Sir Andrew Noble, K.C.B., and George Stuart, for "Improvements in lathes."

27260. Joshua George Mills and Peter Campbell, for "Improvements in apparatus or appliances to be used in place of rope for lashing scaffolding poles, ledgers or the like."

1220. Peel chimney-cowls or pots.

To INVENTORS.—Patents for Inventions, Trade-marks and Designs secured; every assistance given to inventors. Specialists in Building matters. Information free.—Messrs. RAYNER & Co., Patent Agents, 37 Chancery Lane, London, W.C.

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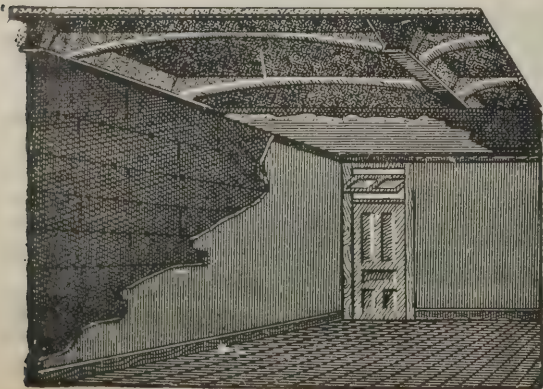
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The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

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Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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For Advertisement Scale, see page xv.

COMPETITIONS OPEN.

BELPER.—Jan. 8, 1898.—The Belper Rural District Council offer premiums of 15 guineas and five guineas for the two best sets of plans and reports for Crich water supply. Mr. Joseph Pym, clerk, Belper.

BELPER.—May 1, 1898.—The Belper Urban District Council offer premiums of 50 guineas and 25 guineas for the two best schemes of sewage disposal. Mr. Joseph Pym, Urban District Council Offices, Belper.

BOOTLE.—Dec. 31.—The Corporation invite competitive designs of a central fire station, firemen's dwellings and district police station. Mr. J. A. Crowther, borough engineer, Bootle.

DORKING.—Dec. 15.—Competitive designs and plan, with descriptive report thereon and approximate estimates, are invited for erection of infirmary upon workhouse grounds. Mr. George Scales, 35 High Street, Dorking.

PORT ELIZABETH.—Feb. 15, 1898.—The public library committee offer prizes of 100 guineas and 50 guineas for designs for a new library building. Messrs. Wm. Savage & Sons, 85 London Wall, London, E.C.

CONTRACTS OPEN.

ALNWICK.—Dec. 16.—For erection of two houses at Glanton. Mr. George Reavell, jun., architect, Alnwick.

BARKING.—Dec. 21.—For erection of an electric-light station at the rear of the public offices, East Street. Mr. C. J. Dawson, Public Offices, Barking.

BARROW-IN-FURNESS.—Dec. 15.—For erection of electric-lighting station, Buccleuch Street. Borough engineer, Town Hall, Barrow-in-Furness.

BIDEFORD.—Dec. 28.—For alterations and repairs on the post office premises. Mr. R. T. Hookway, architect, Bideford.

BIRSTALL.—Dec. 15.—For addition to shop, Market Place. Mr. John H. Brierley, architect, Hanover Street, Batley.

BRADFORD.—Dec. 17.—For erection of herring-curing establishment, stabling and other works in Buck Street. Messrs. Hodgson & Farrar, architects, Old Bank Chambers, Bradford.

BRIDLINGTON.—Dec. 18.—For completion of a grammar school and master's house. Messrs. Botterill, Son & Bilson, architects, 23 Parliament Street, Hull.

BRIDLINGTON QUAY.—Dec. 16.—For erection of four houses and premises, East Side, Flamborough Road. Mr. J. Earnshaw, architect, Wellington Road, Bridlington Quay.

BRITON FERRY.—Dec. 20.—For erecting a villa residence. Mr. H. Alex. Clarke, architect, Briton Ferry.

BURNLEY.—Dec. 29.—For extension to the electric-lighting station. Mr. G. H. Pickles, borough surveyor, Town Hall, Burnley.

BROMLEY.—Dec. 16.—For erection of four pairs of cottages. Mr. E. Bragg, East Street, Bromley, Kent.

CANTERBURY.—Dec. 14.—For erection of a schoolroom at Upstreet. Mr. F. Heath, Westbere Court.

CARDIFF.—Dec. 14.—For erection of public urinal, &c., in Clare Road and public latrines and urinal in Fitzroy Street. Mr. W. Harpur, borough engineer, Town Hall.

CHESTER-LE-STREET.—Dec. 13.—For erection of a shop and wareroom in the market. Mr. R. G. Cowe, architect, Chester-le-Street.

CHORLEY.—Dec. 16.—For erection of a free library. Messrs. Jolly & Buckley, architects, High Street, Chorley.

COLCHESTER.—Dec. 14.—For erection of stables, coach-house, hay-loft, &c., at The Limes, Crouch Street. Mr. Herbert Goodyear, borough engineer and surveyor, Colchester.

COLLINGHAM BRIDGE.—Dec. 15.—For erection of an organ-chamber and vestry to church. Mr. C. Hodgson Fowler, architect, The College, Durham.

CORK.—Dec. 14.—For erection of stores and residential quarters at Patrick's Quay. Mr. James F. McMullen, architect, 30 South Mall, Cork.

CORNWALL.—Dec. 15.—For erection of clubhouse. Mr. Sampson Hill, architect, Green Lane, Redruth.

CORNWALL.—Dec. 15.—For erection of a piggery and other work at Eglosmerther Farm. Mr. George Gow, Tregothnan Office, Truro.

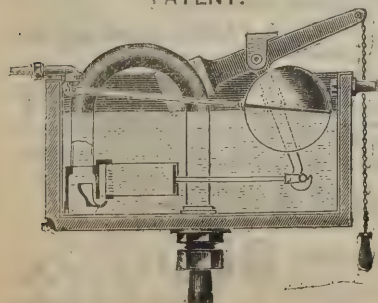
CRICKHOWELL.—Dec. 13.—For alterations and additions to the National Schools, Llangynidr, near Crickhowell, Breconshire. Mr. F. Baldwin, architect, 8 Lion Street, Brecon.

DEVIZES.—Dec. 14.—For additions to the Wilts County Pauper Lunatic Asylum. Mr. Charles S. Adye, county surveyor, County Offices, Trowbridge.

DEVON.—Dec. 14.—For erection of cottages at Loddiswell and Gara Bridge Stations, on the Kingsbridge Branch, Devonshire, for the Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station, London.

ARCHITECTS PLEASE NOTE.

PATENT.



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DEWSBURY.—Dec. 13.—For construction of an iron shed at the gasworks. Mr. H. Dearden, borough surveyor, Town Hall, Dewsbury.

FAIRFIELD.—For erection of a pair of semi-detached houses and two shops with residences. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

FRINTON-ON-SEA.—Dec. 31.—For erection of a school to accommodate 150 children. Mr. S. T. James, architect, Frinton-on-Sea.

GRIMSBY.—Dec. 18.—For alterations to 242 Cleethorpe Road. Messrs. Mitchell, Son & Co., surveyors, 112 Cleethorpe Road, Grimsby.

GUILDFORD.—Dec. 13.—For extension of produce shed in the cattle market. Mr. C. G. Mason, borough surveyor, Tuns Gate, Guildford.

GUILDFORD.—Dec. 14.—For additions to the administration block and block B at the isolation hospital at Woodbridge. Mr. Edward L. Lunn, 36 High Street, Guildford.

HAMMERSMITH.—Dec. 13.—For erection of disinfecting-chamber and van buildings at the wharf, Chancellor's Road. Mr. H. Mair, surveyor.

HARTBURN.—Dec. 15.—For erection of a billiard-room and other additions to Landieu. Mr. E. A. Whigham, architect, 59 High Street, Stockton-on-Tees.

IRELAND.—Dec. 14.—For erection of single one-storey cottages at Monaghan Road Station, at Annakera, and at Pound Lane level crossing, near Portadown, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

IRELAND.—Dec. 21.—For erection of a dispensary house in the village of Derrygonnelly, Enniskillen. Mr. Richey Wilson, Board-room, Workhouse, Enniskillen.

ISLINGTON.—For erection of block of flats. Mr. Walter Stair, 9 Queen Victoria Street, E.C.

KEIGHLEY.—For erection of a warehouse at Providence Mills, Oakworth. Messrs. John Judson & Moore, architects, York Chambers, Keighley.

LEEDS.—Dec. 17.—For erection of a block of four houses, and three houses and a shop, in New Road Side, Horsforth. Mr. J. P. Kay, architect, 34 Prudential Buildings, Leeds.

LEEDS.—Dec. 19.—For construction of lavatory and conveniences in the Corn Exchange. City Engineer, Municipal Buildings.

LLANDUDNO.—For completion of the Duke of Clarence Memorial church. Rev. Francis G. Jones, vicar, Iorwerth House, Llandudno.

LOWESTOFT.—Dec. 15.—For erection of a house, &c., Blundeston. Mr. Sidney Rivett, architect, 3 South Quay, Great Yarmouth.

MANCHESTER.—Dec. 28.—For erection of thirty-two two-storey tenement buildings fronting a new street between Corn-wall Street and Spittal Street, and eighteen cottages fronting George Leighton Street. City Surveyor, Town Hall, Manchester.

MANCHESTER.—Dec. 28.—For erection of thirty-six two-storey tenement buildings fronting Chester Street, Marsland Street and Hulme Street, Hulme. City Surveyor, Town Hall, Manchester.

MERTHYR TYDFIL.—Dec. 17.—For erection of a library, dwelling-house, &c., at Cefn Coed. Mr. R. C. Jenkins, surveyor, Cefn Coed.

MORECAMBE.—Dec. 13.—For additions and alterations to Dr. Glegg's house, West View Terrace. Mr. James Marshall, architect, Back Crescent, Morecambe.

MYNYDDISLWYN.—Dec. 20.—For erection of two additional classrooms and other works at the Pontllanfraith school. Mr. George Rosser, architect, Abercarn.

NEWCASTLE-ON-TYNE.—Dec. 13.—For erection of Primitive Methodist Central Church schools and vestries in Northumberland Road. Messrs. Davidson & Bendle, architects, 33 Grainger Street West, Newcastle-on-Tyne.

NOTTINGHAM.—Dec. 13.—For additions to lunatic asylum. Mr. G. T. Hine, architect, 35 Parliament Street, Westminster, S.W.

PONTEFRAC.—For construction of licensed premises, Market Place. Messrs. Tennant & Bagley, architects, surveyors, &c., Pontefract.

ROCHDALE.—For plastering six houses in Berwick Street and fourteen in Stamford Street. Mr. Nathan Mutch, Moss Cottage, Milnrow Road.

SCOTLAND.—Dec. 15.—For erection of shops and dwelling-house at corner of St. Catherine's Road and Bogton Place, Forres. Mr. John Forrest, architect, 129 High Street, Forres.

SKEGNESS.—For erection of the Primitive Methodist new chapel, with 450 seats. Mr. Hy. Harper, architect, Market Place, Nottingham.

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SOUTHAMPTON.—Dec. 28.—For constructing a public convenience at Northam. Mr. W. B. G. Bennett, borough engineer, Municipal Offices, Southampton.

SOUTHEND-ON-SEA.—Dec. 15.—For erecting the superstructure of the Railway Tavern, Cliff Town Road. Messrs. Thompson & Greenhalgh, Bank Chambers, Southend.

STRATFORD.—For alterations and additions to premises in the rear of the *West Ham Guardian*, Martin Street. Messrs. W. Taylor & Son, architects, Aylesbury.

TEWKESBURY.—Dec. 15.—For erection and fitting-up of a laundry and drying chamber at the isolation hospital. Mr. H. A. Badham, town clerk.

TIPPERARY.—Dec. 20.—For erection of two new schools, viz. male and female, offices and halls, at the Cross of Shrenwell. The Rev. Dr. O'Neill, P.P., Latin.

TIPPERARY.—Dec. 13.—For alterations and repairs to St. Johnstown's Castle. Mr. E. A. Hackett, architect and civil engineer, Clonmel.

TUNBRIDGE WELLS.—Dec. 18.—For erection of offices and stores at central electric-lighting station, adjoining the South-Eastern Railway goods station. Mr. W. C. Cripps, Town Hall, Tunbridge Wells.

UPHOLLAND.—Dec. 13.—For erection of a workshop at waterworks. Messrs. Heaton, Ralph & Heaton, surveyors, King Street, Wigan.

WALES.—Jan. 1.—For constructing abutments, wing walls, piers, &c., of proposed bridge, forming of road approaches and fencing the same, taking down existing bridge, &c. Mr. R. Lloyd Williams, county surveyor, Denbigh.

WALES.—Dec. 16.—For building three houses and shops at Llanwrtyd Wells. Mr. David Jenkins, architect and surveyor, Llandilo.

WALES.—Dec. 13.—For erection of a Congregational chapel, with vestry and boundary walls, at Gelli, Rhondda. Messrs. Griffiths & Jones, architects, Town Hall, Tonypany and Pontypridd.

WALTON-UPON-THAMES.—Dec. 13.—For supplying cast-iron pipes. Mr. W. H. Radford, Angel Row, Nottingham.

WEST BURTON.—Dec. 20.—For erection of a Wesleyan chapel, school, &c. Mr. Wm. Lawson, West Burton.

WORTHING.—For erecting post-office buildings. Mr. R. Singer Hyde, architect, Worthing.

YORK.—Dec. 15.—For extending carriage-building shops for the North-Eastern Railway Company. Mr. William Bell, the company's architect, at York.

TENDERS.

ABERDEEN.

For macadamising and laying kerb and channel, &c., in Devonshire Road. Mr. WILLIAM DYACK, burgh surveyor.
R. MCKAY, Abergeldie Road (accepted) . . . £386 18 10

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T. Buck 26 0 0
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BIRKENHEAD.

For flagging, paving, channelling and sewerage various passages in the borough. Mr. CHARLES BROWNRIDGE, borough engineer.
T. Horrocks, three passages, £61 0 9 £59 8 1 £47 5 9
C. J. Shaw & Co., one passage 44 3 2

BOURNEMOUTH.

For construction of relief sewers in the sea, Christchurch and Palmerston Roads, Boscombe. Mr. F. W. LACEY, borough engineer and surveyor.
G. Troke £2,960 0 0
Cooke & Co. 2,748 0 0
S. Saunders 2,622 0 0
W. H. Saunders & Co. 2,588 0 0
F. OSMAN (accepted) 2,298 0 0

BRADFORD.

For pulling-down of the galleries, building of new transepts and new vestries at the parish church.

Accepted tenders.

W. Farnish, mason.
Thomas Taylor & Son, joiner.
S. Rushworth, plumber.
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P. Sutton & Son, plasterer.

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BRADFORD—*continued.*

For erection of a metal factory in East Parade. Messrs. MILNES & FRANCE, architects, 99 Swan Arcade, Bradford.

Accepted tenders.

Humphreys & Moulson, mason.
Toothill & Balmforth, joiner.
J. Cliff & Co., ironfounder.
F. W. Higginbotham, plumber.
T. Nelson, slater.
H. Dixon, plasterer.
J. Arundel, painter.

BRISTOL.

For erection of pupil teachers' centre, Broad Weir. Messrs. LA TROBE & WESTON, architects, 20 Clare Street, Bristol.

E. Clark	£4,843	0	0
A. E. Longden	4,785	0	0
E. Love	4,685	0	0
W. Cowlin & Son	4,640	0	0
J. Perkins	4,571	0	0
W. Church	4,499	0	0
H. A. Forse	4,495	0	0
G. Humphreys	4,444	0	0
HUGHES & WEEKS (accepted)	4,160	0	0

Plumbers' Work.

J. Wilkins	239	0	0
F. & W. Bracher	234	6	0
A. Saull	229	0	0
S. H. Povey	210	0	0
G. F. TUCKEY (accepted)	209	0	0

BURNHAM.

For alterations and repairs to Institute. Mr. CHAS. S. LEECH, architect, 24 Victoria Street, Burnham.

F. ROBERTS, Burnham (accepted).

BURY.

For erection of two houses and shops in Bolton Road, Elton. Messrs. JAMES SELLARS & SON, architects, Union Chambers, Bury.

J. FLETCHER, Elton, Bury (accepted).

BURNLEY.

For painting, decorating, &c., at the lodge, chapels and out-buildings of the cemetery.

J. Shuttleworth	£130	0	0
Parker & Roose	99	0	0
L. & J. Hargreaves	94	0	0
W. Aspinall	93	0	0
Preston & Son	89	0	0
J. Edwards	85	0	0
Pratt, Limited	85	0	0
W. GREENWOOD, Colne Road (accepted)	79	0	0

CARDIFF.

For construction of a service reservoir (3,000,000 gallons capacity), building a water-tower, keeper's house, boundary walls, &c., on Penylan Hill. Mr. C. H. PRIESTLEY, engineer, Town Hall, Cardiff.

T. W. Ridley	£11,984	0	6
J. Strachan	11,064	10	6
J. Allen	10,458	13	3
J. Vevers	10,074	10	3
Turner & Sons	9,450	12	7
H. GIBBON, Cardiff (accepted)	9,419	0	0
A. S. Morgan & Co.	7,784	18	2
Engineer's estimate	9,121	17	5

CATFORD.

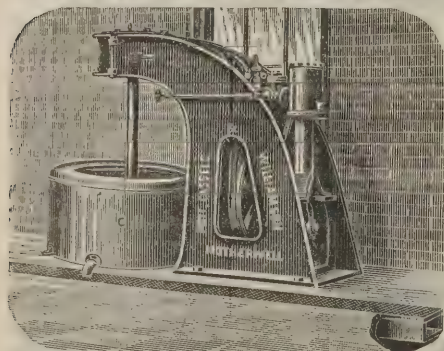
For erection of a coroner's court and mortuaries. Mr. JOHN CARLINE, surveyor.

F. P. Smith	£4,815	0	0
E. Mills	4,786	0	0
J. & C. Bowyer	4,395	0	0
Ham & Son	4,313	0	0
Walker	3,626	0	0

COLCHESTER.

For erection of a nurses' home, laundry, &c., at hospital. Messrs. GOODEY & CRESSALL, architects, Victoria Chambers, Colchester.

R. Beaumont	£3,544	11	0
G. Grimwood & Son	3,472	0	0
E. West	3,460	0	0
F. Dupont	3,400	0	0
H. Everett & Son	3,400	0	0
G. Dobson & Son	3,390	0	0
W. CHAMBERS (accepted)	3,289	0	0

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DAWLISH.

For laying about 1,200 yards lineal of stoneware pipes, with manholes, lampholes, &c. Mr. J. S. DELBRIDGE, surveyor, Priory Terrace, Dawlish.			
Sanders, Harding & Co.	£783	16	2
Gibson	691	0	0
Grounds & Newton	635	0	0
Mingoe & Boone	587	12	0
J. Wescott	558	7	6
Stephens & Son	547	9	4
Thomas	544	16	7
HAWKING & BEST, Dawlish (accepted)	529	10	2

EDINBURGH.

For alterations to premises at High Calton. Mr. J. COOPER, burgh engineer.			
J. Lowrie	£719	17	6
Crerar & Swanson	660	16	6
J. Duncan	655	0	0
W. Kirkwood	630	0	0
R. Wallace	598	0	0
A. WADDELL & SON (accepted)	574	0	0

ELGIN.

For erection of kiln at Glen-Moray Distillery. Mr. CHARLES C. DOIG, architect, Elgin.

Accepted tenders.

A. Allan, builder.
T. McKenzie, carpenter.
G. Ogilvie, slater.
Scott & Sellar, plasterer.
J. Gordon & Son, plumber.
A. Forsyth, painter.

Rose Street Foundry Company, Limited, Inverness, ironwork.

FLINT.

For erection of Railway Hotel, Shotton. Messrs. JOHN H. DAVIES & SONS, architects, Chester.			
G. Lloyd	£2,798	0	0
M. Rogers	2,759	0	0
G. Mayers	2,695	0	0
W. Peel	2,644	0	0
W. S. Wood & Co.	2,466	0	0
T. J. RENEY, Connah's Quay (accepted)	2,433	0	0

FEATHERSTONE.

For furnishing the Featherstone Assembly Rooms and Institute, Featherstone, including two billiard tables. Messrs. GARSIDE & KEYWORTH, architects, Ropegate, Pontefract.			
C. England	£217	0	0
Barker & Jowitt	203	5	10
Millar & Co.	202	2	6
H. Wright	195	15	8
Blackburn & Co.	190	0	0
Worsley & Co.	189	10	5
FARR & SON, Pontefract (accepted)	183	17	0
Bennett & Co.	183	9	10

FOREST GATE.

For erection of nine shops and dwelling-houses. Mr. H. J. HOLLINGSWORTH, architect.			
Edwards & Medway	£9,539	0	0
Webb	8,179	0	0
Hoskins	7,995	0	0
Thomerson & Son	7,790	0	0
Hearle & Farrow	6,998	0	0

HERTFORD.

For supply and laying of about 650 yards of 3-inch and 4-inch cast-iron water mains and works in connection therewith. Mr. JOHN HENRY JEVONS, borough surveyor.			
Mallett & Co.	£428	16	7
A. T. Catley	310	0	0
Pizzey	285	4	11
H. Norris	220	7	3
Skim & Co.	204	15	0
RAYMENT & SON, Hertford (accepted)	203	10	0

For paving, metalling, channelling and lighting Railway Place. Mr. JOHN HY. JEVONS, borough surveyor.			
A. T. Catley	£518	0	10
H. NORRIS, Hertford (accepted)	470	0	0

KINGSTON.

For new roads, sewers, &c., Coombe Neville Estate. Mr. A. J. WINDYBANK, surveyor.			
Free & Son	£4,182	0	0
Cunliff	2,945	0	0
Ballard, Limited	2,864	0	0
Kavanagh	2,600	0	0
Atkins	2,405	0	0
ADAMSON, Kingston (accepted)	2,075	0	0

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For completing Seymour Road.	Mr. W. B. GARTON, surveyor.
J. Keating & Sons	£681 12 2
P. Balmer	680 0 0
T. Horrocks	642 13 11
Exors. of W. F. Chadwick	623 6 0
J. McCABE, Liverpool (accepted)	579 9 6
Surveyor's estimate	649 8 6

LOCKWOOD.

For erection of two houses in Salford. Mr. J. BERRY, architect, 9 Queen Street, Huddersfield.

Accepted tenders.

J. Moorhouse & Sons, mason.
J. Sunderland & Sons, joiner.
D. Taylor & Sons, plumber.
G. Corney, plasterer.
T. Longbottom & Sons, slater.
W. Eastwood, painter.
Total, £350.

LONDON.

For erection of stabling and alterations in existing buildings.

Mr. JOHN FARRER, architect, 20 Finsbury Pavement, E.C.

Stevens	£1,036 0 0
Steed	955 0 0
T. W. Brown	905 0 0
T. SOBEY (accepted)	894 0 0

For repairs to main road at Gore Farm Hospital.

T. Adams	£589 0 0
G. Osenton	521 0 0
W. Griffiths	487 19 0
A. T. Catley	468 0 0

Kent Road Maintenance and Store Supply Company, Limited

J. ELLIS & CO., Invicta Works, Maidstone

(accepted)

Architect's estimate

LONDON SCHOOL BOARD.

For removing fence and providing iron railing, &c., Old Castle Street.

J. Edmonds	£73 0 0
Bayliss, Jones & Bayliss	27 5 0
R. H. & J. PEARSON, LIMITED (accepted)	26 10 6

LONDON SCHOOL BOARD—continued.

For providing corrugated iron roofs to landings, Gifford Street.

T. Cruwys	£45 0 0
Marchant & Hirst	30 0 0
Stevens Bros.	24 10 0
G. S. S. WILLIAMS & SON (accepted)	24 10 0

For taking-down the two iron buildings and offices, Upper Hornsey Road, and stacking and covering the iron buildings on the Brentwood Industrial School site, and depositing the offices in the basement of the Hugh Myddelton School.

T. Hawkins	£275 0 0
Croggon & Co.	175 0 0
W. Harbrow	157 10 0
Humphries, Limited	138 0 0
T. CRUWYS (accepted)	125 0 0

For providing drainage to the Latchmere graded school and reconnecting the existing trough latrines in the girls and infants' offices.

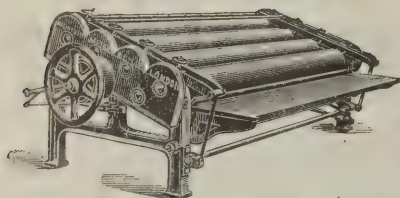
J. Garrett & Son	£1,731 0 0
R. A. Marshall	1,699 0 0
Stimpson & Co.	1,660 0 0
F. G. Minter	1,620 0 0
W. Hammond	1,537 0 0
E. Triggs	1,535 0 0
Lathey Bros.	1,519 0 0
J. & C. Bowyer	1,515 0 0
W. V. Goad	1,460 0 0
Star & Son	1,448 0 0
W. AKERS & CO. (accepted)	1,395 0 0

For removing three iron buildings, &c., from the Conway Road site and re-erecting them on the Essendine Road Site.

Humphreys, Limited	£1,420 0 0
T. Cruwys	1,287 0 0
W. Harbrow	1,262 10 0
Croggon & Co.	1,250 0 0
T. HAWKINS (accepted)	1,155 0 0

For repairs, &c., at Nos. 1 and 2 Sheppard's Place, Berger Road site

W. Silk & Son	£65 10 0
E. Pearce	48 15 0
A. J. Hutchins	43 16 0
F. HEAD (accepted)	40 0 0

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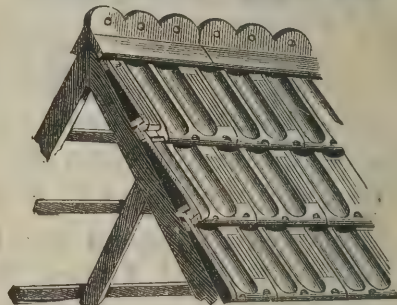
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J. H. Hodgkin	59	10 0
A. F. Fenn	45	0 0
W. Holding & Son	42	10 0
E. PROCTOR (accepted)	32	0 0
For adapting premises for a temporary school, Fortress Road.		
R. A. Yerbury & Sons	£281	0 0
Chase & Son	198	16 0
T. Cruwys	145	0 0
Marchant & Hirst	123	0 0
H. Eady	118	0 0
G. BALL (accepted)	115	0 0

For cleaning and painting the following schools:—

<i>Rathfern Road.</i>		
W. J. Mitchell	£359	0 0
C. G. Jones	305	0 0
W. Banks	299	16 0
G. Summers	276	16 0
H. Somerford & Son	276	0 0
G. Kemp	273	0 0
C. S. JONES (accepted)	218	5 6

<i>Regent Street.</i>		
C. Foreman	390	0 0
C. G. Jones	361	12 0
G. Summers	360	9 0
W. Banks	313	14 6
S. E. Musgrove	296	2 0
W. Brown	282	0 0
E. Proctor	280	0 0
JONES & GROVES (accepted)	235	0 0

<i>Stanley Street.</i>		
J. & A. Oldman	371	0 0
C. Foreman	360	0 0
E. Proctor	290	0 0
G. Summers	288	5 0
W. Banks	279	10 0
S. E. Musgrove	248	9 0
W. Brown	220	0 0
JONES & GROVES (accepted)	217	10 0

LONDON SCHOOL BOARD—continued.

<i>Blackstock Road.</i>		
W. H. Stephens	£514	8 0
Stevens Bros.	468	10 0
W. McCormick & Sons	449	0 0
J. GROVER & SON (accepted)	417	0 0

<i>Vicarage Road.</i>		
G. Summers	246	10 0
Thomas & Edge	235	0 0
C. Foreman	232	0 0
W. Banks	198	17 6
A. J. Fenn	169	0 0
E. Proctor	167	0 0
J. GARRETT & SON (accepted)	165	0 0

<i>Mowlem Street.</i>		
C. Willmott	290	0 0
G. Summers	236	15 0
T. Nicholson	205	0 0
W. Martin	196	0 0
Unsigned	185	0 0
G. BARKER (accepted)	175	0 0

<i>Tottenham Road.</i>		
F. Britton	271	14 6
W. McCormick & Sons	198	0 0
T. Nicholson	180	0 0
F. W. Harris	179	0 0
J. Grover & Son	168	0 0
Stevens Bros.	161	0 0
W. Martin	150	0 0
W. H. Stephens	149	5 0
J. MORRISON (accepted)	132	10 0

<i>Cator Street.</i>		
W. Akers & Co.	322	0 0
J. & A. Oldman	320	0 3
W. V. Goad	317	0 0
W. & H. Castle	305	16 8
J. Garrett & Son	292	0 0
Rice & Son	278	0 0
D. Charteris	270	0 0
H. LINE (accepted)	238	0 0
J. F. Ford	236	0 0

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Crampton Street.

W. & H. Castle	£326	13	2
W. V. Goad	308	0	0
T. Gregory & Co.	306	14	0
J. Garrett & Son	268	0	0
Star & Son	268	0	0
W. Hammond	232	0	0
J. F. Ford	230	0	0
E. Triggs	221	10	0
E. FLOOD (accepted)	210	0	0

Credon Road.

W. & H. Castle	330	14	2
H. Line	299	0	0
W. Banks	297	17	6
Johnson & Co.	278	0	0
Rice & Son	277	0	0
Holliday & Greenwood	269	0	0
G. Kemp	245	0	0
E. TRIGGS (accepted)	240	10	0
Jones & Groves	239	0	0

King and Queen Street.

H. & G. Mallett	320	0	0
Maxwell Bros., Limited	296	0	0
Holloway Bros.	295	0	0
W. V. Goad	282	0	0
Heinemann & Brown	273	0	0
E. Triggs	229	0	0
B. E. Nightingale	209	0	0
D. Charteris	188	10	0
J. F. FORD (accepted)	162	0	0

Netherwood Street.

Cowley & Drake	253	3	0
G. Neal	250	0	0
H. Eady	238	0	0
E. T. Folley	217	0	0
Marchant & Hirst	199	0	0
F. Chidley	196	10	0
T. Cruwys	195	0	0
F. T. Chinchon	192	0	0
W. CHAPPELL (accepted)	188	0	0

LONDON SCHOOL BOARD—continued.

Springfield.

R. E. Williams & Sons	£299	0	0
Holloway Bros.	258	0	0
H. & G. Mallett	235	0	0
W. Hammond	228	0	0
Lathey Bros.	226	0	0
Maxwell Bros., Limited	220	0	0
Heinemann & Brown	211	0	0
Rice & Son	183	0	0
E. B. TUCKER (accepted)	174	4	0

Barrett Street.

G. Neal	187	0	0
E. T. Folley	178	0	0
H. Eady	140	0	0
W. Hailes & Son	138	0	0
G. Foxley	135	8	0
F. Chidley	105	0	0
Marchant & Hirst	99	0	0
F. T. CHINCHEN (accepted)	97	15	0

Prospect Terrace.

F. Britton	264	10	6
J. Willmott & Sons	261	0	0
G. Foxley	241	0	0
T. Nicholson	210	0	0
Marchant & Hirst	199	0	0
J. Morrison	188	10	0
E. T. Folley	187	0	0
F. Newton	185	17	8
T. Cruwys	185	0	0
A. M. Sparks	173	0	0
E. Flood	167	0	0
W. HORNETT (accepted)	154	0	0

Stanhope Street.

J. Willmott & Sons	350	0	0
G. Foxley	279	19	0
F. Newton	238	12	10
Marchant & Hirst	229	0	0
T. Cruwys	217	0	0
J. Morrison	214	0	0
E. T. Folley	212	0	0
W. Brown	195	0	0
F. G. Minter	186	10	0
F. T. CHINCHEN (accepted)	179	10	0

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W. McCormick & Sons	272 0 0
STEVENS BROS. (accepted)	268 10 0
<i>Goodson Road.</i>	
Johnson & Co.	295 0 0
H. Line	273 0 0
B. E. Nightingale	264 0 0
W. & H. Castle	253 12 6
Jones & Groves	207 15 0
Holliday & Greenwood	204 0 0
W. BROWN (accepted)	198 0 0
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E. P. Bulled & Co.	370 0 0
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H. J. Williams	338 0 0
E. Triggs	330 0 0
Holliday & Greenwood	315 0 0
H. SOMERFORD & SON (accepted)	298 0 0
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Johnson & Co.	+ 15 per cent. on schedule
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E. Proctor	376 0 0
E. Triggs	366 5 0
W. & H. Castle	333 19 0
C. S. Jones	306 0 0
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A. E. Symes	269 0 0
J. F. Holliday	221 13 0
W. G. Beaumont & Son	209 0 0
J. T. Robey	205 0 0
S. H. Corfield	188 0 0
J. Kybett	188 0 0
A. W. DERBY (accepted)	183 0 0
<i>Dempsey Street.</i>	
A. E. Symes	280 0 0
J. F. Holliday	242 6 0
D. Gibb & Co.	236 0 0
J. T. Robey	235 0 0
S. H. Corfield	210 0 0
G. Barker	186 10 0
J. KYBETT (accepted)	174 0 0
<i>Farrance Street.</i>	
Marsh, Tucker & Co.	313 0 0
D. Gibb & Co.	239 0 0
A. W. Derby	223 0 0
J. F. Holliday	221 18 0
J. T. Robey	213 0 0
J. Kybett	210 0 0
S. H. CORFIELD (accepted)	180 0 0
<i>Lower Chapman Street.</i>	
J. F. Holliday	259 19 0
E. Jackson & Son	256 10 0
D. Gibb & Co.	252 0 0
J. T. Robey	245 0 0
G. Barker	227 10 0
J. Kybett	226 0 0
J. Morrison	209 10 0
A. W. DERBY (accepted)	208 0 0
<i>St. Paul's Road.</i>	
Marsh, Tucker & Co.	243 0 0
W. G. Beaumont & Son	193 0 0
J. T. Robey	191 0 0
J. F. Holliday	179 10 0
A. W. Derby	177 0 0
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Marsh, Tucker & Co.	115	0	0
J. F. Holliday	113	0	0
J. T. ROBEY (accepted).	111	0	0
A. W. Derby	110	0	0

Charing Cross Road.

A. M. Sparks	240	0	0
G. Foxley	234	18	0
T. Cruwys	219	0	0
W. Chappell	215	0	0
W. Whiteley	199	15	0
B. E. Nightingale	199	0	0
Lilly & Lilly, Limited	197	8	0
F. Chidley	145	0	0
W. BROWN (accepted).	137	10	0

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W. Hornett	120	0	0
C. Gurling	113	10	0
R. E. Williams & Sons	107	0	0
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T. Gregory & Co.	90	0	0
H. J. Brown	88	0	0
W. WHITELEY (accepted)	60	10	0
W. Brown	60	0	0

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W. Hailes & Son.	165	0	0
Lilly & Lilly, Limited	154	0	0
B. E. Nightingale	149	0	0
E. P. Bulled & Co.	130	0	0
W. Hornett	115	0	0
E. B. Tucker	111	7	6
E. Triggs	104	0	0
F. G. MINTER (accepted)	120	2	0

MORECAMBE.

For erection of the Hotel Cecil. Messrs. JAS. MARSHALL, BUTTERWORTH & DUNCAN, architects, Back Crescent, Morecambe.

J. EDMUNDSON, Clarence Street (accepted).

MORLEY.

For erection of seven through houses.

Newton & Asquith	£310	0	0
N. Holroyd	308	10	0
D. Furness	300	0	0
J. E. GRAYSHON, Adwalton, near Bradford (accepted).	285	0	0

NEW BRIGHTON.

For building four pontoons at New Brighton Ferry.

J. JONES & SON, Liverpool (accepted)	£1,108	0	0
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NUNEATON.

For construction of a covered service reservoir of 500,000 gallons capacity. Mr. J. S. PICKERING, engineer, Nuneaton.

G. Law	£4,400	0	0
H. Mayo	3,495	0	0
S. Hipwell.	3,442	10	3
Bentley & Lock.	3,158	0	0
Johnson & Son	3,103	5	0
R. WILSON, Nuneaton (accepted)	3,010	10	0
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PONTARDAWE.

For alterations and additions to the Board school. Mr. W. WATKIN WILLIAMS, architect, Island Chambers, 63 Wind Street, Swansea.

D. REES, Ystalyfera, Swansea Valley (accepted)	£1,306	0	0
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PONTYPRIDD.

For additions to the White Hart Hotel. Mr. ARTHUR O. EVANS, architect, Pontypridd:

Powell & Co.	£1,093	0	0
M. Julian	927	0	0
D. R. LEWIS, Wood Road, Pontypridd (accepted)	925	0	0

SCOTLAND.

For addition to Wesleyan church manse, Reddingmuirhead. Mr. JAMES STRANG, architect, 102 High Street, Falkirk.

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W. Walker, joiner.

A. Cairns, plumber.

Drummond & Crowe, slater.

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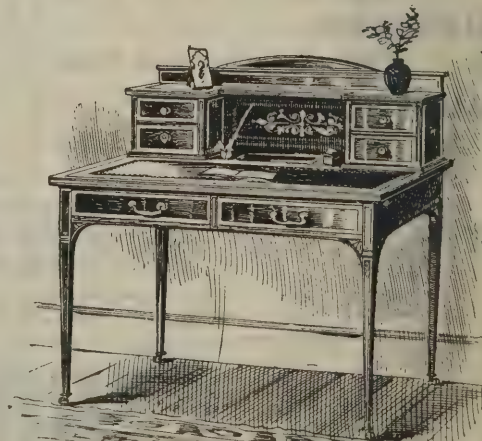
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For erection of business premises at Mallaig. Mr. DUN. CAMERON, architect, Inverness.
 W. BAIN, Creagorry, Benbecula (*accepted*). . . £800 0 0
 For making upwards of a mile of new approach to Glendoe Shooting Lodge, on the Lovat Estate, Fort Augustus. Mr. R. BLACK, architect, 22 Union Street, Inverness.
 Chisholm & Co. £1,187 10 0
 Fraser 1,092 10 0
 Watt & Co. 976 11 0
 Smith & Imry 963 15 0
 W. WILSON, Corroir, Fort William (*accepted*) . . . 857 10 0

WALES.

For erection of infant school at Pontardawe, Swansea Valley. Mr. W. W. WILLIAMS, architect, Island Chambers, 63 Wind Street, Swansea.
 J. Griffiths £4,442 0 0
 T. Davies 4,273 0 0
 J. Williams & H. Davies 4,100 0 0
 E. Thomas 3,499 0 0
 D. REES, Ystalyfera, Swansea Valley (*accepted*) . . 3,364 0 0
 For erection of fifty cottages at Treallaw, Rhondda Valley. Mr. T. R. PHILLIPS, architect, Old Bank Chambers, Pontypridd.
 CHARLES BROS., Penygraig (*accepted*) . . . £7,425 0 0
 For widening Watery Lane, Welsh St. Donatts. Mr. JAMES HOLDEN, surveyor, Queen's Chambers, Cardiff.
 For works at Cwmllynfell Board school, for the Llanguique School Board. Mr. W. W. WILLIAMS, architect, 63 Wind Street, Swansea.
 J. MORRIS, Brynamman (*accepted*) . . . £345 0 0
 For alteration of the Wern schools, Ystalyfera. Mr. W. WATKIN WILLIAMS, architect, 44 Brynawel Terrace, Swansea.
 J. R. WILLIAMS, Ystalyfera (*accepted*) . . . £75 10 0

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 J. AIRD & SON, Wigton (*accepted*) . . . 79 15 0

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BUILDING AND BUILDERS.

THE contract for the building of the new Bluecoat School at Horsham has been signed. Messrs. Langley & Son, of Crawley, are to be the builders, and the cost will be 294,243 $\frac{1}{2}$. The new school is to be finished in three and a half years.

NOTICE has been given to the Hull Corporation to terminate their tenancy of a stone-yard adjoining the Paragon Station at Hull, rented from the North-Eastern Railway Company. The company require the land for the enlargement of Paragon station.

THE plans of the proposed new church in All Souls parish Heywood, have been approved by the Ecclesiastical Commissioners, and it is hoped shortly to begin building operations. In the same parish the new mission church of St. Aidan, at Marland, is to be dedicated on the 15th inst.

MRS. ELAM has decided to erect at her own expense and as a memorial to her late husband new premises for the use of the Unitarian congregation which at present meets in the Iron Church, Manor Road, Liscard. The scheme includes a new church to seat 300, a church hall to seat 250, and a number of classrooms, &c.

ON Saturday a huge crane on an elevated tramway on the premises of Messrs. Lowe & Sons, contractors, Burton-on-Trent, fell to the ground, and carried with it a block of stone weighing several tons. Three men were buried in the debris and seriously injured, one man, named Rowe, being terribly mutilated. A number of masons working in an adjoining shed had a marvellous escape. They heard the snapping of the

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heavy beams, and just managed to get out of the shed as the huge cogwheel and portions of the machinery came crashing through the roof.

At Hammersmith Mr. Drew held an inquest touching the death of William Green, 47, a labourer, of 31 Prince's Place, Notting Hill, who died in the West London Hospital. A large number of witnesses were called, who deposed that the deceased was working in a cutting at Woodhouse Park, Shepherd's Bush, on the new Central London Railway, with another man, breaking down a clay bank 7 feet high and 18 inches wide. To make the work easier deceased and his mate undermined it to the extent of 12 inches, when suddenly the clay collapsed and partially buried the deceased. He was taken to the hospital, where he died the same night.

A PUBLIC meeting was held in the Lesser City Hall, Brechin, on the 2nd inst., in connection with the proposed restoration of the cathedral. Provost Scott occupied the chair. The Provost referred to what had already been done, and hoped the movement would get the hearty support of all classes in Brechin. Ex-Provost Lamb moved that the meeting gave its hearty support to the proposed restoration of the ancient cathedral of Brechin, and commended the scheme to the liberality of all interested in the city and church, especially to all natives of Brechin at home and abroad. Although that motion dealt with an ecclesiastical fabric he did not think that was the time for anyone to air their opinions on ecclesiastical subjects. Mr. A. Robertson seconded the resolution. Mr. William Smart supported the resolution, which was carried enthusiastically.

At the weekly meeting of the York Board of Guardians last week Alderman Agar moved the adoption of a report of the workhouse committee in reference to improvements at the workhouse. He explained that the present appliances for washing were very inadequate to the requirements of the house, and it was proposed to build a steam laundry at a cost of 3,775*l*. At a later date dining-hall and kitchen improvements would have to be effected, and for kitchen purposes they would need steam. They would also require hot water for the house, and a great portion of the building could be heated by steam. They proposed therefore to have two boilers large enough to do the whole work. The fittings common to both laundry and kitchen block would cost 850*l*., which brought the total to 4,625*l*. They would probably require a clerk of works, and the whole cost might be put down at something like 5,000*l*. Mr. T. Jacques seconded the motion, which was carried unanimously.

ELECTRIC NOTES.

A SHOCKING accident occurred on Monday at the Brush Electrical Engineering Works, Loughborough. William Bray, fitter, was turning brass rings in a powerful lathe when his head became jammed between the sharp lathe and the large piece of brass from which the rings were being made. The lathe, catching him just below the eyes, literally cut his head into three pieces, and he was picked up dead.

The Craigpark Gutta-Percha Works, Townmill Road, Glasgow, which have for some time been in disuse, have now been taken over by a new company, of which Mr. A. Bruce Maclean is manager. The premises are being fitted up for the manufacture of electric-light cables, an industry new to Scotland, and it is expected that in the course of a week the machinery will be all in working order. The cables used in Glasgow and other Scottish cities for lighting purposes have hitherto been supplied by English firms. The Craigpark Company, as now constituted, will manufacture telegraph and other wires, as well as cables for lighting purposes.

MR. W. C. HAWTAYNE, London, who was appointed consulting engineer to the Police Commission of Perth to report on their proposed scheme for the introduction of electric lighting into the city, has prepared a long statement in regard to the prospects of the undertaking. The report was before a special meeting of the Perth Police Commission, on the 4th inst., and was generally regarded as somewhat too sanguine. Mr. Hawtayne says it is an ascertained fact that, with one or two exceptions, every undertaking of the kind in the kingdom under municipal control that has been at work for more than three years is now yielding a substantial sum towards the reduction of town's rates. Mr. Hawtayne recommends the erection of thirty-seven arc lamps of about 2,000 candle-power, such as can be seen in Princes Street, Edinburgh. For business premises, houses, &c., he estimates that 10,000 lamps of eight candle-power will be taken up within a comparatively short time. He recommends the adoption of the low tension current system, and estimates the cost at 25,250*l*. If a destructor of refuse is introduced, the cost will be increased to 27,950*l*. The gross revenue he estimates at 4,800*l*. The working cost of the scheme is put down at 2,158*l*., and under the profit and loss statement he brings out that there will be profit available for reduction of rates or other purposes amounting to 1,251*l*.

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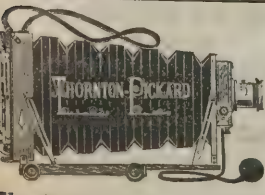
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A DISTRICT nurses' home was recently opened in High Lane, Chorlton-cum-Hardy, by the Duchess of Buckingham and Chandos.

THE authorities of North Street Baptist church, Leeds, have just handed over to the committee of the Yorkshire branch of the Baptist Church Extension Fund the sum of 500*l.* out of the proceeds of the sale of their old chapel. The donation is given towards the erection of a new Baptist chapel at Beeston Hill.

THE parish church of St. Mary, Bocking, has been reopened after reparation. The chief work was the restoration of the roof, which had become very unsafe. A new roof has been placed over the old oak one. There have been also new piers placed to the chancel arch, and the whole of the church has been thoroughly cleaned. The work has been done by Mr. Wm. Parmenter, of Braintree.

AT the Batley Technical School a large new wing, to be styled the "Stubley Memorial Wing," is now in process of construction. The cost of the extension, which will amount to 1,500*l.* or 1,600*l.*, is to be defrayed by the Messrs. Stubley. In design similar to the rest of the building, the new wing is to be utilised for the textile classes, the removal of which will considerably relieve the pressure upon the space of the existing building.

A SOMEWHAT singular outbreak of fire was discovered at the parish church, Kettering, early on the morning of the 2nd inst. Constable Campin, whilst passing the George Hotel, in Sheep Street, noticed a strong glare proceeding from the basement of the west front of the church. Upon a closer examination the constable found that the stoke hole, a chamber some

15 feet by 9 feet, was in a full blaze, sticks, coal and other lumber contributing to the fire. The fire brigade were summoned and succeeded in extinguishing the fire in about half an hour, and no serious damage resulted.

A MEETING of the managing body of the Dewsbury Technical School took place on the 1st inst., under the presidency of Mr. T. Richards. The chief business was the consideration of a suggestion by Mr. S. J. Chadwick, president of the school, that steps should be taken towards carrying out a scheme projected some months ago for enlarging the buildings, at a cost of 3,500*l.* The number of students, it was reported, was larger than in any previous year so early in the session, and unless the usefulness of the school be greatly lessened and impaired, it was absolutely necessary that the extension be carried out. It was resolved to appoint a building committee, who are to confer with the architect and bring up a report, to be submitted to a meeting of governors a fortnight hence.

A PECULIAR accident, resulting in some injuries to a young man named Thomas Williams, Penygroes, occurred at the Anglesey Inn, Carnarvon, on the 3rd inst. Williams alighted at the inn and tied a horse, of which he had charge, to the portico. At the request of the landlord he, however, proceeded to undo the halter, but while this was going on the horse was frightened by the booming of cannon near by and plunged forward, pulling the whole portico down with him. Williams was released from beneath the *débris* by the landlord and conveyed to the cottage hospital. The landlord narrowly escaped from injuries which, owing to the heavy weight of the structure, might have proved very serious.

A FIRE broke out about nine o'clock on Sunday night at Lambeth Palace, but was fortunately subdued before it had attained serious dimensions. It occurred in the vestry-room attached to the vestry-hall in Cranmer's Tower, and is attributable to one of the old beams in the chimney becoming ignited. The old-fashioned room became filled with smoke, and prompt but ineffective steps to overcome the mischief were at once taken. As it was obvious that a considerable fire was burning behind the fire-grates not only in the vestry-room but in the lower floor, it was decided to send for the fire brigade, and a messenger was despatched to the Waterloo Road fire station, while a minute or so later someone pulled the Lambeth Palace fire alarm. On the arrival of the firemen the brickwork was cut away on either side, and water poured upon the great beam, which was smouldering. The work of the firemen

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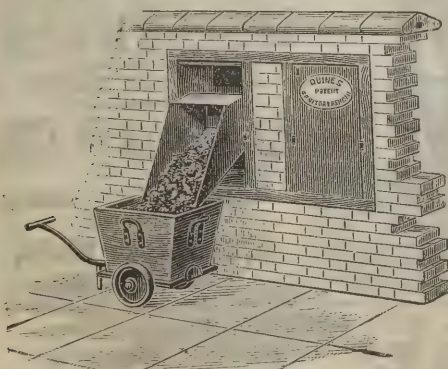
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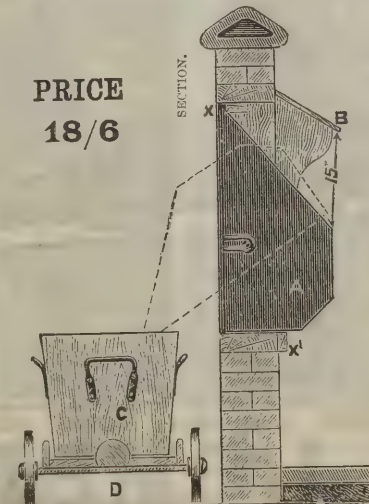
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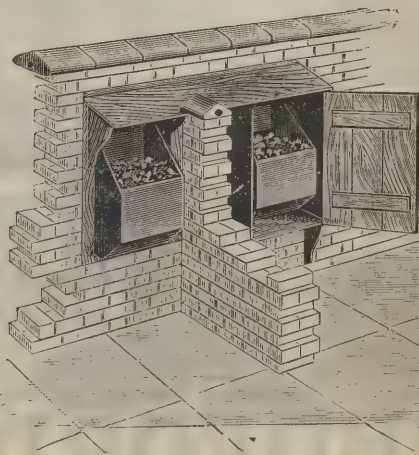
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was watched with the keenest anxiety by the Palace staff, and the efforts of the brigade were aided by the members of the London Salvage Corps, who came from Southwark Bridge Road, under the direction of Superintendent Bridges. The mischief was effectually subdued by eleven o'clock.

THE new Gresham Baptist chapel, facing Gresham and Barrington Roads, Brixton, erected at a cost of 5,000*l.*, has just been opened for public worship. The former chapel was partially destroyed by fire nearly two years ago, and after some delay in seeking a new site the building committee decided to pull down what remained and rebuild on the old site. The foundation-stones were laid early in the year. The elevations are in the Italian style of architecture, and are of yellow malm bricks with Portland stone dressings. The building consists of a basement for heating purposes, chapel on the ground-floor with entrances from both roads, deacons' and minister's vestries; the seating accommodation is for 475; two entrances and separate staircases to gallery, and also two entrances and staircases to schoolroom, which is placed above the chapel, on either side of which are arranged classrooms for boys, girls and infants; kitchen, water-closet, lavatories, &c. The architect is Mr. J. William Stevens, of 21 New Bridge Street, E.C.

A NEW Baptist chapel, erected at Littlemore, Pudsey, has recently been opened for public service. The chapel will supplant an old and incommensurable building which has been used for Divine service for upwards of forty-seven years and which will now be converted into a Sunday-school. The new edifice has been erected from the designs of Messrs. Hodgson & Farrar, architects, Bradford and Pudsey, and is in a plainly-treated Classic style of architecture, the front being relieved with dressed ashlar piers and moulded cornices. The chapel, which has a gallery running on three sides of it, provides sitting accommodation for about 600 persons. At the east end is a choir and organ gallery, separated from the chapel by a large semicircular arch. The whole of the pews, which are of pitch pine, radiate to the rostrum, thus giving every one a good view. The rostrum, which forms a central feature, is elaborately treated and is of pitch pine and mahogany. There are three vestries on the level of the chapel floor, and advantage has been taken of the fall in the site to get kitchen arrangements, rooms for a Young Men's Christian Association and two classrooms in the basement, but above the level of the ground. The ceiling of the chapel is treated with a lantern running the length of it, relieved with ornamental plaster-work. The artificial

lighting is by means of Stott-Thorpe ceiling lights, the heating is by hot-water on the low-pressure system and the ventilation is on the most approved principle.

THE new science buildings, which have been erected at the rear of the Grammar Schools, Wolverhampton, were opened on the 2nd inst. The foundation-stone of the building was laid in April last by Lord Hatherton, and the work has been carried out by Mr. H. Willcock, of Wolverhampton, from plans prepared by Mr. Stanger, the total estimated cost of the structure and fittings being about 2,000*l.* In nearly every respect will the new erection harmonise with the school, the material used being red brick with stone strings. The building is of two storeys, with an elevation from the ground of 40 feet. On the ground-floor are lecture-room, preparation-room, store-room and balance-room. In the lecture-room is a gallery and there is sitting accommodation for eighty students. The first floor is occupied chiefly with a chemical laboratory and a physical laboratory, the former being for use in teaching practical chemistry or metallurgy, and the latter for practical instruction in the various branches of physics. Each laboratory has workbenches for thirty students, and the building throughout is supplied with all the appliances necessary for the work to be carried on therein.

NEW CATALOGUE.

THE new illustrated catalogue which is being issued by Messrs. Colledge & Bridgen, of Church Lane, Wolverhampton, is a handsome production, as well as a useful book of reference. It contains upwards of 200 pages of well-printed and profusely illustrated matter, every description of door and window furniture and plain and ornamental brass and ironwork being represented by carefully drawn and admirably reproduced sketches. The book, which is printed on thick paper, is substantially as well as ornamentally bound, and all prices are clearly given.

THE plans of the proposed alterations and additions to the Royal Opera House, St. Leonards, prepared by Mr. John P. Briggs, of Effingham House, Arundel Street, Strand, were submitted and passed by the Hastings Town Council on November 19. Mr. Briggs's plans for an opera-house in Tunbridge Wells have been also passed, and it is anticipated operations will be commenced on January 1 next.

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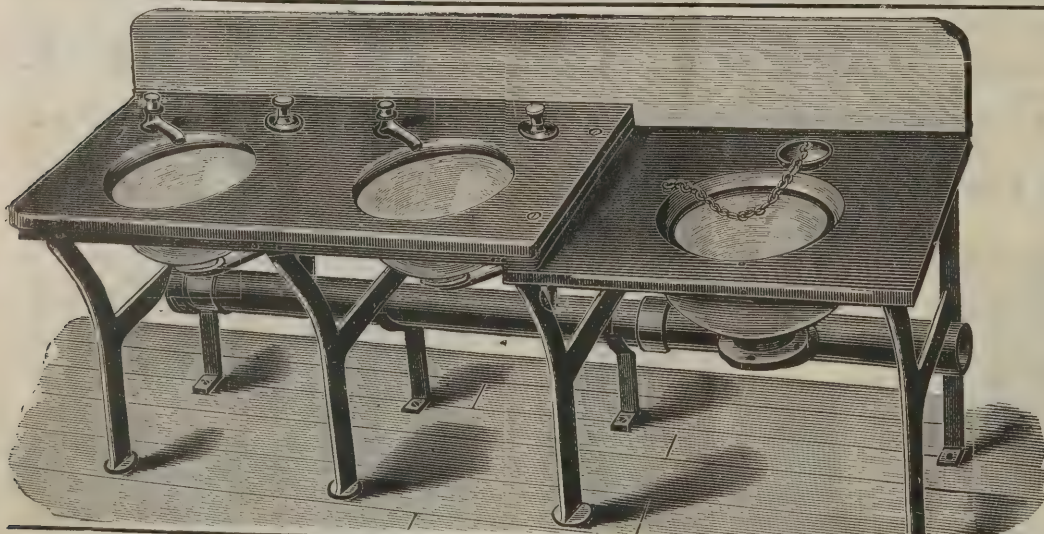
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TRADE NOTES.

THE County Court House, Galway, is being warmed and ventilated by means of Shorland's patent Manchester stoves, with ornamental tiled sides and with descending smoke-flues, and Shorland's patent Manchester grates.

MR. A. G. BELL, of Sherwood Street, Nottingham, manufactures fire-resisting doors and partitioning, the important principle of which is that they are made in three separate sections, the central one being of asbestos. These doors have been subjected to severe fire tests, with the result that while on one side the woodwork has been completely calcined, the asbestos interlining has effectually prevented the fire, and to a great extent the heat even, from extending through to the other side, which has remained perfectly intact. The following are among the advantages which Mr. Bell claims for his patent doors:—They are non-conductors of heat; are not unsightly, as they can be made to harmonise with the other doors in a building, both in design and material; they are not awkward to open like iron doors, for they are not much heavier than ordinary wood doors; they can be made to close automatically—a most important desideratum in a fire-resisting door; they can be used in many positions where iron doors could not be placed; they will be found valuable in connection with hoists—as by their use as trap-doors to each storey they cut off one floor from another, and thus hinder the hoist acting as a huge chimney; and lastly, they are very moderate in cost.

PLUMBERS' EXAMINATION.

AN examination of master and operative plumbers applying for registration under the National Registration of Plumbers was held on the 4th inst. by the Worshipful Company of Plumbers. There were eighteen candidates present from various parts of London and also from several provincial towns. The tests in workmanship included lead-bossing, pipe-bending and joint-making, and the examination questions included the subjects of roof covering, contamination of drinking water from faulty connections, arrangement of bath, sink and closet wastes, drainage of town houses and disconnection with sewers.

The examiners were Mr. Charles Hudson, chairman of the Board of Examiners; Mr. J. Kemsley, master plumber; Messrs. J. J. L. Scott and J. L. McIntosh, representatives of the United Operative Plumbers' Association of Great

Britain and Ireland; and Mr. C. T. Millis, principal of the education department, Borough Road Polytechnic. Three candidates succeeded in passing the examination in practical workmanship.

THE CITY FIRE.

ON Monday the inquiry into the causes of the great fire in the City on November 19 was opened by Mr. S. F. Langham, coroner. The following evidence about the general character of the buildings was given:—

Mr. G. Vickery, architect and surveyor, 50 Gresham Street, said he was the architect of the premises 28, 29, 30 and 31 Hamsell Street. Nos. 30 and 31 backed on to 15 Well Street, where the outbreak was supposed to have occurred. They were, he said, constructed by Messrs. Mortar for Messrs. Harrison & Smith, the freeholders being the Goldsmiths' Company. There was nothing particular about the construction of the buildings. They had frontages of about 20 feet each, and were divided by party walls from basement to roof. There were four storeys above the ground floor, so that they were six storeys high. In the case of 15 and 18 Well Street there were well-holes or lighting areas. The depth of the land from Well Street to Hamsell Street was about 75 feet, so that the well-holes were necessary in order to get sufficient light into the centre of the buildings. Well Street was, roughly, about 25 feet wide, and Hamsell Street 35 feet or 36 feet, with high buildings on either side. In these circumstances the lighting areas were a necessity if the rooms of the warehouses were to be of any good. These lighting areas extended from the ground floor upwards to the roof, and were surrounded by windows to admit light to the different floors. They were open to the roof, but for the ground floor they terminated in a skylight. The basements were lighted underneath the ground floor by means of glass let into the floor, which was a very common way of lighting basements in the City. The staircases were either teak or pitch pine. There was no stone staircase. Stone was very objectionable for staircases in the case of warehouses of the sort under consideration.

The City Solicitor asked if the buildings were constructed on what was believed to be the principle of fireproof warehouses?

Mr. Vickery replied that they were constructed in accordance with the Building Act and to the satisfaction of the authorities. The different floors were supported on wooden

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joists. The span was so short that there was no need of iron girders. It would have been a waste of money to use anything but wood. Wood was used for the floors throughout, but he thought the ceilings and walls were of plaster.

Mr. Brown (intervening) said that in the case of the premises occupied by his firm they were of matchboard.

The City Solicitor asked if the buildings were run up quickly for the purpose of finding tenants?

Mr. Vickery said a building might be run up quickly and yet substantially. No doubt the buildings in question were erected under contract and a reasonable and proper time allowed the contractors. They were not, however, speculative buildings or built by a speculative builder. They were constructed under the supervision of efficient authorities, including the freeholders and the public bodies concerned. They were not, therefore, what was generally understood by the term "run up," although with a heavy ground-rent payable on the property no time was lost in completing them.

The City Solicitor: Then you would not adopt the suggestion that they were jerry-built?

Mr. Vickery: Certainly not. If they were so they would have cracked from time to time, and other complaints would have arisen. At the time the buildings were erected it was a very usual method to use wooden partitions, and he had no doubt that wood was used in the majority of those cases. If a fire broke out on the ground floor the first thing happening would probably be the breaking of the skylight, provided that the fire was of sufficient magnitude. He had not formed any idea at all from any inspection as to whether the fire originated on the ground floor, or as to whether the existence of this well-hole increased the facility of the fire. Of course, when there is a well-hole in a building it becomes to a certain extent a shaft, and to that degree might be considered a danger, though I have not formed any definite conclusion. Two buildings joined by a well-hole might be considered as only one building. It was practically only one. He considered that the premises were reasonably fireproof. They were the usual type of building erected twelve years ago; in fact, he might say that 99 out of every 100 buildings were similarly constructed. He had designed many such buildings, and this was the first fire of any magnitude—he might even say the first fire—that had occurred in any of them. Matchboard ceilings and walls were objected to by the insurance companies, and at the present time it was considered that warehouses were better when finished with plaster. The well-

hole was absolutely necessary, as they had in this case a warehouse badly lighted from Hamsell Street and Well Street, and the buildings must be lighted or they were useless. As to the staircases, a good old oak staircase would have been best, but they were very expensive and he doubted whether he could get them if he wished. Staircases made of oak 100 years old would stand for hour after hour against the fiercest of flames, while a stone staircase would collapse and fly into fragments. Stone staircases in such cases were a delusion. The parapets which divided the two warehouses in question were about 18 inches or 2 feet from the gutter, while a railing was carried along the top of the parapet to make ingress and egress still easier. All this mischief, he continued, has been the fault of narrow thoroughfares. Give us wide thoroughfares and we shall get safer buildings and not need lighting shafts. The architect might contrive and plan and the builder may construct, but the tenant wants to occupy and stores the buildings up on every floor with combustible goods, and it is impossible to make a building fireproof under such circumstances.

THE NEW THEATRE ROYAL, DUBLIN.

THE reconstructed Leinster Hall, Dublin, which will henceforth be known as the Theatre Royal and Opera House, is now rapidly approaching completion, and bids fair to rank with the handsomest theatre in the kingdom. The frontage has been altered by the erection of a graceful portico on the site of the verandahs of the Leinster Hall. The pediment is supported on light Ionic columns, and is surmounted by a handsome Italian balustrade. This structure rises to about half the height of the whole frontage, to the attractiveness of which it materially adds. The entrance to the balconies and boxes will be from Hawkins Street. The vestibule of the Leinster Hall has been largely utilised, and from that point two marble staircases, one on either side, lead up to the dress circle. In large recesses on this landing mirrors will be placed, which, under the electric light, will render the scene a gay and animated one. The ceiling of the Hawkins Street entrance is elaborately worked out, the emblematic painting-work having been done by an Italian artist, who has also done similarly beautiful work on the lofty ceiling of the auditorium.

The stage is amply capable of affording accommodation for the presentation of great spectacular displays. It is 64 feet square, and the height from the floor to the gridiron roof is 60 feet,

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affording great facilities for scenic displays. In the matter of lights in this part of the house a distinct novelty has been introduced. In most theatres it has hitherto been the practice to work the lights from the prompt entrance, but here they will be worked from a suitable platform over that entrance, thus avoiding any risk of fire. With regard to the general lighting of the house, the arrangements are excellent. A powerful steam-engine is in position on the Hawkins Street side, and is already generating electricity for the use of the workmen engaged in the building, and there are also provided a number of accumulators, which will supply light for five hours; but lest anything might go wrong with this arrangement, the Theatre Royal will be connected with the Corporation works in Fleet Street, and there will also be a supply of gas to be used when required. Fire in any part of the building is almost an impossibility, and the asbestos curtain, in the remote chance of anything in the nature of fire taking place on the stage, would effectually protect the auditorium. The "flies" are unusually spacious, and those engaged there will have ample room to attend to their special business.

The auditorium is 80 feet in depth by 64 feet in width, and the inside width is 31 feet. The pit is of great dimensions and will accommodate a vast number of people, while a decided advantage for persons frequenting that popular part of the house will be found in the circumstance that the seats here incline towards the stage, so that the view of those in the back portion of the pit is not at all interfered with. The work in the dress circle and upper circle as well as in the gallery has been completed in splendid style. Two handsome boxes on either side behind the dress circle have been provided, from which an uninterrupted view of the stage will be obtained. A fine promenade behind the dress circle presents a point of vantage for a thorough view of the stage. The old foyer in the Leinster Hall is being transformed into a saloon for visitors to the dress circle, while one portion of it, separated from the saloon, will be devoted to the providing of tea and coffee for ladies, and another part, also separated from the saloon-bar, will be used as a board-room. The box intended for His Excellency and the Viceregal party is being fitted up on a scale of great magnificence, and all the other boxes are being luxuriously upholstered. There will be a saloon for every portion of the house. For the *artistes* engaged the dressing-rooms are numerous, and they are all fitted up with all the necessary accommodation. The opening performance will take place on Monday next.

SANITARY INSPECTORS' ASSOCIATION.

A MEETING of the Worcestershire and Midland Counties Sanitary Inspectors' Association was held in the board-room at the Evesham Workhouse on the 4th inst. Mr. G. H. Fosbroke (medical officer of health for Worcestershire) presided. Mr. Harvey read a paper on "Village Drainage," and afterwards gave a practical demonstration of levelling. In the course of the discussion Mr. Brookes spoke on the question of air-inlets in the line of drains, about which a discussion had arisen in Birmingham. The position of the air-inlet should be carefully selected, and in no case should it be placed over an intercepting trap. He did not think it was right to place a syphon upon every drain connection; the fewer syphons they had the better. Mr. Hillyard urged that no portion of a drain should be covered in unless it had been thoroughly tested with water. Referring to the point which had exercised the authorities in Birmingham, Mr. Fosbroke urged the importance of syphons being properly set and constructed, and said if they did not have an intercepting syphon and an inlet how were they going to get fresh air into the drains? Mr. Fosbroke afterwards spoke upon isolation hospitals, and explained the plans of a hospital which had been approved. Local authorities were enabled to provide such hospitals as far back as 1875, and some authorities then set to work and provided them—at Alcester, for instance, where the hospital had given most satisfactory results ever since. Mr. Fosbroke also spoke of the good results obtained from the King's Norton Hospital. There were many places where hospitals were required, but nearly the whole of the authorities of the county were now considering this question. Mr. Fosbroke explained the friction which had arisen between the Local Government Board and the county councils of Worcestershire, Derbyshire and Staffordshire, owing to the demands of the Local Government Board. In the case of Malvern the Board required that in a hospital of twenty beds eleven bedrooms should be provided for the staff, but a more absurd case referred to Derbyshire, where the Board required nursing accommodation for sixteen, and the hospital was only one of sixteen beds. Mr. Hare, an architect of great experience, had conferred with the medical officer for Staffordshire and himself with the view of inducing the Local Government Board to reduce their demands, and these plans, which provided for twenty beds and six bedrooms, had now been sanctioned by the Local Government Board.

In the course of a general discussion, Mr. Fosbroke said the Tewkesbury Rural District Council was the only district authority in the county so far behind the times as not to have adopted the Notification Act.

PAVEMENT LIGHTS IN BIRMINGHAM.

OUR attention has been called, says the *Birmingham Daily Post*, to certain regulations which the authorities have lately been enforcing in Birmingham with regard to the lighting of basements by the insertion of glass slabs in the pavement, which regulations, it is complained, are a serious curtailment of the privileges which property-owners have hitherto enjoyed. Our information is that prior to the retirement of Mr. W. Till from the office of city surveyor the rule was to allow pavement lights a foot wide along two-thirds of the frontage in cases where they were desired, the Corporation exacting no payment and making no special conditions. The result has been that a very large number of business premises have been so planned as to admit of the use of the basements for offices, show-rooms and so forth, the value of the property being thereby considerably enhanced, and the rates being proportionately enriched. Some time ago it was intimated to persons who were about to erect properties on these lines that the pavement lights would only be sanctioned subject to payment of 5s. per annum for each light of 6 feet by 2 feet, the arrangement to be terminable at three months' notice. Agreements to this effect were entered into in some cases; but other persons concerned have taken the view that not only is the exaction of a rental for the use of the pavement light illegal, but that the reservation as to the continuance of the light seriously vitiates the property-owner's title, rendering the leasing of basements so precarious as to leave no alternative but to revert to the primitive cellar or comparatively dark storeroom.

This view has been forcibly put to us by several professional gentlemen who are in a position to speak with some authority as to the probable effect of the new regulations from the building-owner's point of view. They say that, apart altogether from the depreciation in the value of the property to the extent of the charge now imposed, owners will not consider themselves justified in going to the expense of constructing basements and entering into leases with tenants for their occupation, if they are under liability to forfeit their pavement lights at the caprice of another surveyor or newly-constituted public works committee. Building-owners have, of course, the option of setting back their frontages so as to allow of the areas being constructed on their own land, but it is urged that this would not only involve the sacrifice of a portion of the site, but might lead to many ugly irregularities in the building line. Pavement lights are unquestionably viewed with anything but favour by many people, on the ground that they are a source of danger to pedestrians, particularly in wet weather. The critics of the public works committee point out, however, that this does not enter into the present controversy, the only dispute being with regard to the payment of rental and the reservation as to withdrawing the permission. They say, moreover, that it is recognised in all large cities that the advantages of pavement lights far outweigh any possible disadvantages; and, further, that any misgivings which may be felt concerning the insecure foothold they afford, are conclusively answered by the fact that the doorways of many shops in Birmingham are paved with prepared glass, which admits the light to the apartments below. Particular stress is laid on the argument that the rateable value of business properties is greatly increased by the utilisation of basements for offices, shops, &c., and that while the public purse may benefit by the rents received for such pavement lights as are put in, it will lose much more through the check imposed on the erection of premises with good basement accommodation. One correspondent suggests that it would make an interesting study for the assessment committee to calculate the benefit they have derived up to the present time from such rating, and the loss which is likely to accrue if the public works committee adhere to their present course of action. He adds that it is felt by many who are in a position to know, that a serious blunder has been made in municipal policy. It is said that the new regulations are necessary in view of the possibility of the public services demanding the laying of more pipes or wires under the streets in the future. The architects and surveyors reply that the sewers, gas, water and electric mains do not occupy on an average more than a fifth of the road space. A concrete case has been brought to our notice by way of illustrating the effect which the new regulations have on building enterprises. In the improvement block of buildings about to be erected on the site bounded by Cannon Street, New Street and Needleless Alley, it was proposed to construct good basements, lighted and ventilated on the area plan. The promoters of the scheme found, however, that the necessary pavement lights at 5s. each would involve an annual charge on the property of 15%, thus reducing its full value by 500%. The solicitors advised that apart from this

charge the owners would be so hampered by the condition as to cancellation of the pavement lights that it would be folly to enter into the agreement required by the authorities. It almost appeared that the scheme would be abandoned, but a compromise was arrived at whereby the building line was modified and certain old rights of lighting were exchanged for new, the result being that the scheme was proceeded with, though with a serious reduction of the pavement lights originally intended. The feeling that the authorities are not only acting very inconsiderately with regard to the property-owners, but are levying tribute and usurping rights in a way that the law never contemplated, is so strongly held by some of those affected that it is hinted that the merits of the dispute may be put to the test before a legal tribunal.

In order to ascertain the official view of the matter we have communicated with the city surveyor (Mr. John Price) and the town clerk (Mr. E. O. Smith), who have courteously explained the bearings of the case as concerns the public at large. The city surveyor, whose department is primarily interested, states that the regulation has been adopted in order that the Corporation may receive an equitable return for expense to which they are put in connection with pavement lights, and also with a view to preserving the rights of the public in regard to the footpaths and the space beneath them. The new arrangement is in some respects only tentative, and it is not improbable that it will be modified if it appears to the committee to operate oppressively where properties with extensive frontages are concerned. Mr. Price contends, however, that these pavement lights, though valuable to private individuals, are a doubtful boon from the point of view of the general public, and states that, apart from the fact that their surface is slippery, they entail expense on the rates. There is the preliminary cost of drawing up and stamping the agreement, with incidental correspondence and the supervising of the construction and maintenance of the pavement lights, while the iron framework in which the glass is enclosed causes the pavement to wear away round its edge, thus entailing frequent renewal. As to the necessity of making the concession of pavement lights terminable at three months' notice Mr. Price is very decided. He says it is obviously not in the public interest that the right to the user of the footpaths and the space underneath should be thrown away by the Corporation, as if it became necessary at any time to carry pipes, say, under the pavements, the conciliation of vested interests would become a very costly affair. Mr. Price demurs to the statement that the right to introduce pavement lights was granted as a matter of course prior to his coming to Birmingham. He says permission was sometimes refused altogether, and what he has done has been to put the matter on a systematised basis, so that no one can complain that another person is having preferential treatment. He states further that charges are imposed in the same way in Liverpool and other towns, but he will not pledge himself that it is a regular practice, because he knows places where the authorities will not sanction pavement lights on any consideration. Finally, Mr. Price holds strongly that some limitation of these privileges is desirable in Birmingham, and says in effect that it is bad tactics on the part of the gentlemen who "want something for nothing" to run the risk of overreaching themselves.

The town clerk being consulted by a representative of the *Daily Post* on the legal aspects of the question, had some hesitation in giving an opinion which was not sought by the committee concerned. He, however, went so far as to say that his view was that each case in which pavement lights were desired should be dealt with upon its merits, regard being had to the public interests involved. The paramount duty of the Corporation in the matter was to maintain the rights of the general community; and the Public Health Act and the Birmingham Corporation Consolidation Act 1883 gave them the necessary control over both the carriageway and footpath, not only so far as the surface was concerned, but in reference to subterranean works. These matters were expressly made subject to the approval of the local authority by section 26 of the Public Health Act and section 17 of the Consolidation Act. The town clerk recognised that the Corporation were not entitled to exact any substantial rent for pavement lights, because only a limited right was given to the local authority; but he regarded the 5s. now charged as very little more than an acknowledgment, the object being to preserve evidence of the fact that the public works committee had in a particular instance allowed a person to do that which was forbidden by the general law, save by express permission. When it was pointed out to the town clerk that 5s. per light meant a considerable item on a large property where pavement lights were desired throughout the whole frontage, he said he did not understand that anything more than one small acknowledgment would be demanded for the whole series of lights, adding that the Corporation recognised, of course, that they had no right to sell parts of a public footpath. These are the two sides of a thorny question, so far as we have been able to ascertain them, and the statements *pro* and *con* will perhaps assist our readers

to arrive at an approximate estimate as to how far the authorities have succeeded in reconciling the claims of private enterprise on the one hand with the public interest on the other.

MUNICIPAL BUILDINGS, SURBITON.

The following is the description by Messrs. Forsyth & Maule of their design, which has been accepted by the Council, for the new municipal buildings, Surbiton:—

Position and Site.—The design shows the building placed parallel with Ewell Road, and on the building lines. On the south boundary a space of 7 feet is kept for boundary fence to take advantage of the suggestion of placing windows on this side, and to insure an air space all round. Double wrought-iron gates with brick piers are indicated in the Ewell Road, allowing for a "drive in" to the front door of offices, and a gate is shown in Berrylands Road for caretaker, tradesmen, &c.

Arrangement of Plan.—A vestibule leads to the hall and main staircase. To the left on entering the hall are the doors of the collector's and surveyor's departments, which are easily accessible. The surveyor's department has a north aspect, as being most suitable for drawing purposes, a small third room is arranged between the general and private offices, heated by a radiator, and a good strong room for plans is placed in the former. The collector's office has a small safe. The caretaker's office and staircase is put on this side, being the most convenient for Berrylands Road. The stairs run up from basement (containing heating chamber and coal cellars) to second floor, having door leading therefrom to main hall and first floor landings, to facilitate cleaning operations. A coal lift occupies the centre space of these stairs, and supplies the various floors from basement. To the right on entering are the council clerk's general and private offices, the registrar's office, the medical and sanitary, private and general offices. Strong rooms are given to the council clerk's and registrar's departments.

First Floor.—On the plan are shown the council chamber, two committee-rooms, waiting-room, cloak-room, main and the caretaker's staircases, &c. The council chamber provides ample space for the number of councillors, officials and reporters, and space for deputations in addition. The waiting-room is shown large enough to accommodate deputations. The committee-rooms are arranged in the lobbies near the doors of the council chamber, affording ready communication with the latter.

Second Floor.—The whole of the caretaker's accommodation required is placed on this floor.

Materials (externally).—The elevations have a simple treatment in red brick and stone. The facing bricks to be of a good warm colour and sound, and laid in English bond, with a wide joint weather painted, the general walling to be in good approved stocks. The stonework to be in best brown Portland, and cornices covered with lead. The roofs to be boarded, battened and felted, and covered with approved green Westmoreland slates, finished with lead hips and ridges. The lead flats where shown to be covered with 7-lb. lead checks, 6-lb. lead, and flashings in 5-lb. lead.

Internally.—The floors in entrance hall and vestibule, plain marble floors in large squares, floors in offices to be yellow deal in narrow widths, council chamber and committee-room floors to be pitch pine in narrow widths, and all other floors on first and second floors to be deal. Basement floors to be cement. All staircases to be stone with wrought-iron handrail and balusters. All walls and ceilings plastered, and all angles in Keene's with mouldings and architraves where shown. The fireproof to be of breeze concrete. The whole of the joinery throughout to be in deal, painted with four oils, and with simple mouldings. The council chamber to have panelling round same to height as shown, all in deal and painted. All walls to be distempered. Windows to have deal frames and metal casements and fastenings, and glazed with quarter-inch British polished plate to offices and council chamber, and 21-ounce sheet elsewhere.

Lighting.—To be by gas laid on from meter, in the absence of electric lighting in Surbiton.

Heating.—Heating generally to be by fireplaces, but council chamber, hall, staircase, surveyor's waiting-room and cloak-room to be heated by radiators, supplied by low-pressure boiler in heating chamber; 12 feet super of heating is provided for every 1,000 cubic feet of air.

Ventilation.—Fresh air is admitted in addition to doors and windows to the offices, council chamber and committee-rooms by means of air inlet brackets, and further to council chamber by air gratings behind radiators. An exhaust ventilating trunk and large air-pump ventilators placed in turret is provided in ceiling of council chamber for the extraction of vitiated air.

Estimates.—The dimensions and heights of the various rooms are generally kept under the suggested sizes without, however, prejudicing their working capacity. It was found necessary to do this in order to approximate the cost of building

to a sum allowed, giving at the same time all the accommodation asked for. For this same reason the whole of the detail inside and out is intended to be of the simplest and plainest character. The total number of cubic feet is, main building, 116,127; basement, 5,175; main building at 9 $\frac{1}{2}$ d., 4,596l. 13s. 10d.; basement at 5d., 107l. 16s. 3d.; boundary walls and gates, 300l.; total, 5,004l. 10s. 1d.

The accepted design was placed second by the assessor, Mr. E. W. Mountford. The first place was given to a design by Messrs. W. Wimperis & H. S. East, and the third to the design by Messrs. W. E. Hewitt & A. H. Ryan Tenison.

SOCIETY OF ENGINEERS.

At a meeting of the Society of Engineers, held at the Royal United Service Institution, Whitehall, on Monday evening, December 6, Mr. G. Maxwell Lawford, president, in the chair, a paper was read by Mr. Reginald E. Middleton, M.Inst.C.E., entitled "The Pollution of Water and its Correction."

The author first referred to the recent disastrous epidemics of typhoid fever in Maidstone and King's Lynn, which have forced upon the attention of the public the necessity for protecting our water supplies from pollution. In Maidstone up to this date 1,770 persons out of a population of 32,145, or 5.5 per cent., have been attacked by the disease, while the deaths have numbered 119, or 6.72 per cent. of the reported cases. No doubt many of the cases are due to secondary infection, but that the primary cause was polluted water seems to be certain, and without the presence of the germs of disease in the water supply there could not have been any secondary effects; the whole of the lamentable loss and suffering must therefore be attributed to one cause. An inquiry is, it is understood, to be held; it is not possible, therefore, at this juncture, to offer any opinions on the subject beyond stating the broad fact, which seems to be admitted, that certain of the sources of water supply were contaminated.

From time immemorial running water has been used for two separate and antagonistic purposes, namely, those of water supply and removal of refuse, and it is a curious fact that the earlier sanitary legislation is directed towards the removal of refuse by sewerage or otherwise, rather than to the provision of pure water, and that up to the present date the latter is permissive, the former compulsory. Perhaps those who remember

the state of the Thames opposite the Houses of Parliament in the fifties, and the vile smells which emanated therefrom, may conclude that the Legislature was led by its collective nose, and that we may thank that evil-smelling river for providing us, in many cases, with sewers before we had water wherewith to flush them. It is necessary, under these circumstances, to enunciate the truism that water is provided in the first place for dietetic and cleansing purposes, and that the removal of refuse by its means must be subordinated to this first and most important requirement.

Statistics prove that the first element of aggregated health is a pure and sufficient water supply, and we may congratulate ourselves that we are provided with this desideratum, and that the death-rate of our vast Metropolis is only 18.6 per 1,000 against 18.9 for the thirty-three principal English towns. Notwithstanding that the importance of pure water is now so well understood, it is by no means easy to secure it; the Rivers Pollution Act, 1876, which up to the year 1893 was its only protection, except in a few isolated cases, is so elastic that it is practically impossible to enforce its provisions within any reasonable time unless the authorities themselves are anxious to comply with its meaning.

It must be presumed that there is no such thing as pure water in nature; even rain-water collects impurities, harmful or otherwise, from the atmosphere, and has ceased to be pure before it touches the ground, by which it is further contaminated with animal, vegetable or mineral matter, the amount varying with other conditions until it is found that the washings of a street may be more highly polluted than the contents of a sewer. When the water touches the earth, if the surface be permeable, reaction takes place, and the soil tends to remove the animal and vegetable impurities collected in the water and to substitute others of a mineral character. Water which has percolated through clean soil, and has reached its underground reservoir, has parted with nearly all but its mineral impurities.

Deep well water, though frequently hard, is, for the above reasons, generally free from the presence of many micro-organisms. This very condition, however, lays it open in a remarkable degree to the attacks of pathogenic germs, if any should find access to it. The ordinary organisms present in water appear to be at war with those of dangerous character, and in their absence the latter have a free field. The same thing may be said of moorland waters drawn from rocky districts, while much moorland water contains vegetable matter, derived from peat, which renders the water unsightly, and is

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apt to produce diarrhoea in those unaccustomed to its use. The great polluting element is man, whether considered as an individual, or an aggregation of individuals, or as a manufacturer; animal pollutions hold quite a secondary place.

The most serious forms of pollution generally arise from the sewage works of towns or villages, many of which are so situated that the acquisition of land suitable for the satisfactory disposal of sewage and the production of a relatively pure effluent is difficult; the sewage farms or disposal works are seldom of sufficient extent to deal with more than the dry weather flow, therefore in wet seasons the average is only very partially purified, for dry soil is the essence of the purifying process. Moreover, it is generally accepted that most of the cleansing takes place in the first few inches, decreasing with the depth, and ceasing, or nearly so, when the line of saturation is reached. Many shallow wells, and some deep ones, become contaminated from neglect of this knowledge, the ground around them becoming sodden with clear water as well as with slops and manure, or they are polluted by leaking drains or cesspools, which, being below the surface, are only slightly affected by soil. No chemical treatment of sewage is by itself sufficient to produce an effluent of satisfactory purity. The author believes that—as he stated in a paper communicated to the Congress of Hygiene, held in Buda Pesth in 1894—the solution of the problem is to be found in some form of artificial filtration, accompanied and aided by biological action. This system also offers immense advantages in dealing with the sewage of large towns in a cheap and effectual manner, and obviates the necessity for the erection of large sewage-farms, as well as of large outfall works. It must, however, be worked as carefully as are the filters of a large water-supply, and this is not possible in small villages, the sewage disposal works of which are frequently in a disgraceful condition.

For the prevention of pollution, and as protection against it, there may be said to be three lines of defence. First, by the introduction of clauses into an Act for the prevention of pollution, something on the lines of clauses 93 and 94 of the Thames Conservancy Act of 1894. Secondly, by sedimentation and oxidation in storage reservoirs, by which means, after some twelve days' storage, from 83 per cent. to 96 per cent. of the micro-organisms are removed; and, thirdly, by filtration through sand, which retains an average of 99·6 per cent. of the remaining bacteria. Thus, out of an average number of 24,000 microbes per cubic centimetre contained in the said river water, only thirty-four find their way through the filter beds.

Because, however, two good lines of defence are provided, it is no reason why rivers should be polluted; on the contrary, their existence proves the necessity for other precautions and prevention our first line of defence, which, as we know, is better than cure and should be insisted on.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

27332. Colin Henry Moon, for "Improvements relating to the discharge of liquids from tanks, basins, bottles and other vessels, pipes and receptacles."

27423. Donald Davidson and William Ritchie Cumming, for "A fireclay brick fireplace."

27430. George Cameron, for "Improvements in fixed and portable electrically-driven circular-sawing, moulding, rebating, planing and surfacing machinery."

27448. Charles William Lyon Thornhill Lees, for "Improvements in door knobs."

27492. William Adolphus Smyrk, for "Improvements in knockers."

27526. Ebenezer Arthur William Jefferies, for "Improvements in hydraulic coping or shearing machines."

27584. John William Deans, William Dunn Foster and Arthur Frank Stray, for "Improvements in or relating to drilling machines, back-centres of lathes or the like."

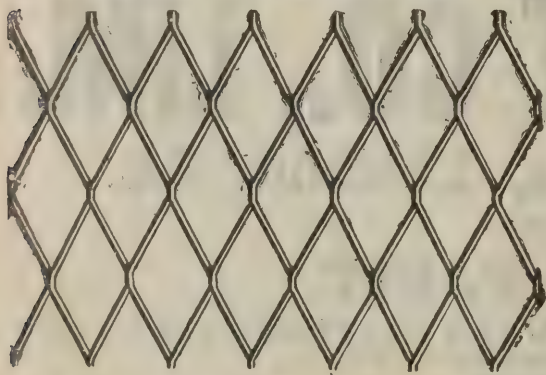
27658. Herbert Scales, for "Improvements in funnels."

27667. Sandham Francis Symes, for "Improvements in gates."

27817. Ambrose Roberts, Edwin Thomas Ball and Walter Henry Bangham, for "Improvements in apparatus for the manufacture of ceramic and other tiles."

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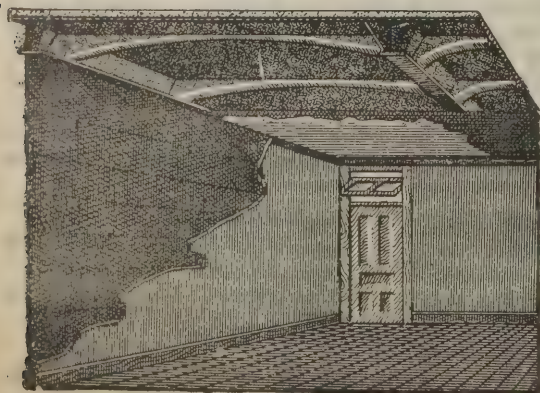
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The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.

Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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For Advertisement Scale, see page xiii.

COMPETITIONS OPEN.

BELPER.—Jan. 8, 1898.—The Belper Rural District Council offer premiums of 15 guineas and five guineas for the two best sets of plans and reports for Crich water supply. Mr. Joseph Pym, clerk, Belper.

BELPER.—May 1, 1898.—The Belper Urban District Council offer premiums of 50 guineas and 25 guineas for the two best schemes of sewage disposal. Mr. Joseph Pym, Urban District Council Offices, Belper.

BOOTLE.—Dec. 31.—The Corporation invite competitive designs of a central fire station, firemen's dwellings and district police station. Mr. J. A. Crowther, borough engineer, Bootle.

PORT ELIZABETH.—Feb. 15, 1898.—The public library committee offer prizes of 100 guineas and 50 guineas for designs for a new library building. Messrs. Wm. Savage & Sons, 85 London Wall, London, E.C.

CONTRACTS OPEN.

ALNMOUTH.—Dec. 22.—For erection of a house in Argyle Street. Mr. Geo. Reavell, jun., architect, Alnwick.

BARKING.—Dec. 21.—For erection of an electric-light station at the rear of the public offices, East Street. Mr. C. J. Dawson, Public Offices, Barking.

BELFAST.—Dec. 21.—For repairs to the dispensaries at Rumford Street, Glengall Street and North Queen Street. Messrs. Young & Mackenzie, architects, Donegall Square East.

BELFAST.—Dec. 23.—For erection of a fire-brigade station in Whitla Street. Sir Samuel Black, town clerk.

BIDEFORD.—Dec. 28.—For alterations and repairs on the post office premises. Mr. R. T. Hookway, architect, Bideford.

BLACKPOOL.—Dec. 22.—For construction of underground urinal, Station Road, South Shore. Mr. J. Wolstenholme, borough surveyor, St. John's Market Buildings, Blackpool.

BRADFORD.—Dec. 20.—For fitting-up a restaurant in Kirk-gate. Messrs. Milnes & France, architects, 99 Swan Arcade, Bradford.

BRITON FERRY.—Dec. 20.—For erecting a villa residence. Mr. H. Alex. Clarke, architect, Briton Ferry.

BURLEY-IN-WHARFEDALE.—Jan. 13.—For erection of National school for 500, with out-offices, boundary walls, &c. Mr. Ed. C. Brooke, architect and surveyor, 4 Huddersfield Road, Brighouse.

BURNLEY.—Dec. 29.—For extensions to the electric-lighting station. Mr. G. H. Pickles, Town Hall, Burnley.

BURY.—For twelve houses off Bolton Road, Elton. Mr. D. Hardman, architect, Silver Street, Bury.

BURY.—For erection of five dwelling-houses at Littlewood Cross, Bury. Mr. Thos. Nuttall, C.E., architect, 20 Market Street, Bury.

COLCHESTER.—For erection of business premises in Long Wyre Street. Mr. Chas. E. Butcher, architect, 3 Queen Street, Colchester.

CORNWALL.—For building a hotel at Padstow. Messrs. Crickmay & Sons, architects, 13 Victoria Street, Westminster, S.W.

DEWSBURY.—Dec. 20.—For long chimney in Back Webster Street. Mr. John H. Brearley, architect, Hanover Street, Batley.

DEWSBURY.—Dec. 23.—For erection of ten through houses, outbuildings, boundary walls, &c., in Greenwood Street. Mr. Thos. W. Speight, architect and surveyor, 28 Boothroyd Lane, Dewsbury.

FLINTS.—Dec. 31.—For erection of school buildings in Victoria Road, Mold. Mr. F. Bellis, architect, Bangor.

FRINTON-ON-SEA.—Dec. 31.—For erection of a school to accommodate 150 children. Mr. S. T. James, architect, Frinton-on-Sea.

GREAT LEIGHS.—Dec. 22.—For erection of a pair of cottages. Mr. George E. Clare, architect and surveyor, 66 Duke Street, Chelmsford.

HALIFAX.—Dec. 31.—For alterations and additions to Moorside school, for the School Board. Mr. Joseph F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

HALIFAX.—Dec. 31.—For additions and alterations to Akroyd Place school, for the School Board. Mr. Joseph F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

HUDDERSFIELD.—Dec. 23.—For erection of three shops and two dwelling-houses in Morley Lane, Milnsbridge. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.

ILKLEY.—Dec. 22.—For erection of four houses in Wilton Road. Mr. E. Barton Johnson, architect and surveyor, Ilkley.

IRELAND.—Jan. 1.—For erection of manager's residence, adjoining creamery at Abbeydorney. The Manager, Creamery Offices.

IRELAND.—Dec. 21.—For erection of a dispensary house in the village of Derrygonnelly, Enniskillen. Mr. Richey Wilson, Board-room, Workhouse, Enniskillen.



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KEYHAM.—Dec. 24.—For alterations at St. James's School. Rev. R. J. Bond, St. James's Vicarage, Keyham.

LEWISHAM.—Jan. 13.—For erection of buildings to accommodate about 800 persons, together with the necessary administrative offices, at Slagrove Farm, Ladywell. Messrs. Newman & Newman, architects, 31 Tooley Street, London Bridge, S.E.

LONDONDERRY.—For erection of a dwelling-house. Messrs. R. H. McElwee & Co., architects, 9 Carlisle Road, Londonderry.

LOWESTOFT.—Dec. 22.—For erection of a house, &c., at Blundeston. Mr. Sidney Rivett, architect, 5 South Quay, Great Yarmouth.

MAIDSTONE.—Dec. 20.—For alterations and additions to the Council's offices, Fair Meadow. Mr. H. Monckton, town clerk, King Street, Maidstone.

MANCHESTER.—For completion of laundry buildings, Chester Road and Thomas Street, Stretford. Messrs. Johnstone Bros., architects, 39 Lowther Street, Carlisle.

MANCHESTER.—Dec. 28.—For erection of thirty-two two-storey tenement buildings fronting a new street between Cornwall Street and Spittal Street, and eighteen cottages fronting George Leighton Street. City Surveyor, Town Hall, Manchester.

MANCHESTER.—Dec. 28.—For erection of thirty-six two-storey tenement buildings fronting Chester Street, Marsland Street and Hulme Street, Hulme. City Surveyor, Town Hall, Manchester.

MORLEY.—Dec. 23.—For erection of stables, sheds, store-rooms, &c., Corporation Street. Mr. M. H. Sykes, borough surveyor, Town Hall, Morley.

MORLEY.—Dec. 22.—For erection of two houses in Park Parade. Mr. T. A. Buttery, architect, Queen Street, Morley.

MYNYDDISLWYN.—Dec. 20.—For erection of two additional classrooms and other works at the Pontllanfraith school. Mr. George Rosser, architect, Abercarn.

NORTHUMBERLAND.—Dec. 23.—For extension of school buildings. Mr. J. Weightman Douglas, The Willows, Alnwick.

REDCAR.—Dec. 20.—For erection of eleven houses. Messrs. Hutchinson Bros., builders' merchants, Grange Road West, Middlesbrough.

SALISBURY.—Jan. 4.—For erection of engine-shed and retaining wall and construction of three engine-pits, for the

Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station.

SCOTLAND.—Dec. 21.—For erection of a villa in Aberlour. Messrs. A. & W. Reid & Wittet, architects, Elgin.

SCOTLAND.—Dec. 25.—For erection of a manse at Ardgour. Messrs. L. & J. Falconer, architects, Fort William.

SOUTHAMPTON.—Dec. 28.—For constructing a public convenience at Northam. Mr. W. B. G. Bennett, borough engineer, Municipal Offices, Southampton.

SUSSEX.—Dec. 23.—For erection of a house at Billingshurst. Mr. William Buck, architect, 60 West Street, Horsham.

TIPPERARY.—Dec. 20.—For erection of two new schools, viz. male and female, offices and halls, at the Cross of Shrenwell. The Rev. Dr. O'Neill, P.P., Lattin.

WALES.—Jan. 1.—For constructing abutments, wing walls, piers, &c., of proposed bridge, forming of road approaches and fencing the same, taking down existing bridge, &c. Mr. R. Lloyd Williams, county surveyor, Denbigh.

WALES.—Jan. 25.—For erection of a school for girls, and alterations to existing boys' school. Mr. H. Teather, Andrew's Buildings, Queen Street, Cardiff.

WALES.—Dec. 20.—For erection of a school at Pinged. Mr. Richard Williams, architect, Burry Port.

WALMER.—Jan. 5.—For erection of public convenience near Strand Promenade, and fencing and levelling site of new recreation ground, Campbell Road. Mr. J. E. Turner, 2 Cornwall Road, Walmer.

WEST BURTON.—Dec. 20.—For erection of a Wesleyan chapel, school, &c. Mr. Wm. Lawson, West Burton.

WESTON-SUPER-MARE.—Dec. 28.—For erection of two cottages at Woodspring. Messrs. Price & Wooler, architects, Waterloo Street, Weston-super-Mare.

At a meeting of the water committee, plans and estimates were approved for the erection of a new house at Craigmaddie Reservoir, in lieu of Invergyle House, Loch Katrine, for the use of the town-councillors during the summer season, and for the use of several officials. The total cost comes to 3,000*l*.

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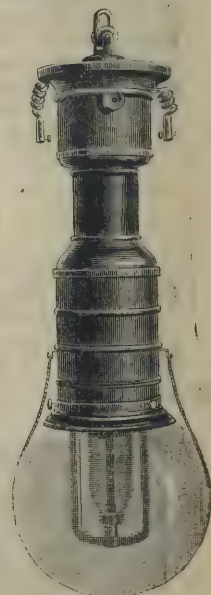
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TENDERS.

ABERDEEN.

For construction of pipe sewers, with ventilating manholes, &c., in Whitehall Road and new streets on Broomhill Estate. Mr. WILLIAM DYACK, burgh surveyor.

Accepted tenders.

W. Pirie (streets at Broomhill) £221 10 11
Gall & Walker (Whitehall Road) 51 4 0

For erection of school and teacher's residence at Inchmyre. Mr. R. G. WILSON, architect, 181A Union Street, Aberdeen.

Accepted tenders.

J. Reid, mason.
R. Thomson & Son, carpenter.
G. Currie, slater.
A. Ross, plasterer.
J. F. Anderson, plumber.
D. McLennan, painter
Total, £1,666.

ARMAGH.

For supply and erection of a pump at Banbrook.

J. Cochran £24 15 0
WINNINGTON & Co., Wilson Street, Belfast
(accepted) 18 15 0

BARKISLAND.

For construction of 260 yards of pipe sewer and a brick cesspool.

J. Balmforth £160 0 0
R. Edwards 140 0 0
J. Brook 105 0 0
J. Davis 91 0 0
W. J. Normanton 83 0 0
Crawshaw Bros. 81 0 0
T. NOBLE, Greetland (accepted) 67 0 0

BIRSTALL.

For sewerage of School, Union and John Streets from Huddersfield Road to Smithies Lane. Mr. J. J. LONGDEN, surveyor.

J. ACKROYD & SONS, Birstall (accepted) £144 0 0

BEDLINGTON.

For construction of about 500 yards of 9-inch glazed sanitary pipes at Choppington Low Pit, with manholes, &c., and providing and laying of about 700 lineal yards of channeling. Mr. CUTHBERT BROWN, surveyor.

J. Wardlaw £528 9 6
J. Thompson 316 13 1
J. ROBSON, Newcastle (accepted) 302 15 1
Engineer's estimate 300 0 0

BRADFORD.

For new window to shop, Bradford. Mr. J. H. COX, city surveyor. Quantities by surveyor.

T. Taylor & Son, Bradford.

BRANKSOME.

For erection of new bathroom at isolation hospital, for the Urban District Council. Mr. SAMUEL J. NEWMAN, surveyor to the Council.

F. Elcock £138 0 0
W. J. Wallis 108 5 0
E. Allner 100 10 0
Baker & Pearcey 93 15 0

BROMLEY-BY-BOW.

For pulling-down and rebuilding the Royal Oak. Messrs. FOULSHAM & HERBERT RICHES, joint architects, 3 Crooked Lane, King William Street, E.C., and Bromley-by-Bow, E.

P. Hart £1,530 0 0
S. Salt 1,343 0 0
A. J. Sheffield 1,290 0 0
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J. T. ROBEY (accepted) 1,259 0 0

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For construction of filters, &c., at the service reservoir, Downpatrick, and other works at the storage reservoir at Tannaghmore.

T. RAYNOR (accepted) £1,370 18 6

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Scott & Smith, carpenter	71	10	0
J. Brodie, plasterer	22	4	0
J. Hunter, plumber	17	16	0
G. Ogilvie, slater	16	5	0
J. Kintrae & Son, painter	7	15	6

FULHAM.

For making-up and paving Rostrevor Road (section III.). Mr. CHARLES BOTTERILL, surveyor.

Roadway.

Wimpey & Co.	£460	0	0
Mears	450	0	0
Parry	408	0	0
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Greenham	400	0	0

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HARROGATE.

For taking-down old Crown Villa, West Park, and erection of new one. Mr. ARTHUR A. GIBSON, architect, 8 Cambridge Crescent, Harrogate.

Accepted tenders.

Simpson Bros., mason and bricklayer.
Clapham & Taylor, carpenter and joiner.
W. Bellerby, plumber and glazier.
Fortune & Calverley, plasterer.
J. & W. Baynes, slater.
C. Wood, painter.
Total, £1,442 2s.

HAMPTON-ON-THAMES.

For erection of pair of semi-detached villas in the Nursery Road. Mr. FREDK. G. HUGHES, architect, Hampton-on-Thames.

J. Singleton & Sons	£1,128	0	0
D. McDonald & Sons	1,030	0	0
H. March	995	16	0
R. Richardson	960	0	0
J. WRIGHT, Hampton (accepted)	830	0	0

IRELAND.

For erection of a public fountain in the square in the town of Castlecomer.

J. Mulhall	£74	0	0
FOGARTY BROS., Castlecomer (accepted)	48	0	0

KEIGHLEY.

For erection of thirty-five houses off Fell Lane. Mr. JOHN HAGGAS, architect. Quantities by architect.

Accepted tenders.

John Hird, mason.
W. Thornton, slater.
Forrest & Antrum, plasterer.
Park & Lodge, plumber.
Total, £5,069.

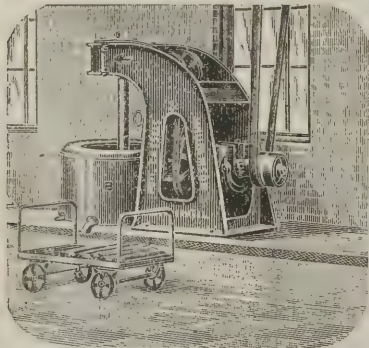
LONDON.

For rebuilding of manufacturing premises at No. 87 City Road, E.C., for Messrs. Sheath Bros. Mr. ALFRED J. MARTIN, architect, No. 386 Old Street, E.C. Quantities supplied by Messrs. HEELIS & WRIGHTSON, surveyors.

Heeps	£2,395	0	0
Dearing & Son	2,313	0	0
Stimpson & Co.	2,307	0	0
Jarvis & Sons	2,276	0	0
Scrivener & Co., Regent's Park *	2,112	0	0
Chessum & Sons †	2,096	0	0
* Amended tender accepted.	† Withdrawn.		

For erecting new general offices for the Metropolitan District Railway Company, at the St. James's Park Station, Westminster. Mr. HENRY L. FLORENCE, architect. Quantities by Mr. JAMES FRANCIS BULL.

Colls & Sons	£18,569	0	0
John Mowlem & Co.	18,000	0	0
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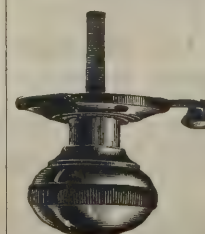
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For erection of new cabinet factories at No. 9 Hoxton Square, N., for Mr. T. Watson Craft. Mr. ALFRED J. MARTIN, architect, No. 386 Old Street, E.C. Quantities by Messrs. HEELIS & WRIGHTSON, surveyors.		
Thomerson & Son	£3,685	0 0
Stimpson & Co.	3,440	0 0
Holloway Bros.	3,130	0 0
Jarvis & Sons	2,780	0 0
Fortescue	2,694	0 0
Chessum & Sons	2,648	0 0
Brown & Harris	2,599	16 0
Goodall, Stoke Newington *	2,231	0 0

* Amended tender accepted.

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For heating, Haseltine Road school.		
G. Davis	£130	0 0
Purcell & Nobbs	72	0 0
J. & F. May	59	10 0
J. C. & J. S. Ellis, Limited *	59	10 0

For heating, Rutland Street school.		
G. Davis	£300	0 0
Strode & Co.	187	0 0
W. G. Cannon & Sons	160	0 0
Stevens & Sons	158	10 0
H. C. Price Lea & Co.	149	0 0
Vaughan & Brown, Limited	146	0 0
J. Esson	145	0 0
J. F. Clarke & Sons *	134	0 0

* Recommended for acceptance.

MANCHESTER.

For erection of a school for the deaf and dumb.		
W. A. PETERS, Rochdale (accepted)	£7,970	0 0
For erection of buildings for a refuse destructor and sanitary works at Old Trafford. Mr. JOHN BOWDEN, architect, 14 Ridgelyield, Manchester.		
W. Southern & Sons	£3,350	0 0
W. Thorpe	3,187	0 0
C. Braddock	3,182	0 0
J. Byrom	3,150	0 0
A. J. Cottle	3,116	0 0
S. WARBURTON, Miles Platting (accepted)	2,727	0 0

NEATH.

For erection of schools at Herbert Road, Melincrythan. Mr. J. COOK REES, architect, Neath. Quantities by architect.		
Lloyd Bros.	£6,349	0 0
T. Watkins & Co.	6,283	0 0
Watkin Williams	5,990	0 0
D. Jenkins	5,899	0 0
Evan Thomas	5,790	0 0
J. Davies	5,750	0 0
Gustavus Bros.	5,750	0 0
Beynon, Thomas & Rees	5,738	10 0
Bennett Bros.	5,635	0 0
T. Walters	5,558	10 0
Walters & Johns	5,400	0 0
W. Thomas	5,347	11 9
D. W. Rosser	5,320	0 0
Billings Bros.	5,295	0 0
A. GEORGE, Neath (accepted)	5,216	0 0
E. Morgan	4,333	10 8
Architect's estimate	5,327	0 0

NORTHAMPTON.

For rebuilding of the Bantam Cock Inn, Abington Square. Mr. F. FOSTER, architect, Leamington and Coventry. Quantities by the architect.

<i>Houses.</i>		
W. Throssall	£1,745	0 0
J. Dunkley	1,731	12 6
F. Harper	1,686	0 0
G. J. Fisher	1,630	0 0
A. J. Chown	1,560	0 0
Woodford & Smith	1,550	0 0
WINGROVE & STANLEY (accepted)	1,534	0 0
W. Heap	1,532	0 0
Architect's estimate	1,500	0 0

<i>Stables.</i>		
F. Harper	345	10 0
J. Dunkley	341	5 6
A. J. Chown	320	0 0
Woodford & Smith	320	0 0
WINGROVE & STANLEY (accepted)	311	0 0
G. J. Fisher	307	0 0
W. Throssall	301	0 0
W. Heap	298	0 0
Architect's estimate	350	0 0

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Lewis Bearne	921	13	0
Parker Bros.	900	0	0
F. A. STACEY, Newton Abbot (accepted)	870	0	0

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For new work and repairs at the workhouse, Madron. Mr. HENRY MADDERN, architect, Penzance.

T. Stewart & Sons	£190	0	0
S. R. Saytor & Sons	145	0	0
J. M. B. CORIN & SON, Causewayhead (accepted)	125	15	0

PLYMOUTH.

For alterations at the Royal Exchange Hotel, Vauxhall Street. Mr. CHARLES COLE, architect, 50 High Street, Exeter.

Lapthorne & Co.	£500	0	0
Stevenson & Gillard	370	0	0
E. Porter	345	0	0
H. KERSWILL, Plymouth (accepted)	320	0	0

PRITTLEWELL.

For construction of about 175 yards of 12-inch pipe sewer, with manholes, in West Road. Mr. ALFRED FIDLER, borough surveyor.

J. & J. JONES, Prittlewell (accepted)	£148	12	2
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SALTBURN-BY-SEA.

For construction of drainage works. Mr. R. A. JACKSON, surveyor.

T. Dickinson	£2,838	3	0
T. Parr	2,554	14	0
J. G. Spooner	1,966	15	0
T. Pearson	1,555	18	6
J. CARRICK, Crossgate Path, Durham (accepted)	1,451	10	0

SCOTLAND.

For erection of school and school house at Inchmyre, for the Banchory Devenick School Board. Mr. ROBERT G. WILSON, architect, 181A Union Street, Aberdeen.

Accepted tenders.

Jas. Reid, mason.
R. Thompson & Sons, carpenter.
Geo. Currie, slater.
Alex. Ross, plasterer.
J. F. Anderson, plumber.
D. McLennan, painter.
Amount of offers, £1,666.

SNARESBROOK.

For erection of a detached house, Woodford Road. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, E.C.

H. W. Tavener	£2,670	0	0
W. Mundy	1,950	0	0
C. S. Foster	1,884	0	0
J. JOLLIFFE (accepted)	1,780	0	0

ST. ALBANS.

For repairs to premises in Victoria Street. Mr. T. FOSTER WOODMAN, architect, St. Peter's Street, St. Albans.

Miskin & Sons, Homelands, St. Albans	£133	0	0
Bushell, Worley Road	132	10	0
Dunham, Victoria Street	123	5	0
Savage, Lattimore Road	117	10	0

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A. H. White	316	0	0
J. Simmonds & Co.	315	0	0
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J. Cruttenden	293	0	0
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J. Thompson	£243	4	9
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I. INSLEY, Aldridge (accepted).

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Ingram	5,866	0	0
Heineman & Brown	5,863	0	0
C. Fifield	5,746	0	0
Peters & Son	5,672	0	0
Gale	5,604	0	0
Martin Wells	5,600	0	0
Harris & Son	5,600	0	0
MARTIN, Addlestone (accepted)	5,525	0	0

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It is proposed to carry out, at a cost of about 4,000*l.*, a scheme of extension in connection with St. Cuthbert's Roman Catholic church, Withington.

THE foundation-stone has been laid of the new mission church which is being erected in St. Peter's Place, Edinburgh, in connection with St. John's Episcopal church.

THE reopening of St. Mary's Church, Plumtree, after restoration and the consecration of an addition to the churchyard, took place on the 10th inst.

ON Sunday last at St. Thomas's Church, Barras Bridge, Newcastle, the Bishop of Newcastle dedicated a new font erected by the congregation in commemoration of the Queen's Jubilee.

PLANS for the erection of a new mission church adjoining Peel vicarage, Little Hulton, have been approved by the Little Hulton District Council. A stone tower is being erected at Peel Church, the cost of which will amount to 1,200*l.*

THE foundation-stone of a new Conservative Club house in the High Street, High Wycombe, was laid on the 10th inst. The building will be of Late Gothic style in brick, stone and tile, having a frontage of about 26 feet to the main street. On the ground floor are provided large smoking-lounge and bar, with stewards' room, lavatories and offices in the rear. On the first floor, reading-room, lofty billiard saloon for two tables and committee-room, and on the second floor five rooms and offices for steward's residence. The cost of the site and building will be about 1,600*l.*, and the contract for the building has been given to Mr. G. H. Gibson, of High Wycombe, at 92*l.*. The architect is Mr. Arthur Vernon, of 29 Cockspur Street, London, and Wycombe.

New business premises are in course of erection in Moor Street, Birmingham, for Messrs. Coleman & Oldland, wholesale clothiers. This building will have a frontage of about 60 feet and depth of 50 feet, the ground-floor nearly covering the whole area of land, but having "set-offs" at back with glazed top-lights. It will be a four-storey erection, and mainly constructed with steel girders, cast-iron columns, and strong brick in cement piers. The principal rooms will have floors and ceilings covered with stained and varnished matchboarding. There will be a wide gateway, separate entrances for proprietors and workpeople, lift running from basement to top floor and efficient sanitary arrangements. The building will be heated

THE works committee of the Glasgow Corporation Water Department at their last meeting had under consideration tenders for the supply of 700 tons of pipes. The following offers were received:—Messrs. Wood (America), 3,25*l.*; Laidlaw, 3,970*l.*; Stewart, 4,135*l.*; Strang, 4,136*l.*; and McLaren, 4,205*l.* Messrs. Wood's tender was for 12 feet lengths instead of 9 feet lengths as required by the department. It was decided to accept Messrs. Laidlaw's tender, being the lowest for the length of pipes specified.

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The Lancet, January 12, 1867.

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by hot water and illuminated by electric light. The front and portion of back elevations will have iron windows, each about 9 feet in width and of varying heights. Large areas will be provided to front of building covered with Hayward's prismatic lights. In the front elevation stone and brick enrichments, ornamental wood and ironwork, &c., will be introduced. The architect is Mr. John Statham Davis, of Cobden Buildings, Corporation Street, and the contractor Mr. William Hopkins, of Thorpe Street, both of Birmingham.

VARIETIES.

A FREE library for young women is being erected in connection with Filey parish church.

MELLOR CHURCH, near Blackburn, which has been for some time undergoing renovation and refitting, is to be reopened on the 23rd inst.

THE city surveyor of Liverpool, Mr. Shelmerdine, is suffering from typhoid fever, but happily it is of a mild form and not such as to cause serious anxiety.

A SUNDAY school and parish room in connection with St. Godwald's, Finstall, were opened on Wednesday. The cost of the new building is about 400*l*.

THE new system of sewerage at Sidmouth was opened on the 8th inst. The plan adopted was prepared by Mr. James Mansergh, and under it all the lower parts of the town hall have been resewered.

AN old thatched Baptist chapel at Purley, Hants, which was renovated a few years ago at a cost of 200*l*., was burned down on the 10th inst., together with two cottages.

THE Archbishop of York consecrated recently St. Peter's Church, Bentley, which was erected at the sole cost of the late Mr. C. E. S. Cooke, of St. Catherine's, Doncaster, and cost about 10,000*l*.

THE turf roof of a cottage at Coleford, Gloucestershire, inhabited by Mr. and Mrs. Hughes and their family of four children, fell in on Wednesday morning, burying all the inmates beneath it. Assistance was speedily rendered, but Hughes and his baby were dead when extricated from the ruins.

THE subscription list for the erection of a monument to Raphael at Urbino is rapidly increasing in length, the Pope, the German Emperor, the King of Saxony, Prince Corsini and

the municipalities of Vienna and Florence being among the principal contributors up to the present time.

A SCAFFOLD which had been erected on the ruins of Ayr Town Hall gave way on Monday while nine men were upon it. Three men managed to save themselves, but three others fell a distance of 70 feet and were killed. The remaining three were seriously injured, and one of them is not expected to recover.

WHILE a number of masons were engaged in giving the finishing touches to a dwelling-house in course of erection at Aberdeen a gable fell inwards and all the men were thrown to the ground. One was killed on the spot, another died during the evening, and four others were removed to the infirmary.

THE Lord Mayor of Birmingham (Councillor Beale) has received a communication from the Sanitary Institute inquiring whether the Corporation will invite the Institute to hold its annual congress in Birmingham next September. His lordship will bring the matter before the City Council at the next meeting. At a meeting of the health committee it was decided, in the event of the Institute visiting Birmingham next year, to do everything possible to make the congress successful.

THE new Eye, Ear and Throat Hospital, which has been erected on the Western Road, Cork, at a cost of over 8,000*l*., was formally opened by the mayor. This hospital is the outcome of the great *fête* known as Donnybrook Fair, which was promoted some seasons ago in the city by Lady Arnott, and through the agency of which a fund was raised sufficiently large to build this fine addition to the hospitals of Cork.

IN consequence of the floods an alarming accident occurred at Mirfield, near Dewsbury, early last Friday morning. An old mill on the Calder, recently used as a machine factory, collapsed, and a number of valuable machines fell into the river which runs beneath it, and which was at the time flooded by the recent rains. The flood also washed away the weir which belongs to the navigation company. The building is the property of Mrs. Wooler and is occupied by Mr. Frederick Smith, of Mirfield. The damage is considerable.

THE Ecclesiastical Commissioners have sold Addington Park, which has been for about eighty years the country seat of the Archbishops of Canterbury, to Mr. English, of Chislehurst, and the price is said to be 75,000*l*. The park at Addington is extensive, undulating and beautifully wooded. At one part of the domain the scenery reminds one of Perthshire, as Arch-

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bishop Tait often remarked. Five archbishops are buried in the churchyard at Addington—Manners-Sutton, Howley, Sumner, Longley and Tait.

WROTTESLEY HALL, the ancestral seat of the Wrotesley family for two centuries, has been destroyed by fire. The flames were first discovered in his lordship's dressing-room shortly after midnight on Wednesday, and before available help could be obtained the entire west front was in flames. Lord Dartmouth's private engine from Patshull arrived about two o'clock, but was unable to check the progress of the flames, and the entire mansion was completely gutted, and its valuable contents of furniture, family heirlooms, pictures, and an extensive library of books were almost wholly destroyed.

At the monthly meeting of the Leeds Sanitary Aid Society, held on the 9th inst. in the Town Hall, evidence was produced showing the very serious nature of the present epidemic of scarlet fever in the city, and it was proposed to form a sub-committee for the purpose of urging upon the Corporation the necessity of providing additional accommodation for infectious diseases. It was pointed out that the present accommodation was 185 beds, whereas the recommendation of the Local Government Board is that $1\frac{1}{2}$ beds per 1,000 should be the accommodation provided. Thus Leeds, with a population of 400,000, should have hospital accommodation for 532 cases, or nearly three times what there is at present.

A DISCOVERY of great interest to archæologists has been made at Tasburgh in Norfolk. The village is the reputed site of a Roman camp, and occasional remains have been disinterred there. The new discovery is the burial-place of the victims of what was evidently a considerable battle. In one small pit only a few yards square forty skulls were found, as if the dead had been thrown in in heaps; and at other points in the neighbourhood excavations following on the first discovery have revealed others. The place was evidently a veritable ancient Golgotha. Mr. Walter Rye, the well-known East Anglian archæologist, has gone down to take charge of the excavations still in progress.

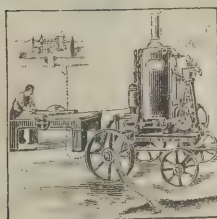
A NEW wing for the Church of Scotland Deaconess (Lady Grisell Baillie) Memorial Hospital, 142 Pleasance, Edinburgh, was opened on Tuesday afternoon. The extension is really the completion of the original plan, and the front therefore shows a three-storey building with attics, designed after the domestic Gothic style of architecture. On the ground floor are a

parlour, dining-room and lady superintendent's room; and on the first floor two private wards, giving together accommodation for three beds; while the remainder of the building is devoted to the provision of bedrooms, a surgical-room and ward kitchen. At the back, on the second floor, is a balcony, intended for the patients airing themselves. An extensive court and garden, to the south and east of the extension, provide accommodation to convalescents and others for outdoor exercise, and of this court advantage has been taken by the architects, Messrs. Hardy & Wight, 74 George Street, to add a drying-room and other accessories of a laundry to the original structure. The new building, including furnishings, has cost about 3,000*l*.

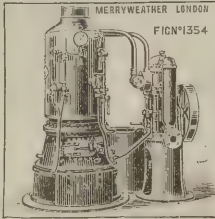
BARCALDINE CASTLE, the ancient seat of the Campbells of Barcaldine, is at present being restored by Sir Duncan Campbell of Barcaldine, Baronet, secretary of the Most Ancient and Most Noble Order of the Thistle. This castle, which is a fine example of feudal times, was built in the latter part of the sixteenth century by Sir Duncan Campbell, seventh of Glenorony (Donnochadh dubh), the common ancestor of the Marquis of Breadalbane and the Campbells of Barcaldine, who is said to have built, or at least to have been the possessor of seven castles, and is therefore distinguished by the cognomen of "Duncan of the seven castles" (Donnachadh nan seachd saisteil). Unlike the other castles in the country, which are built on rocks on the margin of our seas or inland lakes, Barcaldine Castle stands on a rising ground a short distance from the sea, on the neck of land which divides Loch Oreran from the bay of Ardmucknish, and close by the road which leads from Shian Ferry to Connell. The family removed from the castle after the '45, and the castle was in consequence allowed to fall into decay. The castle has been roofless for many years, but it is now being restored exactly on the original plan. The roof is now finished and further restoration is contemplated.

AN ancient urn has been picked up from a sandy knoll on the farm of West Skichen, Carmyllie, near Arbroath. It was lying near a dyke and was just protruding from the ground. The urn is of earthenware, hardly larger than a breakfast cup, neatly formed and quite entire. It was forwarded to Dr. Joseph Anderson, of the National Museum of Antiquities, Edinburgh, along with a request that he would give his opinion about it. Dr. Anderson has replied:—"It is a sepulchral urn and of great interest from its being the smallest of its shape that I have yet seen. It belongs to the Bronze Age—that is, the archæological period which preceded the Iron Age and began

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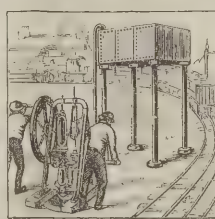
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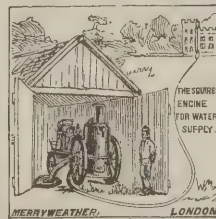
Light Pumping Engine and Boiler.



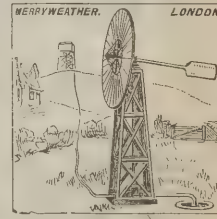
Water Wheel Pumps.



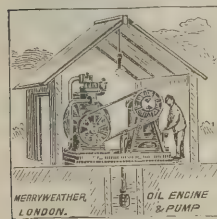
"India" Pattern Pumping Engine.



"Squire" Portable Fire Engine.



Windmill Pump.



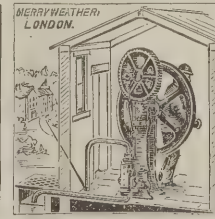
Oil Engine and Pump.



Estate Manual Force Pump.



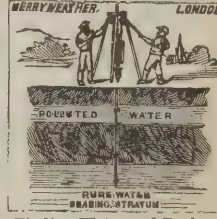
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after the use of stone tools had died out, and lasted in Britain till within a few centuries of the Christian era. The cup, therefore, is at least a century or two older than the Christian era—say, 2,000 years or thereby. It was probably placed with a burial; and if the place where it was found were searched, the bones would probably be found, and perhaps another urn or more, for where there is one burial of this kind there are often others. In fact, the finding of an urn often shows the site of a tribal cemetery. The little urn is such a fine and perfect specimen that we are anxious to preserve it in the Museum, where all similar sepulchral finds throughout Scotland are well represented."

THE borough engineer (Mr. Charles Brownridge) of Birkenhead has submitted the following report to the ferry committee of the Corporation in regard to the new pier, bridge and stage proposed to be erected at Rock Ferry:—The proposed pier is to be constructed on the northerly side of the existing stone slip, immediately adjoining it at the shore end, and being about 26 feet 6 inches from it at the outer or river end. The pier for a length of about 27 feet at the shore end is proposed to be constructed solid of masonry and concrete, and then continued in iron supported on cast columns for a distance of 791 feet 6 inches from the river wall. It is provided with a shelter 16 feet long in the middle, and a further shelter at the end, or bridge-head, 16 feet long. The floor is of redwood 52.5 feet above ordnance datum, and there is a rail barrier down the centre dividing the pier into two widths. The bridge is 160 feet long and 10 feet 6 inches wide. It is hinged to the pier at its upper end, and at the lower end rests directly on the stage and has an elm floor. The stage is 150 feet long and 32 feet wide, carried on ten floating pontoons, of which the two end ones are made V-shaped to act as cutwaters, and the four centre ones are lengthened under the bridge so as to give additional buoyancy and steadiness. It is proposed to moor the stage in such a position that at low water the outer face will not be less than 50 feet from the end of the old slip, by two breast moorings, each 40 fathoms, two end moorings, each 70 fathoms, and two river face moorings, each 50 fathoms long. The deck is of teak, and the stage is provided with signal light, bell, bollards, water and other fittings, and has stagemen's rooms, stores, waiting-room, with w.c.'s and urinals. It is not proposed to do any work to the pay-office and buildings at the entrance at present, but the committee are no doubt aware that at times of exceptional high tides the existing paving at the entrance is subject to flooding.

The walls of the short length of solid pier are arranged, therefore, in such manner that the level of the entrance buildings may be altered at any future time with very little disturbance or interference. The estimated cost of the works is the same as that included in the Parliamentary estimate, viz. 15,000*l*.

TRADE NOTES.

THE Autocopyist Company, late of 72 London Wall, have removed to 64 Queen Victoria Street, E.C.

THE Waterford District Asylum, Waterford, is being warmed and ventilated by means of Shorland's patent Manchester grates and Shorland's patent concealed extract ventilators.

A USEFUL variant of the "push-and-pull" principle applied to doorhandles is the "Combined" turn, push or pull lock, the invention of Mr. Tom Jones, of Wolverhampton, and placed on the market by Mr. James Gibbons, St. John's Works, in that town, and of Southampton Row, London, W.C. As applied to ordinary room or office doors the old "push and pull" was very convenient, in the respect that it could be opened by anyone having their hands otherwise engaged. It has not, however, been generally adopted, chiefly owing to the public being unacquainted with method of opening and being accustomed to open by turning the handle. The new lock combines the above advantages with the addition of a turn, so that those knowing that it will open by a push or pull on the knob can use it in that way, while those unacquainted with that method will turn the knob and open it in the usual manner. Another advantage of the "Combined" lock is that it requires no special fixing and cutting away of the door to allow the spindle, &c., to pass, it being contained in a special mortise lock case, which allows of strong fixing for the roses of furniture. Mr. Gibbons is also showing the "Tom Jones" improved patent automatic panic fittings, door handles especially adapted for schools, and some novelties in fanlight openers.

ELECTRIC NOTES.

AT a meeting of the lighting committee of the Liverpool City Council, held on the 10th inst. under the presidency of Mr. C. Petrie, there were submitted the electric estimates for the year 1898, which on capital account amounted to 136,987*l*., made up of the following items:—Land and buildings, 25,700*l*.; plant, 27,660*l*.; mains and reinstatement of roads, 51,000*l*.; and the amount required for work done and goods delivered but not

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paid for. On revenue account the estimate was 46,080/., the chief items being goods and wages in the supply department 14,000/., and fitting department 20,000/.. The total on capital and revenue accounts was 183,067/.. It is estimated that the receipts of the supply and fitting departments will exceed the expenditure, and will also provide for charges on capital account, consequently no provision will be required in the estimates for the general rate. The estimated cost of the street lighting for next year is (including gas and electricity), 49,946/.; this amount includes 37,939/.. for the old city and 6,916/.. for the added areas.

A CONFERENCE took place on the 9th inst. between the electricity committee of Glasgow Corporation and a deputation representing the burgh of Partick, who are joining in opposition to the application made by the Kelvinside electricity committee for a provisional order entitling them to light an area in which Partick is included. It is understood that an arrangement was agreed to regarding the opposition to be offered to the application.

THE Bo'ness Harbour Commissioners have lately been considering as to having Bo'ness harbour and docks lighted with the electric light, and at their last meeting it was remitted to the engineers, Messrs. Thomas Meek & Son, Edinburgh, along with Mr. Carlow, North British Railway director, and a member of the board, to consider as to having the proposal carried out. The engineers have now purchased the two engines, dynamos and other electrical plant which was recently in use at the Free Library, Edinburgh, for the purpose of lighting Bo'ness docks. The plant, which is as good as new, was purchased at a low figure, and will be forwarded to Bo'ness next week. Offers for fitting up an installation of the electric light at the docks are now being considered, and the work, it is expected, will be proceeded with at once.

ON the 9th inst. Mr. A. Mayor gave an interesting account of the recent applications of electrical engineering before the Glasgow University Engineering Society, the chair being occupied by the president, Mr. H. C. Sadler. The lecturer, after remarking on the great developments made within the last few years, proceeded to describe the application of electricity to street cars, railways and conveyances generally, contrasting their advantages and disadvantages with those worked by steam power. A large number of excellent slides were also shown illustrating the application of electricity to cranes and to boring, planing and other special tools. Mr.

Mayor also showed slides of the workshops of Messrs. Mayor & Coulson, which were specially designed to be worked by electrical tools. In the discussion which followed, Mr. Rowan exhibited some slides of special tools for boring and riveting, the tool being held up to its work by means of electro-magnets. The thanks of the meeting were accorded to Mr. Mayor for his very instructive address.

THE Secretary of State for Foreign Affairs has received a despatch from Her Majesty's consul at Bilbao, reporting that the provisional board appointed in connection with the electric tramway which it is proposed to lay from Zumarraga to Zumaya, in the province of Guipuzcoa, invite plans and tenders, to be received by February 28, for the construction and equipment of the line. Further particulars of the conditions of the tenders for the above-named tram line and branch, which together measures thirty miles, may be inspected at the Commercial Department of the Foreign Office any day between the hours of 11 and 6.

A SERIES of extensive improvements were recently carried out at Strathallan Castle, Perthshire, by Mr. Grame A. White-law, ex-M.P., who some time ago obtained a lease of twenty years of the castle and shootings from the agents of Viscount Strathallan. Besides extensive alterations and renovations in the interior of the castle, a good many improvements were made externally upon the buildings, and also upon the offices, &c., adjoining. Amongst these the introduction of the electric light may be considered as the most important, and Strathallan Castle is now one of the very few mansions in the county where the new illuminant is used. The motive power for generating the electric current is obtained from the river Machany. The course which supplies the existing meal mill is utilised, and by taking from an extension of the present mill-pond a pipe to the old scutching mill on the banks of the river a head of some 20 feet is obtained. The old water-wheel has been removed, and in its place a turbine giving some 10 to 12 horse-power has been substituted, which drives the dynamo. The electric current is conveyed to the castle by means of overhead wires on poles, the distance being some three-quarters of a mile. In an outbuilding close to the castle an electric accumulator, or storage battery, is provided, which is capable of lighting 150 lamps for nine or ten hours. This is charged during the daytime, and supplies current for lighting the castle when the turbine and dynamo have stopped running. The whole of the work, including the water-power, has been carried out by a Glasgow firm.

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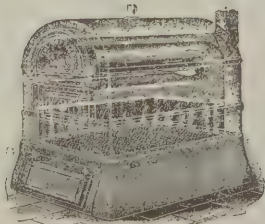
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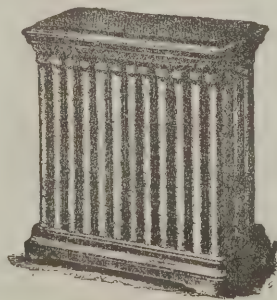
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CALENDARS FOR "'98."

AMONG the many calendars which we have received we may mention as worthy of note that of Messrs. Aspinall. It is of the "tear-off" description, and is surrounded by an ingeniously and artistically arranged colour card showing the various and numerous tints in which they produce their now well-known "Wapitici;" and that of Messrs. Jere Kaye & Co., of Huddersfield, which is also of the "tear-off" variety, but has the advantage of marginal spaces against each date for notes or engagements.

SLAG WOOL AS A FIREPROOF BUILDING MATERIAL.

FULLY alive to the interest in the employment of fireproof materials in building which has been excited by the recent fire in the City, Messrs. McNeill & Co., of Bunhill Row, E.C., and Kirkintilloch, near Glasgow, are issuing an interesting and instructive little book on "The Uses of their Slag Wool in Building Construction for Fireproofing, Sound Deadening, and the Insulation of Heat or Cold." Slag wool, as is now pretty generally known, is essentially a pure mineral glass-like fibre, manufactured from iron slag. It is made by converting this while in a melted condition into fibres by means of a blast of steam or air. It consists of a mass of very fine fibres, varying somewhat in thickness, interlacing and crossing each other in every direction, thus forming an innumerable number of air cells. Slag wool partakes of the nature of glass without its brittleness, the fibres being soft and pliant though inelastic. One of its most important qualities is its unequalled power to prevent radiation of heat or transmission of hot or cold air, which renders it equally valuable as a frost-proofing material or for keeping hot air out of a refrigerator or cold chamber. Being perfectly non-combustible and practically indestructible by heat, as a protection against fire it may be of inestimable value if rightly applied, while its inelasticity and want of solidity prevent the transmission of sound through it, and the material is coming more and more into use as a deadener of sound in the floors and walls of buildings.

As sound is communicated by the actual contact of beams, and especially by the vibration of air between them, it can be well understood how a porous material like slag wool will have a muffling influence on the solid parts of the building, and so occupy the space that sound-wave motion will not be possible.

ILLUSTRATIONS.

CASTLE KEEP, REIGATE.—BILLIARD ENTRANCE HALL.
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CATHEDRAL SERIES.—CANTERBURY: PART OF SCREEN TO DEAN'S
CHAPEL. ARCADE IN CHAPTER-HOUSE. EFFIGIES.

THE OLD BREAKFAST ROOM, ALTHORP PARK, NOTTINGHAM.

ALHAMBRA THEATRE.

THE capital programme set before the patrons of this popular resort by its indefatigable manager, Mr. A. Moul, is proving so attractive that the production of the new ballet which it was intended to put in the bills for Christmas is, for the present, found unnecessary, and it may well be so, since the fare provided comprises the two bright and sparkling ballets, "Donnybrook" and "The Gathering of the Clans," the clever sketch "When two hearts are won," by Mr. and Mrs. Sidney Drew; Cissy Loftus, who has added one or two new impersonations to her already extensive repertoire; the cinematographic views of the Jubilee procession, of which, however, we may perhaps be excused for feeling a little tired now; the American trick cyclists, Madeline Kilpatrick and W. H. Barber, and many other turns, all of which are admirable of their kind.

MUNGO NASMYTH.

AROUND the name of Mungo Nasmyth, a famous Glasgow architect, who flourished in the middle of the last century, says the *People's Journal*, quite a number of legends and traditions are clustered. It cannot be disputed, however, that he was an original genius, self-taught, yet with so much individuality that he could hold his own with the most pedantic architects of his time. The history of his life has never been fully recorded, and possibly that is the reason why so many dubious stories have

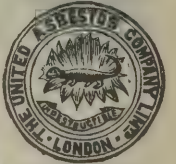
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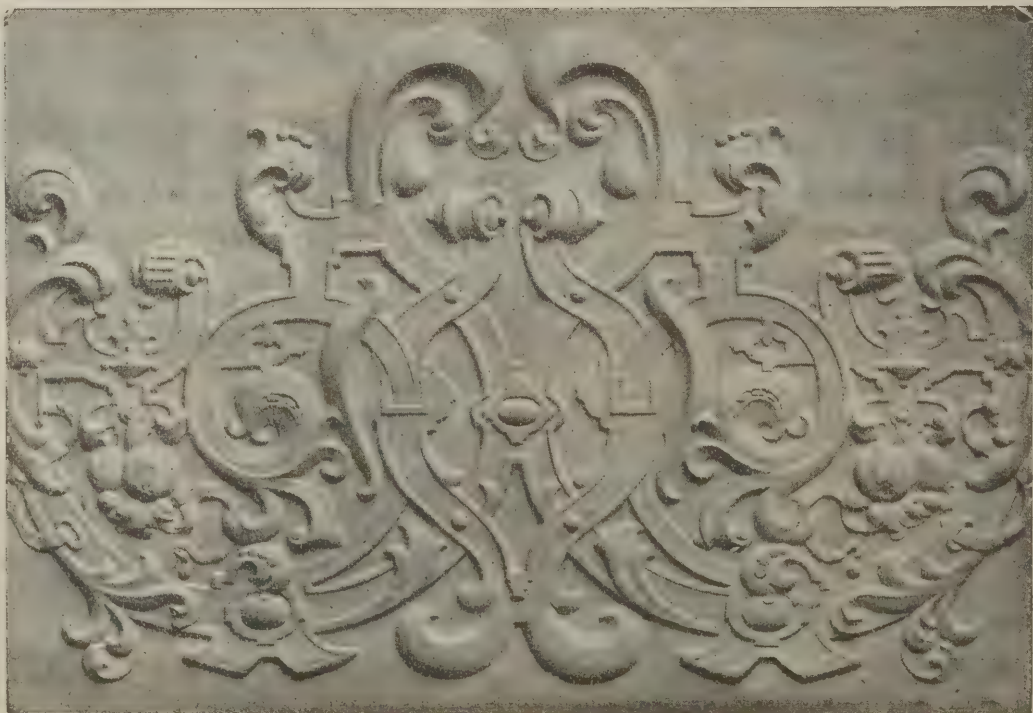
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been circulated regarding him. His name first appears in the annals of Glasgow in connection with the erection of the Town Hall, adjoining the old Tolbooth at the corner of High Street and Trongate, better known as "the Tontine," because the entrance to the Tontine Hotel was afterwards at this spot. There was an open piazza with a succession of arches facing the Trongate, and the keystone of every arch had a grotesque mask carved upon it, the whole series giving a wonderful variety of expression. These masks were familiarly known in Glasgow as "The Tontine Faces," and were for many years a source of wonder to country visitors. It is said that Mungo Nasmyth, then a foreman mason, carved these keystones with his own hands. About thirty years ago, when the piazza was absorbed into the drapery establishment of Messrs. Moore, Taggart & Co., the Tontine faces were removed, and were rebuilt into part of the building then erected by Messrs. Arthur & Fraser (now Fraser, Sons & Co.), drapers, at the corner of Argyle Street and Buchanan Street. Several buildings put up long after Mungo Nasmyth's day were decorated with imitations of these queer faces. When Kirkman Finlay, M.P. for Glasgow in 1812, erected his magnificent mansion of Toward Castle, near Inellan, he caused copies of the Tontine faces to be made and utilised in the building. While it is not improbable that Mungo Nasmyth carved the original Tontine masks, it is doubtful that he then occupied the humble position of a foreman operative mason. The likelihood is that he was the actual designer as well as the builder of the Town Hall. It is difficult to believe that a mere working mason would have been entrusted in 1739 with the heavy responsibility of designing and erecting St. Andrew's parish church in Glasgow. In many ways this is a very remarkable structure. It stands in St. Andrew Square, off Saltmarket, and when it was erected that quarter contained the city mansions of some of the wealthiest citizens. The church itself is almost an exact copy of St. Martin's-in-the-Fields, beside Trafalgar Square, London, which was built in 1726 by the famous Gibbs, on the site of an earlier structure. Two peculiarities are noticeable in St. Andrew's Church. The western façade has a series of pillars supporting a pediment. In ancient architecture it was usual to have one large stone reaching from the middle of the entablature of one pillar to the corresponding centre of the adjoining pillar, thus providing a stable support for the horizontal stone. But in St. Andrew's Church the horizontal course consisted of a number of stones between the pillars, not arched and keyed as in Roman or Norman semi-

circular arches, but showing vertical joints in the masonry between the pillars, without any apparent intermediate support. This was regarded as a great wonder, and Mungo Nasmyth was credited with the invention of a new architectural device. It is no disparagement to his originality to say that he had been anticipated many years before. In the drawing-room at Glamis Castle there is a wide fireplace, which may have been erected about 1480-1520, in which the same device is visible. The horizontal course of masonry has no pillar support in the centre, but stretches across from jamb to jamb, and supports a heavy superstructure. The method of construction is easily understood after a close examination. The adjoining horizontal stones were made with a wedge-shaped tenon-and-mortise on the same principle as an iron bedstead is made, the side-rails of which fit into an inward-sloping mortise. It was thus impossible for a stone to slip through the mortises on each side, and the superincumbent weight only served to make the grip of these stones more secure. This was the method which Mungo Nasmyth adopted in St. Andrew's Church, Glasgow, and had he built this structure in the Middle Ages he might have survived in legends as a potent necromancer. Yet the plan he worked on was a very simple one. In buildings of the Queen Anne period it was quite usual to make horizontal architraves of windows with wedge-shaped keystones, the stones to the right of the centre sloping obliquely to that side, while those on the left were sloped in the opposite direction. The keystone was simply a wedge or inverted pyramid, and it kept the other stones in position by lateral pressure. All that Mungo Nasmyth did was to keep the external joints of his masonry vertical, while the stones were joined together and kept in position by the wedge-shaped tenons in the thickness of the stone. A more remarkable feature in the architecture of St. Andrew's parish church, Glasgow, is the tower with belfry, which rises from the centre of the roof, not from the ground at the west end, as is usual in church architecture. This was a great marvel at the time of its erection, though there is really no mystery about it. The interior of the church has an arcade on each side, running from west to east, supported on strong columns, corresponding in some respects to the cloistered aisles in a Mediaeval church. The weight of the tower is divided between these arcades and the vaulted roof, and it is quite as stable as the central tower of a cruciform church, which was always erected at the junction of the nave and choir with the two transepts. An old Glasgow tradition declares that the masons engaged upon the build-

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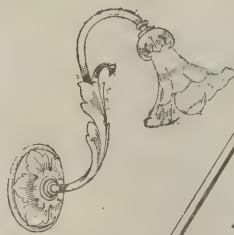
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ing of St. Andrew's Church were convinced that the flat arches and the tower would all fall into ruins whenever the scaffolding was taken down. It is said that Mungo Nasmyth was so confident in the stability of the tower that he stood beneath it with folded arms while the last pieces of scaffolding were being removed. His foresight has been triumphantly vindicated. The church was founded in 1739, but was not ready for occupation till 1761, principally, it is believed, because the Town Council could not raise funds to complete the structure earlier. The actual cost of the church has never been ascertained, but it is certain that between 30,000*l.* and 40,000*l.* were expended upon it, and the Town Council had to sell ground in the neighbourhood of the city that would now be of immense value for the purpose of paying for a church that is left deserted by the wealthy citizens, and serves to decorate incongruously one of the most squalid parts of the city.

CRIPPLEGATE IMPROVEMENT.

A DEPUTATION of owners, occupiers and ratepayers of Cripplegate Ward, headed by Mr. M'Bryde, waited on the City Commission of Sewers in reference to the fire, in which, they stated, most of them had been great losers, while their businesses were practically paralysed by the calamity. They submitted for the consideration of the Commission various matters. The locality of the fire had become a notorious and dreaded one, owing to the occurrence of several previous fires, occasioning far heavier burdens on the petitioners, in the shape of losses and extremely high insurance rates, than upon other citizens generally. There seemed to be a general consensus of opinion that an effort should now be made to prevent, if possible, a repetition of such calamitous disturbances, and that the way to effect it was to open up the locality, by means of street improvements, so as to render the area less densely occupied by buildings, and to give readier access to the numerous and important warehouses in the narrow streets and alleys which abound in the vicinity. Several suggestions had been made and illustrated in the *City Press* for accomplishing that very desirable object, but, being aware of the great experience and knowledge in regard to City improvements possessed by the Commission and their officers, the petitioners thought it unnecessary to come prepared with any definite scheme of improvement, but it might be mentioned that many

of them had regarded with strong approval a proposal made by Mr. H. H. Bridgman, a late member and past chairman of the Commission, to construct a new wide street from the corner of St. Giles's Church, diagonally through the scene of the fire to Aldersgate Street Station, viz. by the intersection of Aldersgate Street, Barbican and Goswell Road, and Long Lane. Beyond being an important local improvement, which the petitioners considered would accomplish the object sought, it would also be the completion of a direct line of thoroughfare from the Tower and the East End to the markets and Holborn, *via* Fore Street, London Wall, Camomile Street, Duke Street and the Minories. It was apparent, moreover, to all taking an interest in such matters that if any material relief was to be secured for the constantly increasing traffic at the Mansion House and adjacent streets—going East to West through the City—the only feasible remedy was the completion of that new main thoroughfare. When such connecting link across the scene of the fire was constructed, it might fitly be regarded as an important metropolitan improvement, and would fully justify the London County Council in contributing towards the cost. The Commission would appreciate the necessity in the public interest of arriving at a decision at as early a date as possible in order to prevent the likelihood of the buildings being again rebuilt on the old lines, thus rendering it impossible to effect any valuable improvement. The petitioners would gladly afford to the Court all the assistance in their power with regard to the carrying out of any improvement that might be decided upon. The memorial was signed by some eighty or ninety firms, some of whom carried on business in Wood Street, but the majority were those whose premises had been destroyed. In some cases, it was said, the occupiers of premises burned out had not been traced, as having resumed business elsewhere. Mr. M'Bryde, replying to questions, said no improvement would be complete which did not deal with the half-circle of Jewin Crescent. There the houses ran back to back, and a fire would run right through them in no time. In the present instance, had there been a strong wind, the fire would not have been stopped until it had reached the General Post Office. Round Fore Street and Jewin Street the street traffic was especially congested, owing to the existence of a great parcels' delivery establishment. He believed the neighbouring occupiers would be prepared to subscribe towards the cost of the improvement. He did not know what the Goldsmiths' Company, who were the ground landlords, were prepared to do, but they had

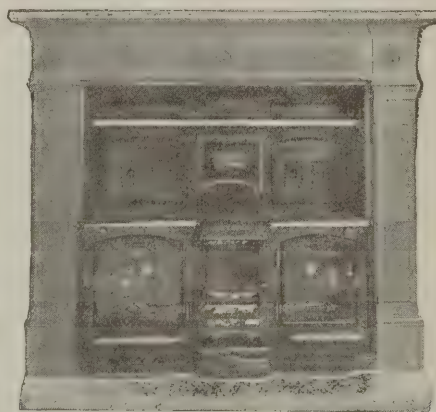
SANITARY CONGRESS, LEEDS, SEPTEMBER. 1897.

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signed the memorial, and he had no doubt they would behave handsomely. The Chairman said he happened to know that the matter was under the consideration of the company. Mr. M'Bryde, replying to Sir Albert Altman, said enormous rates had latterly been charged by the insurance companies, and if the buildings were rebuilt on the old lines it would be impossible to insure at all, or, if it were, people would simply be working for the insurance companies. A good deal of property—especially of stock—was uninsured in the late fire and since then, when reinsurances had to be made by surrounding occupiers, the rates had been considerably augmented. On the motion of Mr. Tranter, the memorial was referred to the finance and improvement committee for consideration and report, the Chairman assuring the deputation that it should have every attention. At the instance of Mr. John Harris, the streets committee were requested to consider and report as to the advisability of erecting near the fire hydrants receptacles to contain a quantity of hose, with the key of the hydrant, so that it might be available for use on the first outbreak of fire. On the motion of Mr. A. A. Wood, the whole question of the prevention of danger and damage from fire in the City was referred to the same committee.

LONDON COUNTY COUNCIL WORKS DEPARTMENT.

THE finance committee of the London County Council submitted on Tuesday a statement of the cost of the works executed by the Works Department during the half-year ended September 30 last. There are in all seventeen estimated works, which have been completed during the half-year and are now reported upon. The final estimate for these works was 171,049*l.*, whilst the actual cost has been 192,410*l.*, showing a balance of cost above estimate of 21,361*l.* An analysis of the return shows that the losses have been chiefly made on five works. The work of putting in the foundations at Bexley Heath Asylum was entrusted to the department in March 1896, on an original estimate of 31,833*l.* Certain deductions were made, leaving the final estimate at 31,306*l.* The work has, however, actually cost 39,230*l.*, showing a difference of no less than 7,924*l.* between the final estimate and actual cost. The architect reports that 31,306*l.* is the actual value of the work done. The next most serious loss is shown in the work done for the

main drainage committee on the Fulham and Hammersmith sewer. The final estimate for this work was 24,368*l.*, whilst the actual cost has amounted to 31,014*l.*, showing a discrepancy between cost and estimate of 6,646*l.* The erection of the piers and dolphins for the Vauxhall temporary bridge has resulted in a loss of 2,267*l.*, the final estimate for the work being 11,265*l.* and the actual cost 13,532*l.* In the construction for the fire brigade committee of the Whitefriars fire-station the department has exceeded the final estimate of 20,591*l.* by 1,936*l.*; the actual cost having been 22,527*l.* On works carried out at the central dépôt at Belvedere Road, which were estimated to cost 19,210*l.*, the estimate has been exceeded by 1,920*l.* There are five other works reported upon where the estimates have been exceeded, and, on the other hand, there is a balance of cost below estimate on seven works. The finance committee, reporting with reference to the five which show the largest excess of cost over final estimate, state that, at any rate for some portion of the time during which these works were in course of execution, the Works Department was undergoing investigation, which was followed by considerable changes in the staff, and that the manager, Mr. Adams, was not responsible for the works, as they were practically completed before his appointment on February 2 last.

The schedule value of the jobbing works carried out during the half-year was 6,270*l.*, whilst the actual cost was 5,502*l.*, showing a balance of cost below schedule value of 768*l.* The committee append to their report a statement showing the totals of the actual cost and of the final estimates or the amount of the schedule value of all works executed by the Works Department since its creation. From this it appears that the final estimate for all the estimated works completed up to March 31, 1897, was 459,772*l.*, and the actual cost 462,897*l.* Adding to that the figures for the half-year ended September 30 last, of final estimate 171,049*l.* and actual cost 192,410*l.*, it will be seen that the final estimate for all the estimated work carried out by the department has been 630,821*l.* and the actual cost 655,307*l.*, so that the operations of the department since its creation in regard to this class of work have resulted in a loss of 24,485*l.* As to the total of the jobbing works figures are only given from April 1895, since prior to that date there was no schedule of prices for comparison. The actual cost of jobbing works executed up to that date was 72,005*l.* The return shows that since April 1895 the schedule value of the jobbing works carried out

THE GREAT FIRE.

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by the department has been 62,446*l.*, and the actual cost 57,763*l.*, showing 4,683*l.*, or about 7½ per cent. as the amount of cost below schedule value.

The committee have also drawn up statements with regard to the works refused by the Works Department, for which tenders were afterwards received from contractors, and also a return of the architect's estimates and lowest tenders received for works suitable for, but not offered to, the department. These have been circulated to members of the Council.

THE CITY FIRE.

THE following additional technical evidence was given at the inquiry into the causes of the fire in the City on the 19th ult. Mr. E. Woodthorpe, district surveyor of the northern division of the City, said he had been personally acquainted with the district in which the fire occurred for eighteen years. Every building erected there during the time he had held his present position, or that he saw built before he succeeded his father as district surveyor, was put up in accordance with the requirements of the Building Act at the time in force. All the property was erected under the supervision of well-known architects. He attributed the speedy collapse of the buildings to the effects of the intense heat on the brickwork and ironwork. The walls left standing after the fire gave evidence of having been badly shaken by the sudden expansion and contraction of the ironwork. His professional opinion was that the nature of the internal construction and fittings of the warehouses accounted for the rapidity with which the fire spread and for its fierceness. Many of the fittings extended from floor to ceiling; they were practically large wooden pigeon-holes with narrow passages between. In many of the warehouses the staircases were only separated, as was general in this class of building, by wood and glass partitions, and the offices and rooms were similarly divided from one another. Then in several cases the walls, and even the ceilings, were matchlined. As far as he knew there was only one stone staircase in the whole burnt-out area.

The City Solicitor asked if witness heard Mr. Vickery describe stone staircases as a delusion.

Mr. Woodthorpe replied that he did, but he did not agree with him. The buildings destroyed showed that they were not fireproof or fire-resisting in any way. There were many build-

ings in the City with fireproof floors, or what were called such, namely, iron and concrete, with stone staircases. As an instance of such a building he might mention Winchester House. More than thirty fires had occurred there, but they had always been restricted to the actual floor of the outbreak, and, in many cases, had not even spread to the second room. He had never known a large fire in a building constructed in that way. By saying it was possible to construct a fireproof building he meant one in which it was possible to stop a fire from spreading to any large extent. In many of the fireproof buildings to which he referred the ironwork was covered with concrete.

The City Solicitor asked if witness was armed with sufficient authority to prevent the destroyed buildings from being erected as before.

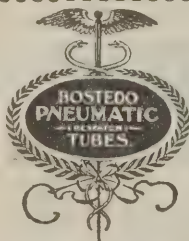
Mr. Woodthorpe replied that in one or two cases the buildings could not be erected exactly as before, but with those exceptions he was not armed with authority to prevent the warehouses from being built again on the same principle. He had no power to insist on the well hole at 15 Well Street being constructed in a different manner, although he considered it a distinct source of danger. Witness added that, within his knowledge, there had been in the district of the fire several narrow escapes from a large loss of life occurring in buildings of the kind recently destroyed. He was strongly of opinion that every man who erected such a building should be compelled to enclose his staircase with a fire-resisting partition, and continue it up to the roof, and from there provide a ready means of escape. To rebuild 28 and 29 Hamsell Street on the fireproof principle to which he had alluded would involve an extra expenditure of about 50 per cent. to the lessees.

A jurymen asked if witness did not think advantage should be taken of the present opportunity to remodel the neighbourhood of the fire.

Mr. Woodthorpe said that no doubt improvements might be introduced in the arrangement of the streets, but, of course, the property, as was all property in the City, was very valuable.

The City Solicitor intimated to the jury that the matter was receiving the most careful consideration of the Commissioners of Sewers at this moment.

Mr. George Vickery, architect, was recalled, and produced plans of the buildings in which the fire broke out, they having been built under his supervision. Referring to Mr. Woodthorpe's observations about the well hole, he said he should



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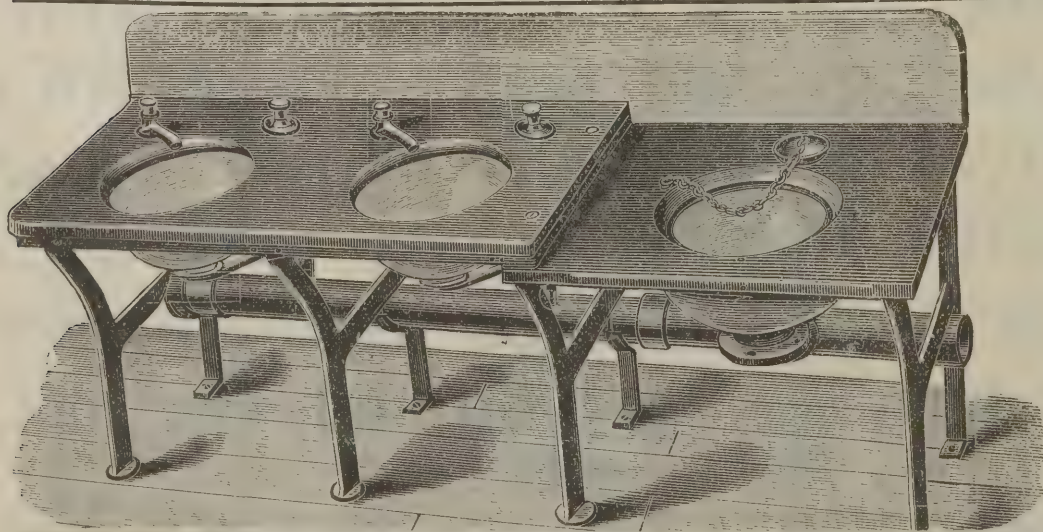
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like that gentleman to explain how it was possible to light the centre of a building with a depth of 75 feet, and surrounded by narrow streets, except by a lighting area or well hole.

Mr. J. Wornham Penfold, one of the three members of the tribunal of appeal under the Building Act of 1894, said he was architect to the Goldsmiths' Company, to whom the Cripple-gate estate, on which the fire occurred, belonged. Including streets, it had an area of about 4 acres, or, without them, of nearly 3 acres. Practically the whole of the streets on the estate had been made and improved from time to time by the company, and he put in plans showing the condition of the property in 1690, in 1778, about 1820, and in 1875. Jewin Street was originally made by the company in 1652, and, together with the remainder of the estate, escaped the great fire of 1666. According to the survey of 1690 the street varied in width from 11 feet 6 inches at the Aldersgate Street end to 15 feet 3 inches at Redcross Street end. At the present time the street was 29 feet wide at its narrowest part and 34 feet at the Aldersgate Street end. In 1690 Hamsell Street was 6 feet wide and was then known as Redcross Alley; by 1778 it had become Redcross Square with a width of 16 feet to 20 feet, and in 1875, in conjunction with the Commissioners of Sewers, it was made 25 feet wide. Compared with other streets in the City that was a very good width. It enabled a cart to stand at any warehouse and still leave a passage for another cart. All the streets on the Goldsmiths' Company's estate, where the company owned the property on both sides, were at least 25 feet wide, but immediately they got off the estate they found no such streets, always excepting the main thoroughfares such as Aldersgate Street and London Wall, and he might also except King Street and Queen Street. With these exceptions there were no streets from St. Paul's Churchyard to the Royal Exchange, either north or south of Cheapside, where two carts could pass one another the whole length of the street. That was nearly possible in Old Jewry, but not quite. There were 107 buildings on the company's estate, of which fifty-four had been destroyed, and about twenty-five damaged. The ground-rent of the whole estate was something like 14,000*l.* or 15,000*l.* a year. When a lease was on the point of expiring they generally had somebody looking out for the site. Except in the case of the charity estate, which they were obliged by the Charity Commissioners to advertise, the company never advertised its sites. If they did so, and threw the sites open for competition, the ground-rent obtained for them would be larger.

A juryman, who said he was a freeman of the Goldsmiths' Company, asked if he might take it that the company were liberal landlords?

The witness replied in the affirmative.

Mr. Hembry asked if witness agreed with Mr. Woodthorpe that to erect fireproof buildings in place of those destroyed would cost 50 per cent. more?

Witness replied that all depended on the degree to which the buildings were fireproof. They would never think of building a warehouse in the way Winchester House was built. The cost would be too much, and the rent more than the people would be able to pay. He thought a reasonable suggestion would be that the different storeys should be isolated by concrete floors. If that were done the probability was that in the case of a building becoming ignited by a fire on the adjoining premises the flames would not spread below the top concrete floor. He did not think the lessees would hesitate, in rebuilding the warehouses, to do as much as that. Witness added that later in the day he had an appointment with a committee of the Commissioners of Sewers to consult about any alterations that might be possible in rearranging the streets on the estate.

The City Solicitor said he believed the Commissioners of Sewers were to meet subsequently representatives of the London County Council to discuss similar matters. He thought the jury might rest assured that the subject was being carefully considered with a view to improvements being carried out.

Witness thought he might add that the Goldsmiths' Company would be glad to give every facility to the authorities.

A NOVEL IRISH RAILWAY.*

It is usually the duty of the president of such a society as this is to select for the subject of his address a review of engineering science during the past year, or to deal in a general way with some branch of that science. This evening, however, I purpose giving you a somewhat detailed description of a novel kind of light railway with which I recently became acquainted. There may be two excuses for departing from custom—the one that light railways are much talked of at the present time, the

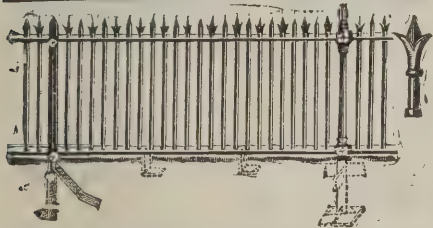
* An address delivered by Mr. Alfred Slater as president of the Gloucestershire Engineering Society.

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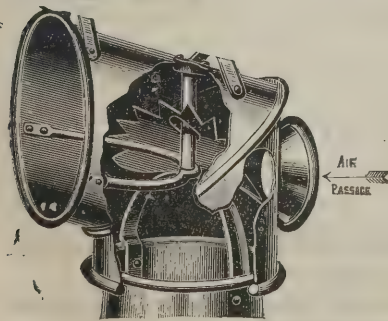
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other that of emphasising the remarks I recently made urging our younger members to keep their eyes open and note on paper any novelties they may meet with either in their daily work or in their travels. The opportunity may not arise in every instance to describe a whole railway and its rolling-stock, but the council would welcome any carefully-written paper, however short, describing merely a detail part of some machine.

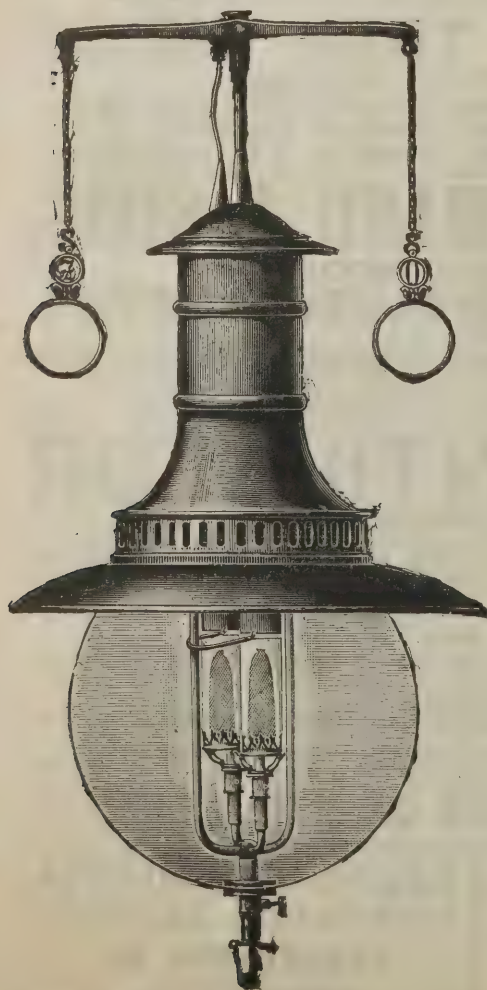
It was in Ireland where I met with the only railway in the kingdom built on the Lartigne system; the line was constructed in 1888, and runs from Listowel to Ballybunion, a distance of about ten miles. It is usual to speak of the "gauge" of a railway, but this is an exception to that rule, for it has no gauge; it is, in fact, a single-rail line. The relative cost of this and ordinary narrow-gauge lines over the same route and for the same amount of traffic is said to be as follows:—The Lartigne, 1,948*l.* per kilometre; the 24-inch gauge, 2,488*l.*; the 39½-inch gauge, 2,800*l.* It is my intention to describe this curious railway rather than to praise or criticise the design. Still, as the line is of such a novel form, it will, I think, be only right to point out briefly some of the advantages claimed for it by the inventor, the more so as serious proposals have been put forward for making a line on this principle between London and Brighton for conveying express trains at the rate of 150 miles per hour.

The inventor claims great safety, also that the line can be quickly and cheaply laid. As earthwork is reduced to a minimum, it is only necessary to clear away sufficient earth for the sleepers, as the carriages are high enough to pass clear of a good deal of rough ground. Another advantage is that by a slight modification in design or strength the line can be its own bridge, and thus cross brooks without having to build piers or incur any expensive bridge work. In some countries this design of railway might be very advantageous, as floods, snowdrifts or sandstorms must be of extraordinary power if either of them prevented the line being worked. We all know that a few inches of water, snow or sand will seriously interfere with the ordinary railway; indeed, the traffic is occasionally stopped for several hours, even in England. I must express my indebtedness to Mr. Behr, the well-known engineer in London, and to Mr. McCarthy, the company's manager in Ballybunion, for their courtesies in facilitating the preparation of this paper. The photographs which I am able to show you were taken by an amateur, and as they are his first efforts in that science, I must ask you to be so good as to excuse all shortcomings. Mr. Pitcher has been good enough to prepare

them for the lantern, and I will now ask him to begin putting them on the screen.

The first picture gives a view showing the general appearance of the line. The building is the Ballybunion railway station, and you will observe that quite a crowd of people are waiting to leave by the next train. Ballybunion, though a small village, is rather an attractive spot, and large numbers of people visit the place for the sea bathing. I should, of course, tell you that this village is situated in the south-west of Ireland on the Atlantic coast. This single rail line is composed of A shaped trestles, the top rail weighs about 27 lbs. per yard, and is placed one metre, or, say, 3 feet 3 inches above the ground. The legs of the trestle are of angle iron above, about 1½ by 1½ by 3-16ths. At about 2 feet from the top rail is a cross bar, and at each end of this there is a check rail to control the oscillating motion. At the bottom of the trestle is fixed the sleeper of dished steel; this is about 3 feet 3 inches long by 6 inches wide and ½ thick. These trestles are placed 3 feet 3 inches apart, and were intended to be supported entirely by the metal sleepers, but in this case it was found necessary to put a wooden sleeper of larger area under the metal sleeper. I presume the ground proved to be softer than was anticipated. The steepest gradient is 1 in 47, and the sharpest curve is 66 feet. The line follows the formation of the ground and runs within a few feet of the public road. The station buildings present no feature of interest; they are constructed to suit the traffic and without any pretensions to architectural effect. As the line stands some 3 feet or more above the ground, it cannot be crossed on the level in the same way that ordinary railways can be crossed. A proper bridge is erected at the only spot where the public road has to be crossed. There are, however, several occupation crossings and these are provided by drawbridges; our next photo shows the bridge closed to the public. The next shows it in course of being opened. You will observe the mechanism which can be operated from either side, and you can just discern a signal which automatically indicates whether the bridge is open or closed. In this photo you will see the trestles are strengthened at this point to carry the ledge on which the bridge drops. The next photo shows the bridge down, that is to say, closed against the railway, and open to the use of the occupant of the adjoining fields. There are very few signals, as the traffic does not necessitate any elaborate system of interlocking signals.

Next to the permanent way the locomotive, which is "Mallet's," claims our attention. This is a fairly good view



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of it, and as the driver stands near, you can form some idea of its proportion. It is in appearance almost like a toy that has lost its wheels, but yet it is one of some interest. The front view shows you that it has two boilers, two fire-boxes and two funnels; the back view that it has two tenders and two tanks; in fact, in every way it is a double-barrelled machine, except the lamp, which is so large that if they had two there would be no room for the engine. The engine and tender empty weigh 7 tons, when loaded they weigh 10 tons 15 cwt. There are two cylinders, 7-inch diameter by 12-inch stroke; the working pressure is 150 lbs. per square inch, in each boiler there are thirty tubes, and on the tender is another two-cylinder engine, but it is never required. The engine wheels are 2 feet in diameter, and of course are placed in line down the centre. At a speed of 12 miles per hour the engine is capable of performing the following work:—

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The latter is the steepest incline on the railway. The consumption of coal is found to be 15 lbs. per mile. The engine is capable of a speed of 25 miles per hour, but the working speed is 15 miles.

The carriages, like the engines, are double. The passengers sit back to back, but there is no communication between the two halves of the carriage, as the intervening space is taken up with the wheels. The carriages are about 6 feet 6 inches high by about 8 feet 6 inches in total width and 18 feet long. Each carriage holds twelve passengers, or twenty-four for the double carriage. My two photos give side views, the second one showing the van which has inside communication with its companion. The third photo shows the goods waggon, which carries five tons, and which you will notice is close down to the ground and is easily loaded; it is 17 feet in length. The next pictures represent the sand waggons, which carry three tons. These are of iron, and have trap doors for releasing the load. Each half of the sand waggon is about 6 feet long by 3 feet wide at the top and 3 feet deep, tapering to nothing towards the bottom.

Now I must return to the passenger stock in order to call your attention to the most extraordinary railway vehicle I have ever seen or heard of. It is nothing less than a travelling staircase, which is placed at about the centre of every train to enable passengers to cross the line. It is quite a distinct vehicle, having its own wheels, buffers, draw-gear and brakes.

It can be shunted about and put in any desired part of the train. This curiosity, like all the rest of the train, is fitted with one of the automatic air brakes. The rolling stock consists of about thirty-three vehicles, including locomotives, carriages, staircases, goods waggons and sand waggons. There are no less than twenty of the latter. It will, no doubt, have occurred to you that a vehicle running on a single rail, however well balanced, must have some check, and my next picture is to show you how this is accomplished. It is an end view of the lower part of one side of the sand waggon. You will observe a piece of mechanism consisting of a broad wheel on a vertical axle and fitted with spiral springs. This wheel or roller as the vehicle oscillates engages with the check rail, which you will remember I alluded to in describing the permanent way. There are four of these rollers to each vehicle. I am sorry not to be able to show you a sketch of the mechanism for carrying the vehicles themselves, as the photograph was a failure. In the case of the passenger stock it consists of two two-wheeled bogies, the wheels of course being in line and fitted with suitable bearing springs. The wheels are 19 inches in diameter. Each carriage therefore, including the carrying gear and the check gear, has eight wheels and sixteen bearings. The photo shows the buffer and drawgear, which you will observe is of the "central" type.

The next pictures show some of the details of the turntable or switch, the principle of which will be explained more fully by means of a diagram. In the second view you will observe the mechanism for fastening the switch in position, this apparatus being interlocked with a signal. Turning now to the diagram of the switch, I wish to point out to you what appears to me a very ingenious method of getting two through roads by means of one turntable. If you have a straight line on your turntable you could only obtain one through road, in order to pass to the other line you must deal with every vehicle separately on the table. The line on the turntable is curved to the extent in some cases of one-fourteenth of its circumference, and the diagram will show that you can obtain two through roads off each line.

I have already alluded to the gear for checking oscillation and keeping the vehicles upright. To your mechanical minds it must already have occurred that a single-line vehicle must be properly balanced in loading, otherwise, without affecting its safety in the least, there would be great resistance by the rollers pressing on the check rails, and therefore greater consumption of fuel. Every care is taken to

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balance the load, as is shown by the fact that even I myself was asked to move to the other side of the train, and I am not particularly heavy. By again referring to one of the views of the engine you will see how easy it is to get the vehicles out of balance; even the driver and stoker must balance each other, or else the engine will be lopsided. I must not omit to repeat a tale told in the district which has, I believe, some foundation in fact. Soon after the line was opened a very stout old lady took a return ticket to Ballybunion; she appears to have been the only passenger, and the guard could think of only one way to balance the train. He borrowed a cow and so accomplished the journey without difficulty. The old lady, however, died, and was buried at Ballybunion, so now the guard was perplexed with the problem how to return the cow. Well, he borrowed another cow of about the same weight, and for eight years, report says, he has been daily borrowing one cow in order to return the one lent him the day before.

GERMAN FLATS.

THE Berlin correspondent of the *Daily Telegraph* writes:—If your correspondents on the subject of "Life in a Flat" imagine that they are much worse off in London as compared with foreign capitals, practical experience of continental life would soon cure their disillusion. The annoyances caused by troublesome, inconsiderate and obstreperous neighbours are pretty much alike wherever one lives; and the defects in houses hired from a landlord are, when one thing is taken with another, rather of a relative kind.

Still, as the subject has been mooted, it may be instructive and interesting to give a brief sketch of the measures taken for rendering houses as sound-proof as possible in the German capital, since Berlin may really be taken as the most modern capital in Europe—comparatively few of its houses being over twenty-five years old. Amongst the more important objects subject to police inspection here is the architecture of dwelling-houses. Not only are the plans of builders submitted in order to ascertain whether they conform to the regulations enacted by the building department of the police, but in the course of erection officials of that department are authorised, whether they have any technical knowledge of the subject or not, to enter the premises and have a look round. The huge barrack-like houses built in Berlin, to be let out in flats, have a great many defects of internal construction from an English point of

view, but their sanitary arrangements are infinitely superior to what they were even twenty years ago, and all this is due to the new provisions rigorously carried out by the police.

Build as you will, however, it is not possible to supply houses of a moderate rent, or of a rent suitable to the pockets of ordinary people, and at the same time to make the rooms absolutely sound-proof. The laws of sound are, like all the laws of nature, inexorable; and unless measures are taken to counteract them, sound will extend upwards, downwards or sideways from one dwelling to another. It does not follow that a house is badly built if the rooms are not sound-proof. The thickness of a party-wall in a Berlin house must not be anywhere less than 25 centimetres, and the thickness necessarily increases by 13 centimetres every two storeys downwards. Thus, the wall-thickness between two houses must be half a metre at the top storeys, whilst on the ground floor it is certain to be over a metre. As to the permeation of sound from above or below, the habits and customs of one's neighbours are necessarily the determining factor. Carpets all over a room are not *de rigueur* in a Berlin house, the parquet floors being very rarely wholly covered. Hence people may often be troubled by the stamping and walking of families immediately overhead. Where musical instruments are constantly being used, their position against or near the wall affects the intensity of the sound heard in the other dwellings. It is impossible to prevent one family from using them in order to suit the wishes of another family in the same house, but there exists a rule or custom in all provincial towns, as well as in Berlin, prohibiting music in general after ten o'clock at night.

Unless I am misinformed, the following description expresses approximately the difference between the customs prevailing in the two cities:—In Berlin the beams supporting the floor of a dwelling are 21 centimetres in thickness; in London they are just half. In Berlin the distance between the beams is 90 centimetres, in London it is 60 centimetres. In the Berlin house the upper half of the space between the floor of one room and the ceiling of the room below is filled with ashes, and the ceiling is constructed of a lining of planks upon which the plaster is laid; in the London house this space is empty, and the ceiling is constructed of plaster, simply laid upon laths. Owing to the difference between the two plasters, the procedure adopted in London would be impossible in Berlin. Then, again, the space between a Berlin floor and the ceiling underneath is 33 centimetres, whilst in London it is only 26 centimetres. The Berlin procedure is dearer and

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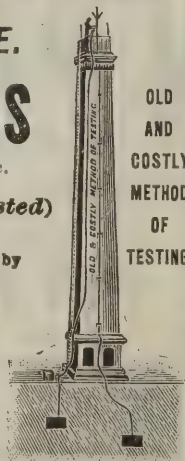
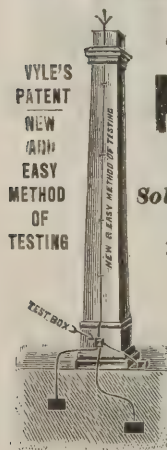
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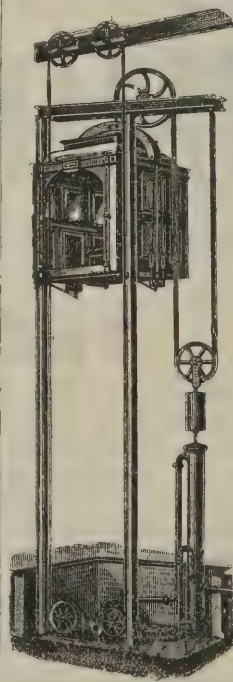
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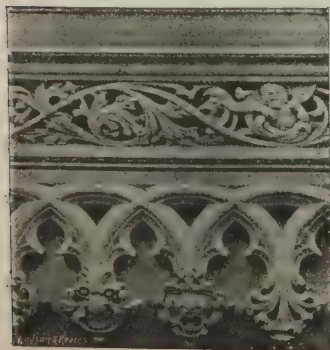
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heavier. London houses are erected on land which is not the property of the builder, whilst in Berlin the owner of a house is also the owner of the soil on which it stands, and this is probably the reason why London houses are of a lighter and less expensive nature than Berlin houses. The above figures and remarks are, of course, only to be taken in a general sense. I cannot say whether they are applicable to all cases in London.

Where money is no object, and in edifices which are built with the express intention of avoiding the transmission of sound from one floor to another, special methods can be adopted, and are actually adopted, as in the case of schools for music, Government and official buildings and the private houses of very rich people.

Another kind of ceiling, called Klein's, has recently come into vogue here in certain cases, notably in a new and enormous shop consisting of several storeys just opened by Messrs. Wertheimer, in the Leipziger Strasse. The beams are of iron and the general construction is of another kind; but this is not applicable to private houses.

The arrangement of doors in a Berlin house differs entirely from that in use in London, so that a comparison between the partition walls of the interior need scarcely be made. The transmission of sound between room and room over here depends mainly on the number and size of the doors used. In Berlin a room rarely has less than three doors.

It is to be feared that no builder in any capital can, in the present state of technical knowledge, and in face of the demand for cheap houses, be expected to consider the woes of the nervous and weary when tormented by the screeching and strumming of noisy neighbours, however desirable such thoughtfulness may be.

AMERICAN TENDERING.

THE following communication from Mr. F. R. Comstock, architect, appears in *Architecture and Building*:—

During the past few weeks my attention has been called to the general condition of the building business, and especially the wide difference in the amounts of the highest and lowest bids received in competition for the erection of many of our buildings.

During an interview with a number of contractors it was suggested that the subject be given a little more attention, and

I have endeavoured to find out the why and the wherefore of the present condition among the building trades. It is not expected to solve this entire question in this short letter, but I would suggest that those interested should write to the editors of *Architecture and Building*, giving their reasons for or against the present system of competitive estimates, and perhaps give a suggestion as to how it can be improved. Many contractors have given the main cause for this wide difference in estimates, that the architects do not make complete plans, showing all the minor details in large scale drawings to enable the contractor to estimate intelligibly; that the specifications are not absolutely complete, and that when they estimate they have no opportunity to see what the full-size details are, for the architect has not had time to make them, or will not make them, so that the contractor has to use his best judgment, and in many cases guess at what the finish is to be.

In a certain city in the Middle States the contractors formed an organisation known as a Board of Trade, got up an agreement that hereafter they would not estimate on any building unless the drawings, &c., were all complete as itemised above, and the result has been that the architects in that locality have been compelled to produce more complete plans and better specifications for the erection of buildings, and it was reasonable to suppose that certain portions of this problem were solved, but a few weeks ago the writer had occasion to visit this city during the awarding of a contract for a six-storey fire-proof building, and the local contractor who was awarded the contract signed it without knowing that the amount of the highest competitor was 32,000 dols. more than the lowest estimate; also estimates were opened for a two-family house which included two copper bath tubs, three water-closets, two wash-bowls and kitchen boilers and sinks, gas piping of the house, with connections to the sewer and water, approximately 25 feet from the front of the building, for the sum of 192 dols., and the heating contract, a hot-water system with six radiators on each floor, was given for 325 dols., all remaining bids for heating and plumbing ranging from 50 to 75 per cent. higher, and it was remarked at the time that there was an opportunity for some people to learn more about estimating.

A few weeks ago there was a competition for a public building in Connecticut where the difference between the highest and lowest contractor for doing the work, according to plans and specifications submitted, was a trifle over 30,000 dols. A while ago a contract for a public institution was awarded where the bid was 52,000 dols. less than the highest estimate,

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the contract approximating 120,000 dols. Seventeen contractors estimated in this case. Within a few months the estimates were opened on a chapel, where there was a difference of 5,000 dols. between three contractors on a 12,000 dols. job. Not only does the public note the difference in the public buildings, but the building public in its domestic work has reached the point where it looks for these great differences in estimates, so as to get the building erected as cheaply as possible, and oftentimes you will hear a client say, "It ought to be built for 6,000 dols., but I will get a large number of estimates, and I will build it probably for 4,000 dols.," and the most remarkable thing in the statement is the fact that he gets it done. Recently the contract for a two-family house was awarded to out-of-town parties for 3,200 dols., where the highest local contractor was 1,500 dols. higher, and last year a friend of the writer obtained drawings and specifications for a single house, and submitted the drawings in competition to five masons and seven carpenters and the usual number of sub-contractors, and the lowest combination was 5,600 dols. and the highest 11,000 dols. A New York gentleman made the statement a few days ago that if he had not obtained a large number of estimates from different contractors he never would have built his house. Many circumstances of like nature, as stated above, could be given, but the foregoing list is sufficient to show the actual difference in many of the competitions. What is the cause of it? What is the reason that two men will take the same set of plans, specifications and details and be 5,000 dols. apart on a small contract? You might ask this question of some contractors, and they would say that it is the difference in the completeness of plans and specifications. One you can drive a horse and cart through, and the other states specifically what kind and quality of material is to be used, yet that same contractor will criticise the architect if he puts everything in his specifications and explains everything carefully, and he says the specifications are too long. Certainly contractors ought to appreciate the fact that the more complete the specification is, the more it tells him what is expected, the longer that specification is going to be. The mere fact that a specification "covers the floors with good quality spruce boards," as some of them are written, is rather vague and more liable to be misunderstood than the clause that calls for "¾ by 5 inch matched, first quality spruce flooring, laid in long lengths," &c.; and again picking up a specification a few days ago, I read under the heading of hardware that "the contractor shall furnish and put on proper hardware for the entire building,"

which is vastly different from giving the number and trade name of the various fixtures, so that each and all can estimate on the same quality of goods. It has been suggested that if two men estimate on certain plans and specifications where the kind and quality of every bit of material is mentioned, sizes given, &c., each go out into market and get their estimates and the prices of the material amount to the same, that it is a question of judgment who will get out of it at the least possible expense. One contractor can take a body of men and handle them to a great deal better advantage than another contractor. One contractor works with his men and only takes the amount of work that he can personally attend to. The other contractor takes a large amount of work which requires expensive foremen, time-keepers, requires a carriage to go around, and some person must pay for his time superintending the work. In this case it is a question of personal expense, one over the other. It stands to reason that the man who works with his men can produce buildings at a lower margin than the man who is compelled to employ superintendents.

One man is satisfied with obtaining day's wages out of a contract with from 2 to 5 per cent. profit on the entire job. The second contractor could not possibly live at this rate. These circumstances must be one reasonable answer to the question.

Some time ago I had occasion to see different detail statements made by various contractors of quantities of material taken off from a given set of drawings. Each took about the required length of time to get the statement from the drawings; all contractors saw the same drawings and specifications, and yet there was a difference of 25 per cent. between the total amounts of material as taken off by these men. The contractor who obtained the contract was asked to keep a record of the number of brick used for that particular job; meanwhile the various amounts taken by the other men had been noted down. When the contract was completed it took 20,000 more brick than the man who had obtained the contract included, and that was approximately 10 per cent. higher than the highest man. From this statement, and from knowledge of the usual system of estimating, it seems, strange to say, that there are very few contractors who can estimate accurately the required amount of material for a building.

In answer to a question put to a contractor some time ago, how he arrived at the number of brick in the building, he replied that he built a building for John Jones last year about the same size and he bought so many brick, and this was something like it and so he supposed it would take about the same number,

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and it is not surprising to note that this man lost money on the contract. The guessing at quantities and cost has considerable to do with the wide difference, for, in speaking of the question to a contractor recently, he said:—"One night when I got home there were seven sets of plans at my house for estimates, and as I had been out on the buildings all day and many of the estimates were required to be in by the morning, I sized them up and gave a guess figure on all seven, comparing it with my other work; strange to say I did not get one of them." And in answer to the inquiry, "Would it not have been better to have selected one that you wanted and given that careful and conscientious estimating, so as to make a strong endeavour to get one of the jobs?" he replied that it would have been of no use, for the whole system of competitive estimating to-day was a lottery; the man that can guess the nearest gets the job, and he said:—"Many times I have been influenced by seeing an article in the paper that so-and-so was to build a house to cost so many dollars, and I would look the plans over and give my guess in and sometimes I would hit it."

Against the contractor who cannot take off proper quantities and the guessing man is put the contractor who has made a list of prices to govern his estimate; that is to say, he has got a detailed statement of all the items that go in the building, with a schedule of prices. Once in awhile it is changed, but usually it lasts for six months or a year. No matter what the condition of the market is, our friend always uses his schedule. He has figured a small profit on each item, no matter whether brick cost 6 dols. a thousand or 9 dols. a thousand; he always charges 15 dols. a thousand to lay them; no matter whether the plaster is one, two or three coats, it is always 40 cents, and everything in proportion, and when he gets his estimate all done according to his schedule he will add a percentage for what he does not see and a percentage for profit, and then he will submit his estimate and then he will stand back and grumble with the rest, "The man who got that contract is losing money," and the invariable rule is that the man who grumbles the most and always sends the other fellow to the poor house estimates this way.

Anybody can see that he is getting a profit on a profit, and it is strange to see how many contractors figure this way. He is like the plumber who estimates his goods up at list prices, which I saw done within three months, and then charges a percentage of profit on that, after giving the total of material and labour, and it is not to be wondered at that his price was about three times what the contract was let for. In various

parts of the country the system of estimating is vastly different. In northern and western New York State contractors always get legitimate sub-estimates on a given list from the mill men or material men, &c., on every contract; also in the larger part of the country, outside of Connecticut, all contractors stand on their own department. Everything is let differently. The mason work goes to the mason and the carpenter work to the carpenter, and so on down through the job. Perhaps it is not as convenient as to deal with one man who knows nothing about the other trades outside of his own, and who charges you 5 to 10 per cent. for doing your business, and he making all he can off the sub-contractors, for no man is going to do your work for pleasure; there certainly must be a dollar in it.

In Connecticut the sub-contracts are usually awarded the last thing so as to get the advantage, if possible, of a fall in the market, and it is their practice, in the majority of cases, to wait for a house to be lathed and plastered and cleaned out before the sizes and measurements are taken for the inside trim. Recently we asked a contractor why this was, and he replied that sometimes the market price of material and labour went down, and then they always deferred ordering the material, for perhaps the owner might want to make some changes and he would not want to pay for material twice.

On the other hand, a New York contractor recently said that inside of twenty-four hours from the signing of a contract he had awarded every sub-contract on the job, turned over all the details on the contract and contracted when it was to be done, and then it was off his mind and he had an opportunity to look for other work, for they were to take charge of their own sub-contracts.

That is one of the principal reasons why work can be erected in other States much more rapidly than in Connecticut. I heard recently that a certain mill man would fill orders in say four weeks from local factories with work and material, whereas if eight to ten weeks were allowed him he would furnish the same work and material from his western factories at something like 25 per cent. less. This should be an additional reason for ordering work promptly, but how many contractors take advantage of this? and it is the prime reason why it takes six to nine months to build a 6,000 dols. house in Connecticut against three to five months in New York State. We have seen contractors take estimates both on the cost per square foot of the ground floor and the cubical contents of the building, of course having kept record of their work and experience on other

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buildings, and thoroughly understanding the conditions and perhaps a knowledge of the work of the architect; but what sort of a chance does the conscientious contractor stand against all these contractors when he sits down and laboriously takes off each item, each quantity of material, gets his sub-estimates from the mill, adds the total cost of the material in the building with their quantities in one column, figures out as accurately as possible his labour account, his insurance account, cartage and incidental expenses, and he knows to a certainty that to do that job it must cost him a certain amount of money?

Now comes in the question of his own time, and he figures the amount of personal attention that will be required of him and adds that, then considering his time and the money with its interest and the risk, and what he is satisfied with for a straight profit—and he has a choice of wide margins here—and it is the balancing of this column of profit and loss that sustains the man in business. A few years ago it was the custom and privilege of many of our contractors to ask 10 per cent. for their profit on any contract, but the wide difference between the highest and lowest estimates shows the profits run from 10 per cent. down to 1 per cent., and we have heard where it was totally ignored in the sum and total. This, no doubt, is why the columns of the financial papers give such an extensive list of failures and assignments, and at the bottom of the page note the disappearance of numerous contractors. Contractors have been obliged to estimate on this principle, and why? Because the general public are estimating closer; people who can easily afford to pay a fair living price want to cut it down as low as possible, and whereas they know you can “live and let live” at 10 dols., make day wages at 8 dols. and just exist at 6 dols., will continually crowd you to the 6-dol. point. The result has been that the contractors, to get any work at all, have been obliged to estimate as close as possible and trust to luck and chance or the possibility of skinning the job to get a fair living out of the work. The owner and client employs an architect, not according to his ability or his honesty, but simply from the fact that he works cheap, and when he employs an architect to supervise his house he only does so that he can get a man to stand over the contractor, who has taken the job too cheap, to see that he cannot possibly skin it, and when the contractor fails to live up to the standard of the specifications, which he cannot do for the price, then our owner and client falls on the architect and says he is not doing his duty in not making the contractor live up to his contract. Owners

and clients are many times at fault and the cause of their own dissatisfaction with contractors and their work, and many times for their being cheated. The one point in view seems to be “How much?” and many people of our city are familiar with the incident where an out-of-town contractor bid for work in a city and obtained five or six contracts. He certainly was lower than the local men; who he was and what he could do was not in it; it was not a question to be considered against the price. To be sure he started the buildings and reached the roofs and enclosed them, for about then two payments were due, which were made, and is it to be wondered at that to-day there are a number of people looking for that man? In some cases the houses are completed, usually at the “expense of the owner,” and sometimes at the expense of the material men. You will rarely hear the owner say how he got caught on that deal, but he will always tell you “how cheap he got it.”

Is it the fault of the competitive system? Is it the fault of the general public in not appropriating more money, or is it the inability of the contractor to make a proper estimate? Who can tell?

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

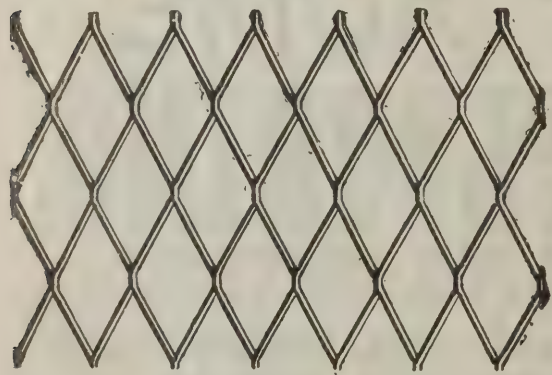
28169. Benjamin Samsome, for “Improved tile for roofing and otherwise covering houses, factories, shops, verandahs and such-like places.”

29151. S. Fawcett, for “Brickmaking machines.”

17. Goodwin, for “Cowl or chimney-pot for preventing down-draught in and rain from descending chimney-flues.”

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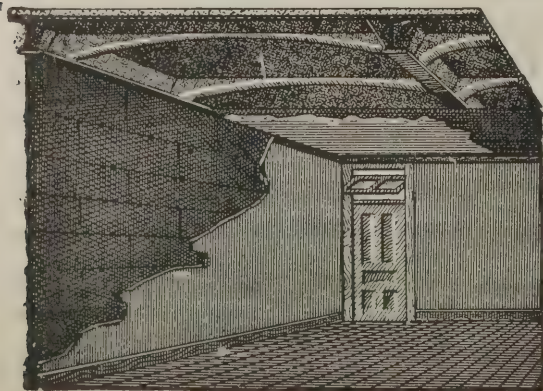
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EDITORIAL NOTICES.

The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.

Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

For Advertisement Scale, see page xiii.

COMPETITIONS OPEN.

BELPER.—Jan. 8.—The Belper Rural District Council offer premiums of 15 guineas and five guineas for the two best sets of plans and reports for Crich water supply. Mr. Joseph Pym, clerk, Belper.

BELPER.—May 1.—The Belper Urban District Council offer premiums of 50 guineas and 25 guineas for the two best schemes of sewage disposal. Mr. Joseph Pym, Urban District Council Offices, Belper.

BOOTLE.—Dec. 31.—The Corporation invite competitive designs of a central fire station, firemen's dwellings and district police station. Mr. J. A. Crowther, borough engineer, Bootle.

PORT ELIZABETH.—Feb. 15.—The public library committee offer prizes of 100 guineas and 50 guineas for designs for a new library building. Messrs. Wm. Savage & Sons, 85 London Wall, London, E.C.

SINGAPORE.—May 31.—The committee of the Singapore Permanent Memorial of Her Majesty's Diamond Jubilee invite competitive designs for a town hall and theatre to be erected at Singapore (Straits Settlements) at a cost not exceeding 300,000 dollars. The committee offer a premium of 200l. for the design that may be selected for the work, and one of 100l. for the design which the committee may judge to be second in merit. Plans and particulars can be obtained from Major F. J. Anderson, R.E., Royal Engineers' Office, South Camp, Aldershot.

CONTRACTS OPEN.

ALDERLEY EDGE.—Dec. 28.—For erection of an engine-house and drying-shed in Heyes Lane. Mr. Walter Cobbett, clerk, Council Offices, Alderley Edge.

BATLEY.—Dec. 28.—For erection of five houses in Dark Lane. Mr. T. Gladwin, 1 Commercial Street, Batley.

BEAMISH.—For erection of a public-house. Mr. T. C. Nicholson, architect and surveyor, Blaydon-on-Tyne.

BEDFORD.—Jan. 10.—For building offices and storerooms at the electricity works. Mr. T. S. Porter, town clerk, Town Hall, Bedford.

BELFAST.—For completion of five houses, &c., Walton Street. Mr. H. T. Fulton, 91 Donegall Street, Belfast.

BIDEFORD.—Dec. 28.—For alterations and repairs on the post office premises. Mr. R. T. Hookway, architect, Bideford.

BLAYDON.—Dec. 28.—For erection of public hall, recreation-rooms and caretaker's house. Messrs. T. C. Nicholson & Edwin Bowman, architects and surveyors, 52 Westgate Road, Newcastle.

BODMIN.—Jan. 1.—For drainage works and repairs at police headquarters and assize halls. Mr. H. J. Snell, architect, Plymouth.

BRECON.—Jan. 5.—For erecting intermediate schools at Builth Wells, Breconshire. Mr. Telfer Smith, architect and surveyor, Market Hall Buildings, Builth Wells.

BRENTWOOD.—Jan. 5.—For alterations to officers' mess-room at Union schools. Mr. W. A. Finch, architect, 76 Finsbury Pavement, E.C.

BRIGHTON.—Jan. 4.—For alteration and enlargement of the York Place higher grade school. Messrs. Thomas Simpson & Son, 16 Ship Street, Brighton.

BURLEY-IN-WHARFEDALE.—Jan. 13.—For erection of National school for 500, with out-offices, boundary walls, &c. Mr. Ed. C. Brooke, architect and surveyor, 4 Huddersfield Road, Brighouse.

BURNLEY.—Dec. 29.—For extensions to the electric-lighting station. Mr. G. H. Pickles, Town Hall, Burnley.

CARDIFF.—For erection of church, schoolrooms and caretaker's cottage, Cowbridge Road, Canton. Messrs. Veall & Sant, architects, 6 Arcade Chambers, High Street, Cardiff.

COVENTRY.—For erection of bakery, &c., Cox Street. Messrs. George & Isaac Steane, architects, 22 Little Park Street, Coventry.

CUMBERLAND.—Jan. 9.—For erection of house and out-buildings at Kirkbride. Mr. E. Hill, grocer, Kirkbride.

DARWEN.—Jan. 3.—For erection of a boiler-house and settings for two boilers at gasworks. Mr. Chas. Costeker, town clerk, Darwen.

DEVONPORT.—Jan. 1.—For erection of a police station, constable's house and appurtenances at Millbrook, near Devonport. Mr. H. J. Snell, architect, 13 Courtenay Street, Plymouth.

EASTBOURNE.—Dec. 28.—For addition to the existing building, Grove Hall, for the lighting and general purposes committee. Mr. Wm. Chapman Field, architect, Town Hall, Eastbourne.

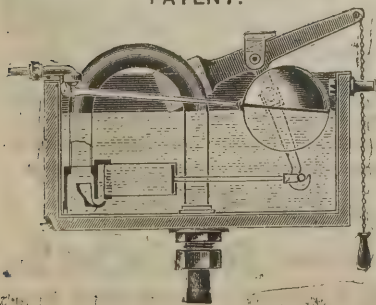
ESSEX.—Jan. 13.—For erection of infirmary, casual wards, labour master's house, boiler-house and additions to existing infirmary, at Billericay workhouse. Mr. A. T. G. Woods, architect, New Road, Brentwood, Essex.

FLINTS.—Dec. 31.—For erection of school buildings in Victoria Road, Mold. Mr. F. Bellis, architect, Bangor.

FRINTON-ON-SEA.—Dec. 31.—For erection of a school to accommodate 150 children. Mr. S. T. James, architect, Frinton-on-Sea.

ARCHITECTS PLEASE NOTE.

PATENT.



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HALIFAX.—Dec. 31.—For alterations and additions to Moorside school, for the School Board. Mr. Joseph F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

HALIFAX.—Dec. 31.—For additions and alterations to Akroyd Place school, for the School Board. Mr. Joseph F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

HALTON.—For plastering, slating and plumbing four houses. Mr. C. W. Lambert, 39 Whingate, Armley.

HARROGATE.—For alterations and additions to the Claremont Hotel. Mr. T. Butler Wilson, architect, Leeds.

HUDDERSFIELD.—Jan. 4.—For extension of the electric supply station. The Town Clerk, Town Hall, Huddersfield.

HUDDERSFIELD.—Jan. 3.—For erection of seven dwelling-houses in Moor Lane, Netherton. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.

HUNSWORTH.—Dec. 29.—For erection of a Conservative club. Messrs. Empsall & Clarkson, architects, 7 Exchange, Bradford.

ILKLEY.—For erection of four shops in The Grove. Messrs. Baxendall & Critchley, architects, The Grove, Ilkley.

IRELAND.—Jan. 1.—For erection of a classroom at Moybane National school. Mr. E. R. Crook, Moybane, Letterbreen, Enniskillen.

IRELAND.—Jan. 3.—For construction of a urinal through wall and under Fair Hill at north end of town hall. Mr. W. G. Young, town clerk, Larne.

IRELAND.—Jan. 14.—For erection of municipal offices and stores at George's Place. Mr. John Donnelly, town clerk, Town Hall, Kingstown.

IRELAND.—Jan. 1.—For erection of manager's residence adjoining creamery at Abbeydorney. The Manager, Creamery Offices.

KIDLINGTON.—Jan. 4.—For erection of two cottages at Kidlington station, Oxfordshire, Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station, London.

LEEDS.—For erection of a factory, Whitehouse Street, Hunslet. Messrs. Ambler & Bowman, architects, 9 Park Place, Leeds.

LEEDS.—For alterations, new stockrooms, &c., to the Victoria Hotel, Great George Street. Mr. Archibald Neill, architect, 18 Cookridge Street, Leeds.

LEEDS.—For foundations and cellars of the Standard Life Assurance Buildings, City Square. Mr. Archibald Neill, architect, 18 Cookridge Street, Leeds.

LEWISHAM.—Jan. 13.—For erection of buildings to accommodate about 800 persons, together with the necessary administrative offices, at Slagrove Farm, Ladywell. Messrs. Newman & Newman, architects, 31 Tooley Street, London Bridge, S.E.

LITTLEPORT.—Dec. 28.—For Wesleyan chapel and schoolroom, Black Horse Drove. Rev. W. Farmer, Bexwell Road, Downham.

LIVERPOOL.—Dec. 28.—For additions, alterations and sanitary and other improvements to the Steble Street and Burroughs Gardens Baths. Mr. W. R. Court, 15 Great George Square, Liverpool.

LYNDHURST.—Jan. 10.—For erection of the following additions to Holmfield, Lyndhurst:—(1) A range of stabling, with coachman's cottage and groom's apartments; (2) a billiard-room as specified; (3) a greenhouse; (4) sundry alterations throughout the present house, comprising a complete renewal of sanitary arrangements and water supply. The Hon. G. Lascelles, Queen's House, Lyndhurst.

MANCHESTER.—Dec. 29.—For alterations to offices in New Bridge Street. Mr. A. J. Murgatroyd, architect, 23 Strutt Street, Manchester.

MANCHESTER.—Dec. 28.—For erection of thirty-two two-storey tenement buildings fronting a new street between Cornwall Street and Spittal Street, and eighteen cottages fronting George Leighton Street. City Surveyor, Town Hall, Manchester.

MANCHESTER.—Dec. 28.—For erection of thirty-six two-storey tenement buildings fronting Chester Street, Marsland Street and Hulme Street, Hulme. City Surveyor, Town Hall, Manchester.

MOLD.—Dec. 31.—For erection of school buildings on a site adjoining Victoria Road. Mr. F. Bellis, architect, Bangor.

NEW QUAY.—For erection of the Headland Hotel. Mr. Silvanus Trevel, architect, Truro.

NOTTINGHAM.—For additions to the Shelton Street Board school. Mr. A. N. Bromley, architect, Prudential Buildings, Queen Street.

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PETERBOROUGH.—For erection of two villas on Eastfield Road. Mr. J. G. Stallebrass, architect, North Street, Peterborough.

RADCLIFFE.—Jan. 11.—For erection of public baths, and supplying and fixing of all engineering work, hot and cold water systems, and all connections and fittings complete. The Engineer, Council Offices, Radcliffe.

ROTHERHITHE.—Jan. 1.—For repairs to timber wharf. Mr. Robert A. Carr, engineer, 1 West Pier, London Docks.

SALISBURY.—Jan. 4.—For erection of engine-shed and retaining wall and construction of three engine-pits, for the Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station.

SCOTLAND.—Jan. 3.—For erection of villa on West Terrace, Kingussie. Mr. Alexander Mackenzie, architect, Kingussie.

SHOEBURYNESSE.—Jan. 8.—For erection of Victoria Hall. Mr. W. Cox, churchwarden, High Street, Shoeburyness.

SOUTHAMPTON.—Dec. 28.—For constructing a public convenience at Northam. Mr. W. B. G. Bennett, borough engineer, Municipal Offices, Southampton.

SOUTHAMPTON.—Feb. 1.—For erection of an isolation hospital on land in Mousehole Lane, Millbrook. Messrs. Greenaway & Smith, architects, 21 Queen Anne's Gate, Westminster.

SOUTHBOURNE.—Jan. 6.—For additions and alterations to the Board school at Southbourne, 1½ miles from Emsworth. Mr. N. C. H. Nisbett, architect, 62 High Street, Winchester.

STOCKPORT.—For plasterers' work required at five shops at Poynton. Mr. Geoff. H. Brady, architect, 18 Little-underbank, Stockport.

TEWKESBURY.—Dec. 28.—For erection of an additional ward at the isolation hospital. Mr. H. A. Badham, town clerk.

WALES.—Jan. 1.—For constructing abutments, wing walls, piers, &c., of proposed bridge, forming of road approaches and fencing the same, taking down existing bridge, &c. Mr. R. Lloyd Williams, county surveyor, Denbigh.

WALES.—Jan. 25.—For erection of a school for girls, and alterations to existing boys' school. Mr. H. Teather, Andrew's Buildings, Queen Street, Cardiff.

WALMER.—Jan. 5.—For erection of a public convenience near the Strand Promenade and for fencing and levelling the site of the new recreation ground, Campbell Road. Mr. J. E. Turner, 2 Cornwall Road, Walmer.

WESTON-SUPER-MARE.—Dec. 28.—For erection of two cottages at Woodspring. Messrs. Price & Wooler, architects, Waterloo Street, Weston-super-Mare.

WHITBY.—Jan. 1.—For erection of a small villa residence at Goathland. Mr. Edward H. Smales, architect, 5 Flowergate, Whitby.

WYLAM-ON-TYNE.—For erection of proposed branch stores, stables, manager's house, &c., at Crawcrook. Mr. W. Dixon, architect, St. John Street, Newcastle-upon-Tyne.

YORK.—Dec. 31.—For alterations to working men's club. Secretary, 218 Salisbury Terrace, Leeman Road, York.

TENDERS.

ASTLEY.

For erection of a small house at Astley. Mr. JOHN R. WITHERS, architect, Shrewsbury.

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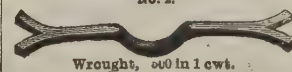
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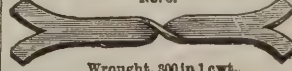
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C. Ash	202	0 0
E. H. Page	190	0 0
T. Davies	188	0 0
M. Davies	186	0 0
Williams & Thomas	182	3 4
W. Farquharson	172	6 0
M. WILLIAMS, Caerphilly (accepted)	163	0 0
H. Gross	143	0 0

CASTLE BROMWICH.

For construction of about 2,800 yards of 9-inch earthenware pipe sewers, with lampholes, manholes, flushing chambers, &c. Mr. J. EDWARD WILLCOX, engineer, Union Chambers, Birmingham.		
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J. Biggs	3,090	0 0
J. White, jun.	2,989	0 0
T. Vale	2,389	0 0
J. Mackay	2,300	17 0
H. Holloway	2,273	18 1
G. Law	2,200	0 0
J. C. Trueman	2,075	0 0
H. LAW, Chester Road, Erdington (accepted)	1,787	0 0

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For erection of eleven houses at Chrisharben Park. Mr. SAM SPENCER, architect.		
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DALTON-IN-FURNESS.

For erection of farm buildings, Greenhills. Mr. J. BURTLE, architect, Barrow and Dalton.		
R. TOWNLEY, Station Road (accepted).		

DEAL.

For erection of an underground convenience, near the South Parade. Mr. T. C. GOLDER, surveyor.		
G. Jennings	£600	0 0
T. T. Denne	575	0 0
F. COLLYER, Deal (accepted)	549	18 6

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For erection of new male ward and recreation-room at the Wilts County Lunatic Asylum. Mr. CHARLES S. ADYE, county surveyor.		
	New Ward.	Recreation-room.
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H. Ash	4,681 10 0	3,388 0 0
Long & Son	4,417 0 0	3,183 0 0
R. B. Mullings	4,437 3 0	3,019 12 10
Hayward & Wooster, Bath*	4,334 0 0	3,113 0 0
E. Linzey	4,120 0 0	2,650 0 0
A. J. Colborn	4,850 0 0	—
		Total.
		£8,948 0 0
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		8,069 10 0
		7,600 0 0
		7,456 15 10
		7,447 0 0
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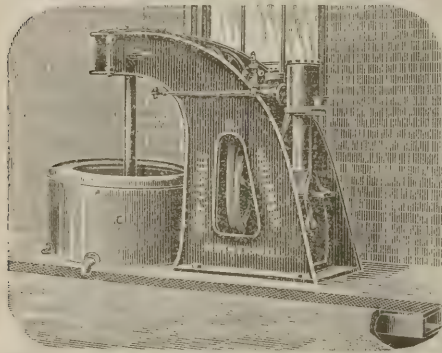
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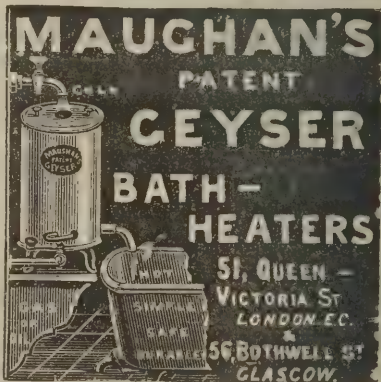
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Graham & Son	3,872	0	0
J. Ainscouth & Son	3,353	0	0
A. Braithwaite & Co.	2,851	0	0
W. & J. Foster	2,738	0	0
E. Kellett	2,657	0	0
R. W. Ibbetson.	2,634	0	0
H. Wilson	2,475	0	0
F. Eyre	2,481	0	0
W. Brigg	2,242	0	0
W. BINNS (accepted)	2,207	0	0

KEIGHLEY.

For erection of thirty-five houses off Fell Lane. Mr. JOHN HAGGAS, architect, North Street, Keighley.
J. Hird, Keighley, mason.
W. Thornton, Bingley, slater.
Forrest & Antrum, Keighley, plasterer.
Park & Lodge, Keighley, plumber.
Total, £5,069.

LISCARD.

For new church, Liscard, Cheshire. Mr. SAMUEL DAVIES, architect, Runcorn and Frodsham.
W. FARRELL & SON, Runcorn (accepted) . £1,280 0 0
For new house, Liscard, Cheshire. Mr. SAMUEL DAVIES, architect, Runcorn and Frodsham.
W. FARRELL & SON, Runcorn (accepted) . £1,450 0 0
For boundary walls, Liscard, Cheshire. Mr. SAMUEL DAVIES, architect, Runcorn and Frodsham.
W. FARRELL & SON, Runcorn (accepted) . £180 0 0

LONDON SCHOOL BOARD.

For cleaning interior, Old Castle Street school.
J. F. Holliday £319 0 0
D. Gibb & Co. 269 0 0
E. Jackson & Son 265 0 0
G. Barker 245 0 0
A. W. Derby 230 0 0
J. KYBETT (accepted) 206 0 0

MALLOW.

For alterations to the female school at the workhouse and the drainage of the Mallow new cemetery.

Accepted tenders.

Hassett, schools £18 10 0
J. Sullivan, cemetery drain 10s. per perch

PONTEFRAC.

For the construction of about 5,700 yards of pipe sewers, pump, well, settling tanks, engine-house and machinery, conduits and land filtration works, with manholes, lampholes, storm overflows, automatic flushing taps, &c. Mr. MALCOLM PATERSON, engineer, 35 Manor Row, Bradford.

F. Eyre £4,691 15 10
W. & J. Foster 4,686 1 1
G. Bell 4,488 6 0
Jackson Bros. 4,450 0 0
J. Bentley 4,408 1 4
M. Hall & Sons 4,346 13 1
W. Binns 4,342 16 4
A. BRAITHWAITE & Co, Leeds (accepted) . 4,162 8 9

PORT TALBOT.

For erection of station at Port Talbot, for the Glamorgan Joint Police committee.

BENNETT BROS., Swansea (accepted) . . . £3,800 0 0

RUNCORN.

For enlargement of board-room, &c., at the workhouse, Dutton, for the Runcorn Board of Guardians. Mr. SAMUEL DAVIES, architect, Runcorn and Frodsham.

THOMAS DAVIES & SONS, Frodsham (accepted) £425 0 0

For erection of new theatre, Lowlands Road, Runcorn. Mr. SAMUEL DAVIES, architect, Runcorn and Frodsham.

W. FARRELL & SON, Runcorn (accepted for first contract only). £1,900 0 0

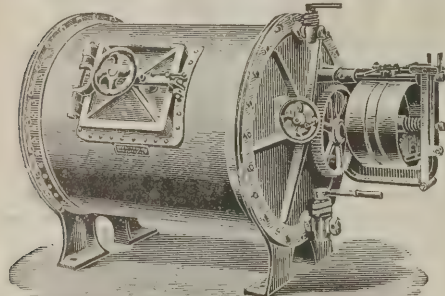
For decorating the lodge-room, Runcorn, for the Ellesmere Lodge of Freemasons. Mr. SAMUEL DAVIES, architect, Runcorn and Frodsham.

J. PAYNTER, Runcorn (accepted) £25 0 0

For alterations and repairs to Bank House, Runcorn, for Parrs Bank, Limited. Mr. SAMUEL DAVIES, architect, Runcorn and Frodsham.

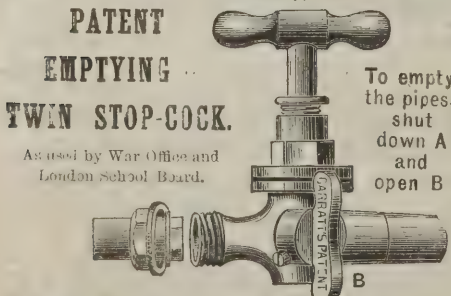
W. FARRELL & SON, Runcorn (accepted) . . £340 0 0

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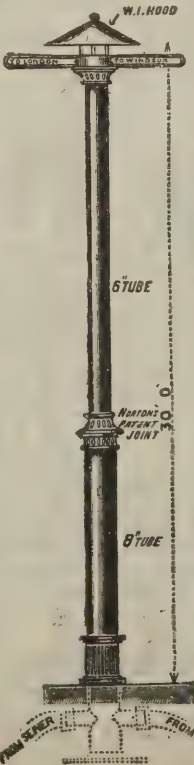
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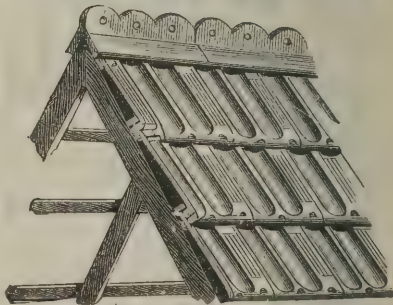


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- For alterations to Grove House, Runcorn, for Dr. MacLennan.
Mr. SAMUEL DAVIES, architect, Runcorn and Frodsham.
W. FARRELL & SON, Runcorn (accepted) . . . £600 0 0
- For alterations and additions to Rockfield, Higher Runcorn,
for Mr. Charles A. Timmins. Mr. SAMUEL DAVIES,
architect, Runcorn and Frodsham.
W. NICKSON, Runcorn (accepted).
For alterations to premises, Greenway Road, Runcorn, for
Mr. Walter Collier. Mr. SAMUEL DAVIES, architect,
Runcorn and Frodsham.
W. FARRELL & SON, Runcorn (accepted) . . . £200 0 0
- For alterations and repairs to premises, Halton Road, Runcorn,
for the Wigan Coal and Iron Co., Limited. Mr. SAMUEL
DAVIES, architect, Runcorn and Frodsham.
W. FARRELL & SON, Runcorn (accepted) . . . £140 0 0
- For alterations to shop, Greenway Road, Runcorn, for Mrs.
Waterworth. Mr. SAMUEL DAVIES, architect, Runcorn
and Frodsham.
BILLINGTON & ROYLE (accepted) . . . £60 0 0

SCOTLAND.

- For supply of pipes for the construction of a new water supply
for Corpach, for the Lochaber District Council. Mr. JOHN
PATERSON, engineer, Fort William.
R. Campbell . . . £927 7 7
W. Wilson . . . 836 4 6
J. Livingston . . . 746 0 0
Anderson & Nisbett . . . 739 10 0
- R. Harper, pipes cast vertical and tested to 300
feet pressure . . . 698 11 0
- R. HARPER, Fort William, pipes cast slanting
and tested to 400 feet pressure (accepted) . . . 655 11 0
- For erection of shops and dwelling-house, St. Catherine's Road.
Mr. JOHN FORREST, architect, 129 High Street, Forres.
Accepted tenders.
D. Ross, Tolbooth Street, mason.
G. Forrest, Masset Place, carpenter.
A. Forbes, Tytler Street, slater.
R. H. D. Forsyth, Tolbooth Street, plumber.
Angus & Ross, Orchard Road, plasterer.
A. Macdonald, High Street, painter and glazier.
W. Smith & Son, High Street, ironmonger.
Total, 1,020l.

SCOTLAND—continued.

- For works in connection with the West Kilbride sewerage
extension, which embraces the construction of about 1,500
lineal yards of sewers from 8 inches to 15 inches diameter,
with manholes, &c. Messrs. WARREN & STUART,
engineers, 115 Wellington Street, Glasgow.
G. & G. Wardrop & R. Muir . . . £1,132 5 0
J. Stevenson . . . 1,628 17 2
W. Donald . . . 993 1 9
W. Simpson . . . 949 17 0
J. Osborne . . . 934 2 5
A. Donald . . . 928 16 3
T. Scott . . . 891 13 2
- SHANKS & McEwan, 196 St. Vincent Street,
Glasgow (accepted) . . . 821 8 1
P. Bow . . . 713 7 9
G. M. Stirling . . . 709 18 4
R. C. Brebner & Co. . . . 699 18 0

SHIBDEN.

- For erection of semi-detached house in Kell Lane. Messrs.
JACKSON & FOX, architects, 22 George Street, Halifax.

Accepted tenders.

- W. & G. Drake, Queensbury, mason . . . £310 0 0
H. Abbott, Ambler Thorn, joiner . . . 226 19 0
L. Lister, Hipperholme, plasterer, &c. . . 52 0 0

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STONEHAVEN.

- For construction of concrete reservoir, cast-iron water-mains
and fireclay pipe sewer in Slug Road, with manholes,
tanks, valves, &c. Mr. MURDOCH, burgh surveyor.
J. McPetrie . . . £1,645 4 7
P. Tawse . . . 1,596 4 3
Scott & Sellar . . . 1,573 0 0
A. McKay . . . 1,541 12 5
Laing & Sons . . . 1,534 8 0
Gall & Walker . . . 1,533 3 0
McAdam & Sons . . . 1,527 19 6
J. Murray . . . 1,415 15 4
G. McKay & Son . . . 1,413 19 0
- W. SMITH, jun., Arduthie Street, Stonehaven
(accepted) . . . 1,377 6 0

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SOUTHEND-ON-SEA.

For erection of superstructure of the Railway Tavern, Cliff Town Road. Messrs. THOMPSON & GREENHALGH, architects, Bank Chambers, Southend.

Davis & Leaney	£5,591	0	0
E. West	5,393	0	0
A. E. Symes	5,350	0	0
Baker & Wiseman	5,163	0	0
F. DUPONT, Southend-on-Sea (accepted)	5,137	0	0

THORNTON LE-MOORS.

For new Sunday school. Mr. SAMUEL DAVIES, architect, Runcorn and Frodsham.

JOHN LITTLER, Frodsham (accepted)	£407	0	0
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WESTON-SUPER-MARE.

For construction of shop front and other works. Mr. SIDNEY J. WILDE, architect.

Keen & Keen	£305	0	0
Collard & Croker	298	0	0
Penny	285	10	0
Dubin	265	0	0
Stokes	215	0	0
GIBBS & SONS, Weston-super-Mare (accepted)	205	18	0

WIDNES.

For converting three houses into shops at Appleton, Widnes, for Mr. James White. Mr. SAMUEL DAVIES, architect, Runcorn and Frodsham.

W. JOSEPH PENNEY, Widnes (accepted)	£530	0	0
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THE church of St. Mary, Scawton, which for some months has been closed for restoration and renovation, was reopened last week for public worship by the Archbishop of York. The porch has been entirely rebuilt, also part of the west end, and the original window restored. The outer walls have been carefully repaired where required, and the whole completely repointed. The roofs have been renewed, the heavy stone slates replaced by red tiles, the chancel roof brought to its original pitch, a new bell-cot provided, all dressed stonework stripped of its plaster and whitewash, floors replaced with cement concrete, &c., and the church now has a neat appearance. The work has cost about 600*l*.

THE STEWART ENCLOSED GLOBE ARC LAMP.

WE have had brought to our notice an enclosed arc lamp which has many excellent features, and which is being introduced by the Stewart Electrical Syndicate, 5 New Compton Street, W.C.

This arc lamp works on the same principle as the now well-known Jandus lamp, but there are many features which stamp it as one of the best on the market. The arc is very long, being from $\frac{3}{8}$ to $\frac{1}{2}$ an inch, depending on the voltage, and burns in an enclosed globe of glass. This globe is placed inside the outer ordinary globe, which itself is nearly air-tight. The effect of this is that the oxygen in the inner globe is soon completely consumed, and the arc is maintained in an extremely heated atmosphere of nitrogen and carbon dioxide. There being very little oxygen present, the carbons do not burn rapidly.

The special feature of the Stewart arc lamp is the purity of the carbons, which removes the objection to nearly, if not all, other enclosed arc lamps, viz. the blackening of the bulbs. It has come to our notice that the inner bulbs of these arcs do not blacken perceptibly in the time allowed between the trimming.

The arc lamp mechanism is very simple and effective. Another very important advantage in this lamp is the ease in trimming and the economy in carbon. The lamp will burn for 150 hours with one pair of carbons. The negative carbon is completely consumed, and the portion of the positive carbon which is left is just long enough for, and is used as, the negative for the next run. This means that only 12 inches of carbon are necessary for 150 hours burning. Supposing the cost of carbons for an ordinary arc lamp to be 2*l*. per annum, the cost of carbon will be, say, 3*s*. 6*d*. for the enclosed lamp to do the same work, and if the ordinary lamp burns ten hours without retrimming it will require trimming fifteen times to the enclosed arc lamp's once. The saving in carbon and attendance is thus considerable.

The Stewart arc lamp is the only one which will burn singly on circuits of 150 to 220 volts with economy. It is made in all sizes from 2½ amperes and upwards, and for all circuits from 75 to 220 volts. They are used for public lighting by the St. Pancras Vestry and at the Blackpool Winter Gardens, and they are also used at the Holborn Restaurant, the Frascati Restaurant, and in many shops in London and the Provinces.

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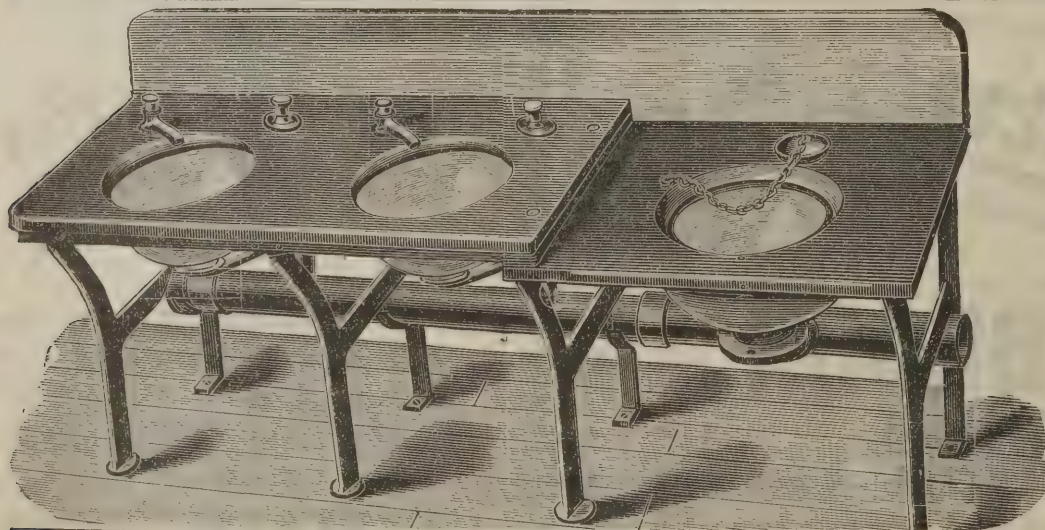
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147 STRAND, LONDON, W.C.

BUILDING AND BUILDERS.

A MEMORIAL-STONE was laid on the 15th inst. in connection with the enlargement of the Duke Street Wesleyan church, Castleford.

A NEW Board school is to be erected in Cragg Street, Colne. The site will cost 300*l*.

It is proposed to establish a new Liberal Club in Peterborough, and a site has already been obtained.

IN a recent limited competition the plans submitted by Mr. T. W. Cubbon, architect, of Birkenhead, have been placed first by a professional assessor, for new Unitarian school buildings to be erected in Bessborough Road. The scheme includes a future church and other buildings.

THE memorial-stone of the Chalmers Memorial Free Church, Pollokshaws Road, Glasgow, was laid on the 18th inst. Accommodation will be provided in the church for 840 people. There will also be a hall and classrooms in connection with the church. The contracts amount to about 6,000*l*.

It has been decided to build a mission church in the parish of St. Barnabas, Openshaw. Plans and specifications have been sent to the committee of the Diocesan Church Building Society, with a view of obtaining a grant in aid of the project. The parish of St. Barnabas is one of the poorest and most populous in Manchester. A similar movement has been started in the district of Maeland, Rochdale.

THE foundation-stones of Belgrave Hall, a new Wesleyan place of worship at Leicester, were laid on the 13th inst. The new building is situated in a densely populated district, commodious Wesleyan schools opened last June being already overcrowded. The entire premises, including school and land, will cost about 9,500*l*.

A CONSIDERABLE portion of some new buildings being erected in Westgate, Bradford, opposite, Worsley's furnishing establishment, collapsed on Thursday, the 16th inst. The Castle Hotel is being reconstructed and so far as the principal part of the hotel is concerned had been practically completed. On the Gratton Road side, however, there were being erected a billiard-room, three shops and a number of bedrooms, which had been carried to the ceiling, and it was this portion which, just about two o'clock, collapsed into the cellars, without in any way injuring the adjoining premises. It is generally believed that the foundation, which is said to have been "made ground," gave way.

ARRANGEMENTS have been made for the transfer of the whole of the cliff front from Boscombe to Bournemouth Pier from Sir George Meyrick to a syndicate, with a view to the construction of an undercliff drive and promenade. The cliffs and foreshore are at present held by the Corporation, but their tenancy is terminable at a month's notice. The greater part of the undercliff will, it is conjectured, be utilised for building purposes.

A WELL-ATTENDED meeting for the consideration of the scheme for the proposed enlargement of St. George's Church, Redditch, was held in St. George's Schools on the 17th inst., Colonel V. Milward, M.P., presiding. The chairman spoke warmly in favour of the scheme. It was proposed to add a new aisle, which would be somewhat wider than the existing aisles, the seats being made to hold five persons instead of three. The Rev. Canon Newton expressed his approval of the scheme, which was estimated to cost 500*l*., and proposed a resolution that it be adopted. This was carried unanimously.

THE foundation-stone of St. Kenneth parish church, Govan, has been laid. The new church is situated near the junction of Hutton Drive and Catherine Drive, and overlooks the Elder Public Park. It will be constructed chiefly of brick and white freestone, and the architectural design is after the Early Norman type. The entire cost of the building will be over 4,000*l*. Mr. P. Macgregor Chalmers is the architect.

At the Town Hall, Barnsley, an inquiry was held on Friday last into an application of the Barnsley Town Council to borrow 6,416*l*. for the purchase of a site and the erection of a smallpox hospital. The Kendray Infectious Diseases Hospital, erected in 1886, had a special block for smallpox cases added to it in 1889, taking up about one-third of the whole accommodation. It is being increasingly appreciated, and a larger proportion of cases are being sent to it; 179 cases were treated in 1895 and 293 in 1896, although the number of notifications was less. At present the smallpox block is being used for convalescent scarlet fever cases. Further accommodation is required, and as the Local Government Board will not sanction any loan to hospitals where smallpox is treated with other diseases, the hospital now proposed becomes absolutely necessary. It will be built for fourteen adults, and such an administrative block as will suffice for any future extension of the hospital. Five acres of land at Lund Lane, Monk Bretton, have been bought from Colonel Wombwell's trustees for 1,000*l*.; the remainder of the money is required for the building.

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TRANSEPT. ELEVATION AND SECTION OF THE END
OF THE SOUTH TRANSEPT.

TRADE NOTES.

THE new fever hospital, Llandudno, is being warmed and ventilated by means of Shorland's patent Manchester grates.

A CERTAIN section of property owners in London can view with equanimity the reports appearing from time to time as to the purity or otherwise of the water supplied to London consumers as they draw their water from the chalk by using private wells on their own premises. It can be readily imagined that brewers avail themselves largely of the opportunity of thus securing a pure and abundant supply, and a number of hotel proprietors also figure in the list, the cost per day for water being far below the amount that would be chargeable by a water company. Amongst others the Langham and the Savoy Hotels find the system a distinct advantage, and the huge new building, the Hotel Grand Central, is to be supplied with water from a well now being sunk by Messrs. Merryweather & Sons, who propose to insert a lining of cast-iron cylinders through the London clay to exclude all impure springs, which would otherwise contaminate the pure supply from the chalk.

LOWE'S Patent Pipe Joint Syndicate have a patent which, properly exploited, should prove of the greatest advantage in sanitary work. It consists of a new elastic joint for earthenware pipes, and undoubtedly possesses many advantages over the old system of cement joints. Among these advantages may be mentioned the following:—The rapidity with which joints can be made; that none of the material can possibly get into the inside of pipes; that the joint is a perfect and reliable water-tight joint as soon as completed; that a number of the pipes can be jointed on the surface of ground before laying into trenches. The absence of sockets enables the pipes to be more evenly laid on concrete bed, also enables them to be packed more closely, and

consequently the liability of breakage in transit is very much reduced; the elasticity of the joint and the very small portion of the material composing joint that is exposed to the action of sewer gases; analyst's report as to the durability of jointing material, and its freedom from being affected in any way by the action of sewage or other gases; the ease with which a severance can be made when desired without damaging the pipes. So far round pipes have been employed by the Syndicate, but it is their intention to use ovoid pipes in future. We certainly think well of the Syndicate's specialty, and shall probably refer to it at greater length when space permits.

VARIETIES.

THE new Keighley Building Trades Exchange was formally opened by the mayor, Mr. R. N. Smith, on the 15th inst.

A STONE statue representing St. John has been placed in a niche near the Percy Shrine in Beverley Minster. It is the gift of Canon Nolloth, the vicar.

THE Ferguson Memorial E.U. Congregational church, Springburn, Glasgow, was opened on Saturday last. The church has sitting accommodation for 350.

A NEW Primitive Methodist chapel was opened at the mining village of Goldthorpe, near Mexborough, on the 16th inst. The building will accommodate 400 worshippers, and cost 400*l*.

THE fresco painting of the Nativity discovered recently underground in the Piazza San Pietro, near the right colonnade, is supposed to be part of the decoration of an ancient demolished church which once stood there.

MR. BAKEWELL, architect, at a meeting of the Leeds corporate property committee, stated that the City Square will be thrown open early in February. The statues, however, are not expected to be in their position for a couple of years.

A PICTURE which has been attributed to Rubens has been discovered at the house of a resident at Sandis, near Havre. The canvas is 4½ feet by 3 feet, and the subject of the work is the "Death of Dido." The French Minister of the Fine Arts has sent a representative to examine the picture, with a view of securing it for the State if it be really a genuine Rubens.

THE large and commodious schoolrooms which have been erected in connection with the Cross Street Baptist chapel,

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Arnold, were formally opened on the 13th inst. The memorial-stone of these buildings was laid on September 9. The work has been carried out at a cost of about 500*l.*, and provides accommodation for 200 children.

UNDER the auspices of the Birkenhead Corporation Prof. Fred. M. Simpson, professor of architecture at the University College, delivered on the 16th inst. a lecture at the town hall on "Old Architecture in Liverpool." He dealt with the general principles of architecture, and as examples of eighteenth-century houses existing in Liverpool he showed views of Duke Street, Great George Square and Kent Square, which he said was one of the best squares in the city. He also illustrated the ironwork of the period, and said houses in those old days looked at each other with dignity and did not jeer across the street, as did so many modern buildings.

A PLEASANT meeting of the members of the Worcester Diocesan Architectural and Archaeological Society was held at the Guildhall on the 13th inst., when the Very Rev. the Dean occupied the chair. There was exhibited during the evening a collection of historical medals, tokens and curiosities of a very interesting character. The Rev. J. K. Floyer (joint hon. secretary) read a paper of considerable interest on "A recumbent effigy in the cloisters of Worcester Cathedral, said to represent Alexander Neckam (died 1217), and some account of his life and works."

ON Saturday afternoon the mayor of Heywood (Mr. Alderman William Healey) opened the new sewage works which have been constructed at Botany Bay for the Corporation at a cost of about 35,000*l.* The precipitation tanks are six in number, each 75 feet long, 30 feet wide and 8 feet deep, and will in the whole contain 675,000 gallons, or about one day's dry weather flow of sewage. The tanks can be worked upon the quiescent or continuous flow system, and it is proposed to adopt the latter. There are also twelve artificial filters, each 60 feet 9 inches long, 16 feet 4½ inches wide and 6 feet deep, and these cover a surface of 1,325 superficial yards. In addition, five acres of land have been laid out in filtration plots.

BRAMPTON CHURCH has been reopened for public service after having undergone during the past six months, under the supervision of Mr. Taylor Scott, architect, of Carlisle, considerable addition and improvement. The external portion of the fabric has been restored and new sanitary arrangements executed. A large number of internal improvements have been made, the most conspicuous being a handsome moulded and

carved oak pulpit of Gothic design with oak stairs and elaborate balustrade at either side, continued to form the rails at the sides of the Communion-table on the raised floor above the church. The Communion-table is also of beautiful moulded and carved oak-work, as is the minister's seat. The choir-seats have been constructed in front of the pulpit, slightly raised above the congregation. The internal decoration has been carried out in light warm tints to harmonise with the surroundings. New floors have been laid and the seats renovated and varnished, new gas-fittings provided and the lighting greatly improved.

ELECTRIC NOTES.

THE Bournemouth Town Council have finally disposed of the proposals to construct electric tramways. An endeavour was made to appoint a committee to obtain information as to the working of tramways in other boroughs, but by a majority of ten votes to six it was considered not desirable for the Council to construct or allow others to construct tramways in Bournemouth.

At a meeting of the lamp committee of the Leeds Corporation, held on the 16th inst., it was reported that the arrangements for lighting Briggate, Boar Lane and North Street by electricity were almost completed, and that, at the very latest, the streets mentioned would be so lighted on Christmas Day.

THE trustees of the British Museum have decided to discontinue the opening of the exhibition galleries on weekday evenings from 8 to 10 P.M. after the close of this year, and, instead, to keep them open until 6 P.M. all the year round. The evening opening commenced in February 1890 on the installation of the electric light, the galleries, however, being opened only in sections, as the electric plant is not powerful enough to light up the whole building. At first the eastern and the western portions of the Museum were opened on alternate week-day evenings, but the number of visitors so rapidly declined that the galleries were afterwards further subdivided into three sections. The numbers, however, have still continued to decline. The experiment of evening opening having thus had a fair and patient trial, will now be abandoned, and a lengthened exhibition by day will be substituted during the months when the Museum has hitherto been closed at 4 P.M. or 5 P.M., according to the season of the year. On and after Monday, January 3 next, the exhibition galleries will be kept open throughout the year from 10 A.M. to 6 P.M., with this

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reservation, however, that during the dark hours, when the electric light has to be employed, only half of the Museum (the eastern and western galleries alternately) can be opened to the public. It is believed that the extension of time will be appreciated by visitors, particularly during the winter months, when hitherto the closing hour has been 4 P.M. The arrangements for opening on Sunday afternoons will not be altered.

ON Tuesday, before the Recorder of Dublin, the interesting action was heard of Charles Thorpe, a commission agent's clerk, against the Dublin Corporation, in which plaintiff sought to recover damages for injuries sustained through the alleged negligence of the defendants in their control of the city electric-lighting system. The plaintiff's evidence showed that on October 30 last, while in Grafton Street, he put his feet on the iron plate at the foot of an electric lamp-post, and immediately received a terrible shock, which threw him on the pavement. He felt as if he had been struck by hundreds of needles, was unable to close his mouth, and was made to dance about. A person who came to his assistance also received a shock. Witness had not yet recovered from the effects of the occurrence. For the Corporation, it was admitted that something was wrong with the electric light on the night in question, and evidence was given that no injuries were received by the plaintiff, though he might have received a shock. Professor Barrett, examined for the defendants, stated that he had studied this case and the system of electricity laid down, and in his opinion it was incredible and inconceivable that any injury could be caused by the conditions that existed at the time of the alleged occurrence, assuming that the Board of Trade regulations were at the time carried out. It was incredible that one man catching another who stood on this plate could have been affected by an electric shock. Darling, one of the plaintiff's witnesses, was recalled, and said he felt the shock on the footpath, and that he lost his senses and was thrown into the street. Another man who touched the plaintiff, thinking he had an epileptic fit, received a severe shock himself. The Recorder, in giving his decision, said that this was, dramatically, one of the most remarkable incidents that had occurred in the city. He was told that what had been deposed to was impossible to have occurred. He did not care a fig for what scientists might say in view of proved and certain facts. He did not, however, believe that the plaintiff was much injured, and would therefore make a decree for only 20/.

THE Secretary of State for Foreign Affairs has received a despatch from Her Majesty's Chargé d'Affaires at Madrid,

transmitting copy of a Royal Order inviting tenders for the construction and working of a telephone system in Tarragona. Sealed tenders will be received at the office of the Civil Governor of the Province of Tarragona for forty days, counting from the 11th inst. Further particulars of the conditions of the tenders may be inspected at the Commercial Department of the Foreign Office any day between the hours of 11 and 6.

ARTISTIC INTERIORS.

MESSRS. GRAHAM & BANKS, the well-known and very artistic firm of furnishers and decorators, of 455 Oxford Street, and to whose beautiful productions we have had on more than one previous occasion to refer, have just prepared a new edition of a charming book, "The House Comfortable and The House Beautiful," which, while ostensibly a trade catalogue, is really a work of art which it is a pleasure to examine, so charming and so numerous are the illustrations, which consist of views of complete interiors, fitted and furnished by Messrs. Graham & Banks, and a vast number of sketches of "fittings" and furniture in detail. These offer a wide range, comprising as they do all styles, while it may well be said that no article depicted leaves anything to desire on the score of taste, which is in all cases perfect, and the price of each is marked. Among so many designs of such uniform excellence it is almost impossible to particularise any one, but Messrs. Graham & Banks's Multiform Bedstead naturally attracts attention to itself by the ingenious economy of space by which, while looking like a French wardrobe when closed, space is found for a bedstead with spring mattress and bedding, washstand, toilet fittings, secrétaire, and stationery cabinet. Messrs. Graham & Banks inform us that they will be happy to send post free a copy of this beautiful and interesting book to any of our readers who write to apply for one.

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THE new music hall in the Edgware Road, which has arisen on the site of the old and successful Metropolitan, is a handsome structure erected from the designs of Mr. Frank Matcham. It is of fireproof construction throughout, and is amply supplied with entrances and exits, of which there are no fewer than nine. Ample fire extinguishing appliances are provided, and there is a curtain of iron and asbestos which completely isolates the stage from the auditorium.

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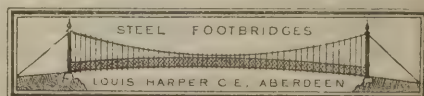


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The stage has been enlarged, the latest and best appliances provided, and a new range of dressing-rooms has been added.

Mansfield stone of a light terra-cotta colour has been chiefly employed in the front elevation. Large spherical and dome-shaped windows, in which stained-glass is effectively used, help to break any unwelcome uniformity of line. Wrought-iron and glass awnings shelter the entrances at both ends of the building.

The principal entrance leads through a marble vestibule, paved with ceramic mosaic, with a lofty dome-shaped Moresque ceiling rich in colour and gilding, to the fauteuils and stalls; here, too, are four private boxes. These are on the level of the stage, whilst, approached by a few steps at their rear, two other handsome boxes flank the proscenium opening, somewhat below the balcony level. Of the two saloons for the convenience and refreshment of the ground-floor occupants, one is charmingly decorated (walls, ceiling and counter) in Burmantofts faience; the other is finished in walnut panelling, with alternate mirrors and tapestry of an original decorative character, the ceiling being treated in Louis XVI. style. The balcony is roomy and cosily upholstered, and every seat commands an unlimited view of the stage, as indeed, it may be mentioned *en passant*, does every seat in the house. This tier is provided with a bar saloon, which is handsomely decorated and appointed. The gallery, which holds from 800 to 900 persons, is light and capably ventilated. The style adopted in the internal decoration is Flemish Renaissance, the painting being almost entirely in various shades of ivory liberally embellished with gold. The whole of the upholstery, including the tableau curtain, is in two shades of dark crimson. This colour scheme gives a welcome sense of delicacy as well as richness, partaking in decorative effect more of the graceful method of the best continental opera houses than that of an English variety theatre.

The decorations are the work of Mr. James M. Boekbinder, who has achieved two notable triumphs in the painting on the asbestos fireproof curtain, which will be used as an occasional act drop, of a picturesque view of the Marble Arch, and especially in his treatment of the coved ceiling, in the four sides of which he has placed pictures of considerable size and beauty, which contain between fifty and sixty life-size figures—graceful and natural in every pose, and illustrative of "Old English Merry Making," "An Indian Festival," "French Carnival," and "Spanish Revelry." Crowning the pictured coves is the magnificent ceiling, a *chef d'œuvre* of plastic art.

The electric light has been installed throughout. The

sanitary fittings are by B. Finch & Co., Limited, the constructional ironwork by R. Moreland & Son, Limited, and the mosaic floors by Craven, Dunnill & Co., Limited.

WISE BENEFICENCE.

MONDAY last was a private view day of the latest completed addition to the series of Rowton houses which are springing up in various quarters, and which are unquestionably destined to effect a marvellous amelioration in the condition of the class of persons they are intended to benefit.

Originating in pure philanthropy on the part of Lord Rowton, the idea has germinated and sprouted and grown to the dimensions of a great public boon, while by dint of remarkably able management it is at the same time a financial success, yielding no less than 5 per cent. to its shareholders (for it has developed into a public company), after a fair amount has been set aside for wear and tear, deterioration, &c.

This is the third house which has been erected under Lord Rowton's auspices. Another is in course of erection at Hammer-smith, and there is plenty of scope for the company to still further largely extend, but for the difficulty they experience in obtaining suitable sites, which must, perforce, be large, and it is equally essential that they should be in crowded or at least in populous neighbourhoods.

The building in question has been erected upon a site with-in a few yards of Newington Butts and overlooks along its entire frontage a public recreation ground, which was formerly the churchyard of St. Mary, Newington, to which it has a frontage of 214 feet; it is 138 feet from front to back, with a superficial area of 27,850 feet.

The elevations are in pressed Leicester facing bricks, relieved with mingled gaults and dressings of pinky-buff terra-cotta from Mr. J. C. Edwards, Ruabon. The whole of the interior walling, excepting where glazed bricks are used, is built with gault bricks. All brickwork throughout the building has been built in Portland cement mortar.

The roofs to front elevations are covered with green slates, nailed direct upon coke-breeze concrete slabs, carried upon steel construction; all other roofs are flat, concrete and steel construction, covered with asphalt.

The floors are fireproof throughout, formed of concrete and steel, and the staircases and landings are in Portland cement concrete.

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the floor-boards are nailed directly upon the concrete to cubicle floors, and solid block floors are bedded directly thereon to all other rooms.

Especial care has been exercised in the planning and execution of all the sanitary work, both in the portion underground and the plumber's work.

Access is immediately obtainable to any portion of the underground work by the placing of inspection manholes at every change in direction of pipes. The entrance and corridor opening out from same to the various rooms and the two staircases are built in glazed brickwork from floor to ceiling, the dado formed in cream and chocolate-glazed bricks, and above ivory-glazed bricks, including the moulded cornice. The main entrance and screen-doors are in polished teak. Floor is cement and granite chippings. Oak seats are provided in positions out of the line of traffic in corridors. Water is laid on for drinking purposes in corridor next reading-room.

The floor space provided in the dining-rooms is 5,300 feet; seating is provided at tables for 440 men, and in addition a number of extra seats and wooden easy chairs are provided. The walls are built with a high dado of cream and chocolate tinted glazed brickwork, with plastering above tinted to a shade of terra-cotta. Pictures are hung in frames around rooms. The tables and seats are in teak on cast-iron standards. Four large cooking ranges, with ovens, hot plates and grills are provided out of the line of traffic in each part of rooms; large boilers at the back of two of these provide a supply of boiling water for lodgers for cooking, tea, &c.

The lodgers' scullery is placed between the two large dining-rooms, with access from both, and is a provision to enable lodgers who wish to prepare their own food for cooking to do so out of the dining-rooms. It is built in ivory glazed brickwork from floor to ceiling, and fitted up with twelve white enamelled fireclay sinks, with hot and cold water supply to each and teak draining boards. Large sanitary pails are provided for potato peelings, &c., and two for tea leaves.

The smoking-room adjoins the dining-room, and is approached from same and main entrance corridor. The floor-space is 1,600 feet. The tables and seats are teak, as in dining-room, and, as fitted, seat 112 lodgers; in addition, a number of seats and wooden easy chairs are provided around the two fireplaces. Glazed faience mantels and overmantels are provided and fitted with large open fires. Walls, glazed dado as in dining-room, plastered above and furnished with pictures. Floor, solid oak block.

The reading-room is at rear of building, and is an L-shaped room having an area of 2,550 feet. The walls have glazed brick dado with plastering to tint, as in dining-room. The seats and tables, in teak, provide for 169 men, in addition to a number of wooden easy chairs around the three glazed faience fireplaces, and in other parts of the room. Two bookcases, in polished teak, fitted up with books and cupboards for papers, &c., are provided. Books are lent to lodgers on application to superintendent. Pictures furnish walls as in other rooms on this floor.

Between the dining and smoking-rooms a lobby is formed giving access to this room. The walls are ivory glazed brickwork from floor to ceiling, and are fitted up with stout wood shelving. Crockery, cooking utensils, teapots, &c., are placed here for the free use of lodgers who wish to prepare their own food, and are collected by the company's officials from dining-rooms after use, and returned by lift formed in this room to basement scullery.

The shop is planned with windows at each end, opening into and giving a view of dining and smoking-rooms. It is lined with glazed tiles from floor to ceiling, fitted up with cupboards, drawers, shelving, sink, gas stove, hot plates and boiling-water apparatus, and stocked with goods to meet the varied requirements of lodgers. Lift to kitchen service-room. Tobacco license is held.

The bedrooms or cubicles are approached by two fireproof staircases, built in ivory glazed brickwork, situated at the extreme boundaries of the site and end of cubicle corridors, and are carried up to the roof. The disposition of the staircases renders it an impossibility for the lodgers to be trapped by fire in the event of an outbreak, as the cubicle corridors run from staircase to staircase, thereby leaving open a way for retreat in the event of access to one staircase being blocked. In addition, each floor is divided by divisional walls into ten sections, which would check if not stop the progress of a fire horizontally. The sectioning of floors also enables isolation and efficient fumigation in the event of a case of contagious disease.

There are six floors of cubicles, with a total sleeping accommodation for 804 men; each bed is in a separate cubicle, and every cubicle in the building has a window under the control of the occupant.

The portion of the cubicle partition next corridor is 6 feet 6 inches high, while the divisions dividing the cubicles are 7 feet 6 inches, leaving a space up to ceiling level free of partitions for ventilation.

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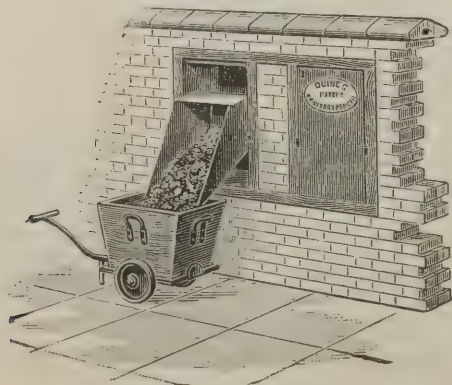
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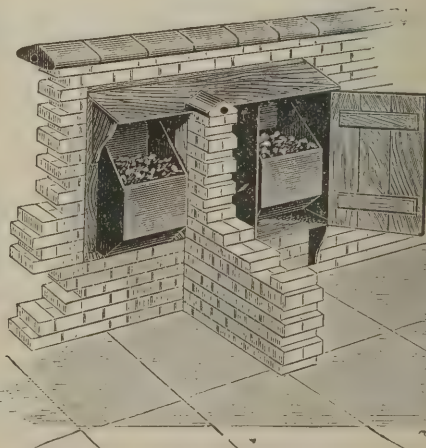
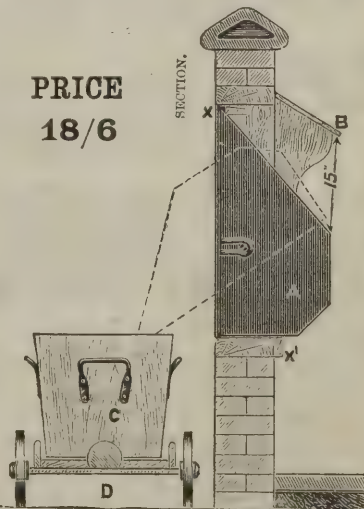
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The bedsteads are iron, fitted with wire woven mattresses, horsehair mattress and bolster, blankets, sheets and quilts, and each cubicle is provided with a chair, shelf, clothes' hooks and utensil.

The sanitary accommodation and appliances are of the latest and most complete description; hot, cold and filtered water is lavishly provided.

The lavatory and feet washing-room is 36 feet wide by 71 feet long, and has a French grey and ivory dado, with ivory walls and moulded cornices above same, all in glazed brickwork. There are eighty lavatory basins, white enamelled fireclay, fitted up with polished slate top, brass taps for hot and cold water supply to each basin, towel and hat rails. The waste pipes from each lavatory are discharged over an open white enamelled earthenware channel in floor, and the flooring is laid with falls to this channel throughout for cleansing and speedy drying.

The hot-water pipes are exposed, that the radiated heat may be utilised for warming lavatory.

A section 7 feet wide by 36 feet long has been divided off by an obscured glazed screen, 6 feet 6 inches high, to form a separate room for feet washing, fitted with twelve deep feet-washing troughs, with teak boards between each, and hot and cold water supply carried to each trough.

The bath-rooms are placed on each side of a corridor extending from lavatory to lodgers' washhouses at foot of front main staircase. They are each fitted up with ivory glazed fireclay baths, with teak bath tops and brass taps for hot and cold water supply. The walls and front of bath are in ivory glazed brickwork.

Two extra rooms are provided for use, either as bath or dressing-rooms, to enable lodgers to change their garments during the hours that access is not permitted to cubicles.

A large brilliantly lighted room is provided under reading-room as a barber's shop, and fitted up with hot and cold water and usual fittings.

Two rooms are provided and fitted up in basement corridor at base of two main staircases as workshops for shoemaker and tailor, and adjoining same are two bedrooms for use of male staff.

The lodgers' washhouse is separated from the foregoing corridor by a glazed screen, and is for the use of lodgers who may wish to wash their own garments. It is fitted with washing troughs in ivory glazed fireclay, draining boards in teak, hot and cold water supply to each, and a large heating

stove surrounded by a galvanised iron framework for the speedy drying of garments.

In short, nothing seems to have been forgotten or omitted which could tend to the health and comfort, even luxury, of the lodgers, who can at their option purchase at the merest fraction over first cost their food already prepared, or bring it in and cook it with the appliances provided free of charge, and the price for all this accommodation is only 6d. per night.

We should add that the whole of the work was executed by the company's own men, under the superintendence of the company's architect, Mr. Harry B. Measures, and Mr. G. J. Earle is the surveyor.

WATER SUPPLY AND EPIDEMICS.

THE Local Government Board have issued a circular letter to the clerks of town, urban district, and rural district councils, on "Water Supplies in Districts not Within Limits of Supply of Water Companies." It is dated December 17, and is as follows:—

Sir,—I am directed by the Local Government Board to call the attention of the council to the subject of the water supply of their district.

The importance of a wholesome supply of water need not be emphasised in view of the serious epidemics of enteric fever which have of recent years been brought about by specific contamination of water supplies in different parts of the country. It is true that this disease, which formerly prevailed somewhat generally in endemic form, has during the last twenty-five years been largely reduced as a cause of death; but, on the other hand, there is now a recurring tendency to sudden localised epidemics, in which the typhoid infection is distributed to large populations by means of the contamination of water delivered from public works of water supply.

The council are the body responsible under the Public Health Acts for securing to the inhabitants of their district a proper and sufficient supply of water, and the Board desire to impress upon them the importance of taking the matter into their serious consideration with the object of guarding their district against dangers, the gravity of which has been sufficiently shown by recent examples.

Where the council have themselves constructed or purchased any waterworks it is their duty, in pursuance of section 55 of the Public Health Act, 1875, to provide a supply of "pure and wholesome" water, and in order to fulfil this obligation it

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behoves them to exercise every precaution to secure that the water which they deliver to the consumers shall be protected from risk of contamination, whether in connection with the sources from which it is derived or during the course of its storage or distribution, and that where means of filtration are necessary these should be adequate and maintained in a thoroughly efficient condition.

Not only are the council thus under a responsibility for the wholesomeness of the water which they themselves supply, but they should by careful inquiry make themselves acquainted with the sources, nature and quality of the various supplies in all parts of their district, and in every case in which the result of their inquiries is unsatisfactory, should take all such steps as may be within their powers with the view of supplementing or improving the supplies.

The Board would observe generally that accurate information should be procured, if not already available, in such matters as the following:—

1. *Where Water is derived from Gathering Grounds or from Springs.*

Whether drainage from human habitations, farmyards and the like finds its way, directly or indirectly, into the reservoir or to any part of the water service; and whether risk of access to the water of human excreta and similar refuse is likely to arise.

2. *Where Water is derived from Deep Wells.*

Whether surface or other water, liable to be contaminated by drains, sewers, cesspools and the like, reaches, or is liable to reach, the wells. The existence and direction of fissures in the strata deserve especial consideration in this respect.

3. *Where Water is derived from Shallow Wells.*

Whether the wells are so circumstanced that they run risk of contamination by reason of drains, privies, cesspools, or middens, or by the deposit of manure—whether derived from human excreta or not—in or on the ground in the neighbourhood of the wells.

The Board trust that the council will not fail to give their most careful attention to this subject, and that, where it may appear that further works which may be within the powers of the council for the improvement or protection of existing supplies are needed, the council will forthwith, with the assistance of such skilled advice as the circumstances of the case may require, execute the necessary works.

The Board request that a copy of this communication may be furnished to the medical officer of health.—I am, Sir, your obedient servant,
HUGH OWEN, Secretary.

THE METROPOLITAN ASYLUMS OFFICES.

A MEETING of the Metropolitan Asylums Board was held on Saturday last, when the works committee presented a report and plans of the chief office buildings to be erected on the Embankment site, together with the architect's descriptions. The committee stated that the architect's rough estimate of the cost of the buildings, including foundations and detached ventilating tower for the railway tunnel, was 49,543*l.*, and they recommended that the plans prepared by Mr. Edwin T. Hall, architect, be approved and adopted, and forwarded to the Local Government Board for their formal sanction under seal. In their report on the 4th inst. the committee called attention to the necessity of the excavations and concrete raft foundations of the new office buildings being proceeded with as soon as possession of the site was obtained, and they were authorised by the Board to advertise for tenders for the execution of the work. They had now received from the architect a specification for the execution of this work, the cost of which he estimated at 3,400*l.* Before, however, any expenditure could be incurred in respect of any portion of the proposed buildings, it would be necessary for the Local Government Board to issue an order authorising such expenditure, and they now recommended that application be made to the Local Government Board to issue a provisional order authorising the expenditure of (say) 40,000*l.* in respect of the buildings, and empowering the managers to raise the amount on loan. The recommendations were agreed to.

CRYSTAL PALACE SCHOOL OF ENGINEERING.

At the Crystal Palace on Friday Mr. John Aird, M.P., presented the certificates awarded by the examiners to the successful students connected with the Crystal Palace Company's School of Practical Engineering. There was a large attendance of students and their friends in the lecture theatre of the school. After the report of the examiners had been read the chairman congratulated the management of the school on the continued success which attended their efforts. Referring to the difficulty which parents encountered in finding employment for their sons

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AGENTS APPOINTED IN ALL LARGE TOWNS.

after they left a school like this, he said that the solution lay to some extent in the advice lately given by Sir John Wolfe Barry, that students should learn some trade. Rather than lead an idle life and be a burden on their parents, students should go to a leading contractor and offer to work for daily bread, say, in the position of timekeeper. They must put their dignity in their pockets; they must be early risers and be constant in their attendance to their duties. Such a position as this would not only relieve their parents, but it would bring the students into contact with the workmen and give them opportunities to acquire knowledge which would be invaluable in their future career. He had himself followed the course he now advocated, for he served four years as a timekeeper in his father's works, one period of his service being during the construction of the Crystal Palace itself. The awards were as follows:—First year's course, drawing office—E. L. de Lautour. Pattern shop—C. E. Bristowe. Fitting shop—F. K. Peach and W. Simms (equal). Second year's course.—Civil engineering, first term—H. A. C. Yarborough; second term—O. A. G. St. John-Kneller; third term—F. G. A. Pinckney and J. W. Simpson (equal). Electrical section, first term—W. J. Wood; second term—S. C. Batstone and S. F. Mott (equal). Colonial section, first grade—J. A. L. Caesar, H. L. Edridge and A. F. Mortimer. Certificate of honour—F. G. A. Pinckney. Mr. J. W. Simpson was presented with a medal of the School of Art, Science and Literature, as he had obtained eight certificates, none of which were below third in order of merit. Votes of thanks to the officials and to the chairman closed the proceedings, the last-named suggesting that the time had now arrived for taking steps to inaugurate another great industrial exhibition to be held in London.

THE NEW BROADWAY THEATRE AT DEPTFORD.

THE new Broadway Theatre which Miss Cissy Graham has built at Deptford and opens on Boxing night is a conspicuous addition to the list of London suburban theatres. It will be interesting, however, to the general public no less than to the theatrical profession, from the fact that both constructionally and decoratively it reveals certain distinct and entirely new departures. The architect has been Mr. W. G. R. Sprague. The decorative scheme has been entrusted to S. J. Waring & Sons, and the feature of their beautifully artistic work has been the adoption of the vertical lines of the building as the basis of their work instead of the horizontal lines hitherto in vogue. The new building occupies a commanding corner position in the historic Broadway. Its frontage, worked in Portland stone in the free Italian style of architecture, with circular towers running up the front and surmounted with cupola roofs, presents a handsome appearance. The chief entrance is in a circular bay leading directly into the main reception hall. This interior is decorated in Cinque-Cento style. The prevailing colour are warm rich red-browns and gold, ceiling and walls being so treated. The corridors are similar, except that here a liberal use is made of a full ibis red. The foyer on the dress circle tier is similar in character to the reception hall, but the details are more delicate. In the auditorium, which is capable of accommodating some 2,500 persons, Messrs. Warings have done themselves the fullest justice.

CHURCH BUILDING SOCIETY.

THE Incorporated Society for Promoting the Enlargement, Building and Repairing of Churches and Chapels held its usual monthly meeting on Thursday last at the Society's House, Dean's Yard, Westminster, the Rev. Canon C. F. Norman in the chair. There were also present the Revs. Canon J. Erskine Clarke, Canon Utterton, H. E. Trotter and C. Wyatt-Smith, Messrs. James Hilton, E. Lee-Warner and J. E. Ollivant, and the Rev. R. Milburn Blakiston, secretary. Grants of money were made in aid of the following objects, viz.:—Building new churches at Basset, St. Michael and All Angels, in the parish of North Stoneham, near Southampton, 40%; Battersea, St. Bartholomew, Surrey, 300%; and Willesden, St. Matthew, Middlesex, 250%; and towards enlarging or otherwise improving the accommodation in the churches at Aberystwyth, Holy Trinity, 100%; Gorse Hill, St. Barnabas, near New Swindon, Wilts, 50%; North Searle, All Saints, near Besthorpe, Lincolnshire, 25%; and Hale Magna, St. John the Baptist, near Heckington, Lincolnshire, 50%, in lieu of a former grant of 35%. Grants were also made from the mission building fund towards building mission churches at Carlisle, St. Stephen, 20%; Coventry, St. Saviour, 25%; and Woolwich, St. John, 55% in lieu of a former grant of 40%. The following grants were also paid for works completed:—Enfield, St. Mark, Middlesex, 80%; East Tuddenham, All Saints, near Norwich, 5%; Willesden, St. Andrew, Middlesex, 135%; Kirtton in Holland, St. Peter and St. Paul, near Boston, Lincolnshire, 20%; Orford, St. Bartholomew, near

Wickham Market, Suffolk, 60%, balance of a grant of 100%; Hamnish, in the parish of Kimbolton, near Leominster, 10%; Ivyhouse, in the parish of Broadwood-Widger, Devon, 10%; Dwygyfylchi, St. David's, in the parish of Penmaenmawr, 50%; and Leytonstone, St. Margaret, Essex, 20%. In addition to this the sum of 611% was paid towards the repairs of eleven churches. The Society likewise accepted the trust of a sum of money as a repair fund for the church of St. Mary the Virgin, Burham, near Rochester. The grants voted at this meeting have completely exhausted the mission buildings fund. The committee feel that one of the great needs of the Church at the present time is the providing mission buildings in densely-populated districts and in widespread rural parishes, and they appeal earnestly to Church people to come forward with liberal contributions both to the general fund and the Mission Buildings Fund to enable them to give substantial grants to the many pressing cases that are being constantly brought before them, and to continue the valuable work which this Society has so successfully carried on during the past eighty years. The following resolution was passed unanimously. Resolved, "That the committee of the Incorporated Church Building Society desire to place on record their sense of sincere regret at the death of Mr. J. L. Pearson, R.A., who for thirty-nine years was a member of the committee of Honorary Consulting Architects. Until the last few years, when his advanced age prevented it, he was a regular attendant at the meetings of that committee, and bestowed great care and attention on the examinations of drawings submitted to the Society. The committee desire to express their sympathy with Mr. Frank L. Pearson in the loss he has sustained, and to assure him of the regard which they had for his father and of the high value they placed on his work for the Society."

THE CITY FIRE.

AT the inquiry into the origin of the fire in Cripplegate on the 19th ult. evidence was given, says the *City Press*, by Mr. Charles Jackson, secretary of the London office of the Royal Insurance Company. In answer to Mr. Crawford he said he had thirty-five years' experience in connection with insurance business, and was well acquainted with the district in which the fire occurred. There had been a strong objection on the part of insurance offices to insure premises in the district in question for some years past. The offices generally had not been taking what were regarded as full limits on any of the buildings in this locality. This referred to the offices in a collective sense. It was due to the character and construction of the buildings, the congestion of the traffic, the narrow thoroughfares and the large expanse of glass. The class of goods stored in the premises would naturally have considerable effect upon the minds of insurance directors.

Mr. Crawford: Is it the view of the insurance companies that the safety of the property and the public demanded a different construction of building?

Witness: A different type of building. Continuing, he said he was acquainted with well-holes and the lighting area of such buildings, and he regarded well-holes as a source of danger, as they were calculated to cause a fire to spread from one building to another. He had known several fires which had been caused by gas explosions. He had heard the greater part of the evidence given at that inquest, including that given by Professor Redwood, and he agreed with that gentleman's view that the fire could not have been caused by a gas explosion. He thought that the stack of goods which had been referred to must have been in contact with a light of some kind, but he could not account for any light coming in contact with it. He thought that if well-holes were fitted with iron shutters it might prevent a spread of fire, at least it would give buildings a better chance.

By the Jury: The insurance companies would more favourably consider the issue of a policy if that was done. The companies were always prepared to recognise anything of that sort. He was not aware that any portion of the ruins had been subjected to a chemical process.

A Juror: What is the average premium?

Witness: The average would be from a guinea up to 25s. per cent.

A Juror: Prior to the fire 25s. was the maximum?

Witness: We are getting more now.

A Juror: Is there anything left to insure?

Witness: I was speaking of the outer fringe of the fire.

Witness, in the course of further examination, said there were certain spots which were considered very dangerous, and insurance experts had always anticipated that, in the event of a serious outbreak of fire occurring in any one of these buildings, a large number might be involved. In block 212 there were twenty-two buildings, the upper floors looking into one common well-hole. As far as they could the insurance companies penalised matchboarding.

A Juror: Can you tell me the premium on fire-resisting buildings?

Witness: Where were they? A building would be rated on its merits.

A Juror: Would you be ready to recognise those merits?

Witness: Undoubtedly, we do so. Witness, proceeding, said it would be possible in an insurance for a floor to have a self-contained risk, but it would largely increase the initial cost of the building. The buildings which had been described by Mr. Penfold left certain of the ironwork exposed, and the present fire in that respect was an object-lesson. He would suggest that a large building should have its own distinct well-hole. So long as a number of windows looked upon a common well-hole, so long they might expect serious fires. Another fruitful source of mischief in the spread of a fire was the internal lifts. Those lifts, as a rule, were simply enclosed with a thin boarding, but the insurance companies would like to see iron doors and the lifts carried through to the roofs in the form of a parapet. At present each floor of a building caught fire simultaneously, and the lift acted like a chimney shaft.

A Juror: Is that the mode of construction at Winchester House?

Witness said he thought the only lifts were passenger lifts, and one or two others which were used by Spiers & Pond, Limited. They would be enclosed with woodwork, which was not the kind of thing he liked. The only two cases of fire he could trace at Winchester House were one which occurred in December, 1890, when a quantity of rubbish was destroyed, and another, on June 24 last, when some rubbish was burnt in a store-room in the front basement. In fires like the present the buildings burnt downwards from roof to roof, and he suggested that in future the roofs of warehouses should be flat in such congested areas, and that the party walls should rise and form a parapet not less than 3 feet high. That would not only improve the building, but afford shelter to the members of the Fire Brigade. Another feature which the insurance companies would like to see abolished was the use of thin matchboarding in the ceilings. Another thing was that all the windows in the street frontages of these buildings were unshuttered. With regard to buildings in equally small streets in other portions of the City, it should be remembered that there was not generally the multiplicity of tenure as in the locality in question.

Mr. Crawford: I don't want to cause any unnecessary alarm by saying that because streets in the City are narrow they are dangerous. It is, I suppose, in the character of the buildings and their contents that the risk lies?

Witness: Yes, that is so, undoubtedly.

Mr. Crawford: Have you ever come across a single fire where you have found it assume such fierce proportions, and in such a short space of time as in this case?

Witness: No; not in so short a time.

Witness went on to say that there had been fires which spread very rapidly in a similar class of building. There was the fire which broke out in Great Eastern Street in 1888. That was a modern thoroughfare. There was also a fire which assumed the character of a conflagration in 1885 in Charterhouse Buildings. There was also the St. Mary Axe fire in 1890, and, in 1896, the fire in Colonial Avenue in the Minories, and the large fire in Tabernacle Road. The buildings in the above-mentioned cases were similar to those under discussion. The fault was no doubt in their construction. Witness suggested that Mr. Penfold should make an appointment with the insurance surveyor to discuss the question of the construction of buildings. The rapidity with which the present fire spread was marvellous. He had never known anything like it before. The insurance companies had nothing to do with the management of the brigade. They paid 35% for every million pounds insured.

A Juror: Do you attach any importance to the keeping of fire appliances beyond hydrants on premises like these?

Witness: Amateur appliances like hand grenades, &c., would be useful if they could be applied a few moments after the outbreak, but not afterwards.

LAND-SLIDES ON RAILWAYS.

AT the ordinary meeting of the Institution of Civil Engineers on the 14th inst. a paper on "The Great Land-Slides on the Canadian Pacific Railway in British Columbia" was read by Mr. Robert B. Stanton.

Since the opening of the Canadian Pacific Railway in 1885 great trouble and expense has been caused by large land-slides on a section of the line which followed generally the contour of the east and south-east bank of the Thompson River, at an elevation of about 65 feet above low-water level, about 197 miles east from Vancouver. Within a distance of 6 miles there had occurred seven great slides, six of which crossed the railway line, and several smaller slips; and at a point 20 miles further down the river, opposite Spence's Bridge, another large slide had taken place. The largest slides occurred where the

river traversed a gorge, above which the surface of the land rose in benches and terraces extending to a general altitude of about 1,000 feet above the river. These terraces were under cultivation, for which artificial irrigation had to be resorted to, the water being carried on to the land from the mountain streams and lakes by ditches. The two greatest slides had occurred before the railway had been built, and were situated one north and the other south of two hard sandstone points in the narrowest part of the gorge, penetrated respectively by the Black Canon Tunnel and an open cut. The south slide had an extreme length of 1,880 feet along the railway, and an extreme width back from the river of 1,575 feet. It was of somewhat irregular form, with a semicircular outline at the back, and covered an area of 66 acres. On the land above the slide irrigation had continued since the railway had been working, and had kept up a continual movement towards the river. This movement was more marked for 500 feet or 600 feet in the centre of the slide, where the water seemed now to be concentrated. At times the road-bed had sunk 4 feet and had moved out twice that distance in a night, so that constant rebuilding of the line had been necessary for the last ten years. The movement was continuous, though it was greatest in the months of July, August and September. An extra force of section men, watchmen, construction trains, &c., was continually necessary on this section. At the south slide alone over 10,000% had been spent on such work; and the section of 5 miles or 6 miles of slides had cost the Canadian Pacific Railway Company directly and indirectly 100,000% in maintaining a safe road-bed. The north slide had a maximum width of nearly $\frac{1}{2}$ mile, and a length back from the river approaching $\frac{3}{4}$ mile, with the same semicircular back line, and was of irregular form, and 155 acres in extent. Irrigation had been carried on above it for some years, and some time before the final catastrophe occurred a reservoir 2 miles distant in the hills had broken through its dam, and most of the water thus liberated spread over the upper benches of this land, already well soaked. The whole tract sank vertically in one movement to a depth at the back edge of over 400 feet. The lower portion, about 2,000 feet wide, was forced entirely across the river, a distance of 800 feet or 1,000 feet, and filled the whole inner gorge of the valley, forming a dam 160 feet high, with a lake 12 miles in length above it. The height of the first bench next the river, in both cases, was originally about 80 feet above low-water level. The land then rose in successive levels to a height, on the south slide, of 400 feet to the bench at the top, or back edge, where the cave-down broke off from the solid ground, and in the case of the north slide it extended to the third higher bench to a height of 500 feet above the river. It was estimated that at the back edge of the south slide the break fell almost vertically for a distance of over 300 feet. The ground consisted of light sandy loam to depths of between 1 foot and 8 feet, then 3 feet to 10 feet of clean coarse river sand, next loose and nearly clean stratified gravel and boulders, and below this partially cemented gravel with larger boulders. The material holding the gravel and stones together was a porous sandy clay silt through which water passed freely, but which in a dry state would stand in vertical walls to a considerable height. It extended to a greater depth in the higher terraces, in places, perhaps, to 500 feet. The silt lay in masses between 200 feet and 1,000 feet in thickness, and was generally fine and of uniform texture, and usually well bedded in horizontal layers of from $\frac{1}{4}$ inch to 3 inches or 4 inches thick. In its natural state it was hard and dry, like a soft sandstone, and when held between the fingers and struck with a light hammer rang like stone. A large piece of this silt, however, placed in a basin of water after a few minutes dissolved and mingled with the water, forming a semi-fluid mass. The same soft mixture had been observed oozing out at many points along the foot of the slide, forced out by pressure from above. By the continued application of large quantities of irrigation water upon the cultivated fields above and upon the upper portions of the slides almost the entire surplus not taken up by the plants or evaporation sank down freely through the loose soil, sand and gravel, and through the boulder clay, reaching the underlying silt. After some years this water saturated the argillaceous silt and converted it into the form of river mud. Long before the whole mass reached a state of perfect saturation the silt would lose its power of sustaining weight; and finally, when so large a body of the silt had become saturated to the extent that it could not sustain even its own weight except in its confined position, and the limit of resistance, possibly in the form of an arch, of the boulder clay having been reached, the great mass of earth and boulders above—in the case of the south slide estimated to weigh about 32,000,000 tons, and of the north slide approaching 100,000,000 tons—dropped almost vertically, while the immense tracts of broken and mixed material seeking an outlet forced their lower sides out on the line of least resistance and found their way into the river.

In further discussing the causes of the slides the author showed that neither natural precipitation upon the land nor natural surface drainage from the watershed above it, nor even

natural drainage by subterranean streams, could have been sufficient to produce such results. Neither could they be attributed to the effect of surface streams running by the land; and the only remaining explanation was that the artificial irrigation had acted in the manner described. There was no way, therefore, of preventing the continual disastrous effects upon the railway except by cutting off the irrigation water. This had been and could be made effectual, the water so easily absorbed as easily drained out, and the mass after a time again became firm and solid.

ASPHALTE PAVING.

A COMMITTEE of the American Society of Municipal Improvements was lately requested to prepare instructions relating to "What constitutes an asphalt pavement in good repair, particularly with reference to the condition the pavement should be in at the expiration of the guarantee?"

The following reply was given:—

Your committee have earnestly taken up this question, and have endeavoured to formulate definite and satisfactory specifications governing the point under consideration.

The principal features to be considered in examining an asphalt pavement to be placed in condition for acceptance are, first, the thickness compared with that of the original; second, the extent of disintegration; third, depressions or elevations; and, fourth, the length, breadth, direction and character of the ruptures.

Heavy traffic and constant sweeping or scraping are the main causes which reduce the wearing surface in thickness. Extended observations and inquiries show that the decrease in thickness of asphalt pavement after five years of use is so small as to be of little consequence even in case where the amount of traffic has been excessive. Disintegration, or the separation of the mixture into its various ingredients by the action of the elements can generally be attributed to the use of poor materials, to an improper mixture, or to neglect in manipulation. As these features are wholly within the control of the contractor, it is clear that he should be required to renew all places showing the least signs of disintegration.

Settlement of trenches beneath the pavement, shoving of the asphalt by travel, buckling of the concrete foundation, and expansion of the wearing surface will produce depressions and elevations on the surface of the pavement, which mar the

appearance of the street and interfere with the traffic. When due to either of the last three causes they are clearly created by faulty material and workmanship, and the contractor should be required to remedy such defects.

Depressions caused by the settlement of trenches cut into the street before the contract is signed should be made good, as the contract in such cases is taken with a full knowledge of the facts. But a grave injustice is frequently done the contractor and the pavement by cities arbitrarily cutting deep trenches in the street for the purpose of laying gas, water or sewer mains and services after the contract is signed or the work of paving has begun, and compelling the contractor to become responsible for such work.

One of the most serious defects of asphalt pavements in certain sections of the United States is the formation of cracks by the contraction of the asphalt during sudden and extreme changes in temperature. These variations in temperature are so extreme in certain localities that it has been impossible with the mixtures now used to prevent rupture of the pavement without laying the material so soft that it soon forms waves and ridges, which are more detrimental to traffic than the cracks. In localities subject to changes in temperature, sufficiently severe to cause extensive cracking of the pavement, it would appear wise to provide for such contraction and expansion by separating the pavement into separate blocks at stated intervals in the same manner as is now done on cement walks and kerbs. These divisions should be at such intervals along the length of the street that the spaces will allow the mixture to expand without forming ridges, and the contraction will not produce separations sufficiently large to be objectionable.

In considering this question the chairman of the committee made personal examination of the condition of pavements composed of the various kinds of asphalt, after having been laid for a period of five years or more in Chicago, Buffalo, New York, Brooklyn and Washington, and also gave due weight to the condition of the pavements in Cincinnati, Indianapolis, Pittsburg and Philadelphia, which had been previously visited and the asphalt pavements inspected. In the examination the particular points considered were the decrease in thickness, the formation of rolls and ridges and cracking of the surface. The object sought was to determine the causes, extent and responsibility of these defects by an inspection of pavements laid with the various kinds of asphalt under different climatic conditions, in order to provide guarantee stipulations that would be general in character and be fair to municipalities and contractors.

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Your committee have also consulted with prominent engineers and contractors, and present with this report the views regarding the condition of an asphalt pavement at the end of the guarantee period of Mr. E. B. Guthrie, chief engineer, Buffalo, N.Y.; Mr. E. P. North, consulting engineer to the Department of Public Works, New York; Cranford & Co., paving contractors, New York; and Mr. Philip W. Henry, of the Barber Asphalt Company.

Your committee does not consider it possible to give definite specifications for this work that will be applicable to all localities, but after a careful consideration of all the facts obtainable, and after due consideration of the opinions presented, we would recommend that the following clauses, modified as found necessary for each locality, be included in the guarantee contracts of the cities belonging to the association.

Section 1. The pavement shall not be reduced more than one-fourth of an inch from the original thickness at the end of the first five years, nor more than one-half of an inch from the original thickness at the end of the first ten years. This requirement shall not apply to pavements constructed of rock asphalt, as this material does not receive its ultimate compression for a considerable period after being laid.

Section 2. Places which show a disintegration of the material shall be removed to the binder or concrete foundation, as found necessary, and replaced with new material having the same thickness and conforming to the adjacent pavement.

Section 3. All elevations or depressions three-eighths of an inch or more above or below the general surface of the street shall be brought to the same elevation as the general surface. These elevations and depressions to be determined by measuring from a straight edge 4 feet in length placed on the surface of the pavement parallel to the line of curbing. In making such repairs the process known as "skimming" may be employed.

Section 4. Where elevations or depressions are due to the failure of the concrete foundation from any cause the asphalt and concrete shall both be removed a length and width sufficient to include the entire defect.

If the failure is due to buckling of the concrete, the new foundation shall consist of broken stone thoroughly compacted, and of the same thickness as the original concrete. In all other cases a new foundation of concrete shall be placed of the same quality and thickness as the original construction. Upon the foundation shall be placed the pavement of the same thickness as the adjacent surfaces.

Section 5. Cracks which show any indication of disintegration, or which are three-eighths of an inch or more in width, shall be cut out of the binder or concrete foundation as found necessary, a length and width sufficient to include the entire portion affected. This portion to be replaced with new material of the same quality and thickness as shown in the pavement adjacent thereto.

Section 6. Should it be found necessary to replace 40 per cent. or more of any section of the street with new material, the entire section shall be resurfaced.

Your committee would also recommend that the indefinite and unjust requirements that the pavement shall be satisfactory to one officer, or set of officers, of the city, at the end of the guaranteed period, with no definite requirements of condition be omitted from guarantee clauses.

Your committee would further recommend that the city engineers of this Society maintain a record of the traffic on the paved streets in their respective cities, in order to determine the most durable pavement and the best pavement suited to specific requirements of traffic.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

APPLICATIONS FOR PATENTS.

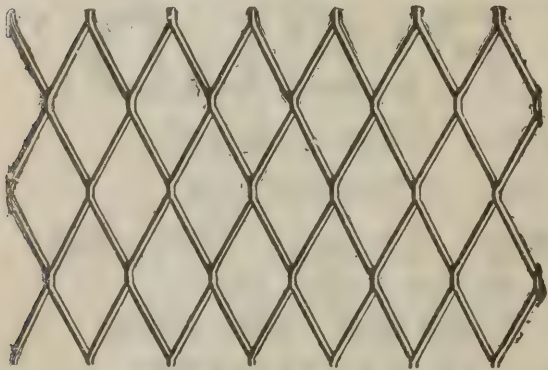
28988. Henry Drummond, for "Improvements in tops for chimney and ventilating shafts."

29240. Earnest Alexander Claremont Hulme, for "Improvements in and relating to ceiling roses and other like fittings."

29263. Charles Hannay, for "Improvements in firebricks, slabs or tiles."

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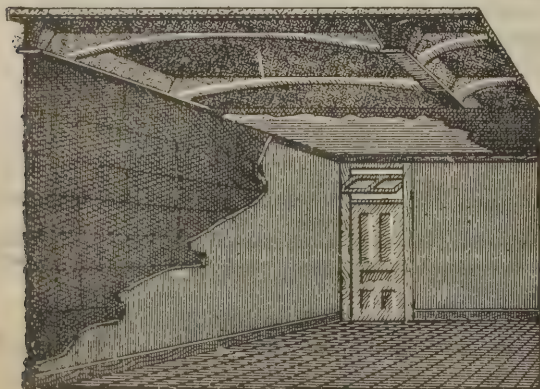
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EDITORIAL NOTICES.

The authors of signed articles and papers read in public must necessarily be held responsible for their contents.

No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.

Correspondents are requested to make their communications as brief as possible. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.

TENDERS, ETC.

*** As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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For Advertisement Scale, see page xiii.

COMPETITIONS OPEN.

BELPER.—Jan. 8.—The Belper Rural District Council offer premiums of 15 guineas and five guineas for the two best sets of plans and reports for Crich water supply. Mr. Joseph Pym, clerk, Belper.

BELPER.—May 1.—The Belper Urban District Council offer premiums of 50 guineas and 25 guineas for the two best schemes of sewage disposal. Mr. Joseph Pym, Urban District Council Offices, Belper.

PORT ELIZABETH.—Feb. 15.—The public library committee offer prizes of 100 guineas and 50 guineas for designs for a new library building. Messrs. Wm. Savage & Sons, 85 London Wall, London, E.C.

SINGAPORE.—May 31.—The committee of the Singapore Permanent Memorial of Her Majesty's Diamond Jubilee invite competitive designs for a town hall and theatre to be erected at Singapore (Straits Settlements) at a cost not exceeding 300,000 dollars. The committee offer a premium of 200l. for the design that may be selected for the work, and one of 100l. for the design which the committee may judge to be second in merit. Plans and particulars can be obtained from Major F. J. Anderson, R.E., Royal Engineers' Office, South Camp, Aldershot.

CONTRACTS OPEN.

ABERDEEN.—Jan. 5.—For taking-down and erecting walls and outhouses at Berryden Road. Mr. Wm. Dyack, burgh surveyor, Town House, Aberdeen.

BATLEY.—Jan. 5.—For erection of a residence in Dark Lane. Mr. W. Rhodes, architect and surveyor, Deighton Lane, Healey, Batley.

BEDFORD.—Jan. 10.—For building offices and storerooms at the electricity works. Mr. T. S. Porter, town clerk, Town Hall, Bedford.

BELFAST.—Jan. 4.—For fitting-up water-closets at the lunatic department, and new bathrooms, &c., at the fever hospital of the workhouse. Messrs. Young & Mackenzie, engineers, &c., Donegall Square East.

BEN RHYDDING.—Jan. 10.—For erection of a residence. Messrs. Empsall & Clarkson, architects, 7 Exchange.

BOLTON.—For rebuilding the Robin Hood Inn, Halliwell Road. Mr. C. H. Openshaw, architect, 6 Fleet Street, Bury.

BOX.—Jan. 10.—For erection of a villa residence. Mr. W. H. Stanley, architect, Market House Chambers, Trowbridge.

BRECON.—Jan. 5.—For erecting intermediate schools at Builth Wells, Breconshire. Mr. Telfer Smith, architect and surveyor, Market Hall Buildings, Builth Wells.

BRENTWOOD.—Jan. 5.—For alterations to officers' mess-room at Union schools. Mr. W. A. Finch, architect, 76 Finsbury Pavement, E.C.

BRIGHTON.—Jan. 4.—For alteration and enlargement of the York Place higher grade school. Messrs. Thomas Simpson & Son, 16 Ship Street, Brighton.

BURLEY-IN-WHARFEDALE.—Jan. 13.—For erection of National school for 500, with out-offices, boundary walls, &c. Mr. Ed. C. Brooke, architect and surveyor, 4 Huddersfield Road, Brighouse.

CROSSGATES.—For erection of four terrace houses. Mr. William Walker, Albert Mount, Horsforth.

CUMBERLAND.—Jan. 9.—For erection of house and out-buildings at Kirkbride. Mr. E. Hill, grocer, Kirkbride.

DARTFORD.—Jan. 17.—For erection of a surrounding wall surmounted by an iron palisade, chapels and caretaker's house, and other buildings, on the site of new cemetery at Stone. Mr. G. H. Tait, Lowfield Street, Dartford.

DARWEN.—Jan. 3.—For erection of a boiler-house and settings for two boilers at gasworks. Mr. Chas. Costeker, town clerk, Darwen.

DOVER.—Jan. 18.—For erection of a boiler-house, with inlet pipe, &c., at the sea baths, Marine Parade. Mr. Henry E. Stilgoe, engineer, Town Hall, Dover.

EARLSHEATON.—Jan. 3.—For alterations and additions to works at Old Bank. Mr. James C. Haller, 5 Savile Road, Savile Town, Dewsbury.

EPSOM.—Jan. 24.—For erection of temporary structures for 700 patients and staff at the Morton House Estate. The clerk of the asylums committee, London County Council, 21 Whitehall Place, S.W.

ESSEX.—Jan. 13.—For erection of infirmary, casual wards, labour master's house, boiler-house and additions to existing infirmary, at Billericay workhouse. Mr. A. T. G. Woods, architect, New Road, Brentwood, Essex.

HARWICH.—Jan. 15.—For additions to the present school-room and for new pulpit, reseating, &c., at the Congregational church. Mr. J. W. Start, architect and surveyor, Colchester.

HUDDERSFIELD.—Jan. 4.—For extension of the electric-supply station. The Town Clerk, Town Hall, Huddersfield.

HUDDERSFIELD.—Jan. 3.—For erection of seven dwelling-houses in Moor Lane, Netherton. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.



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ESTIMATES FREE.



IRELAND.—Jan. 3.—For construction of a urinal through wall and under Fair Hill at north end of town hall. Mr. W. G. Young, town clerk, Larne.

IRELAND.—Jan. 14.—For erection of municipal offices and stores at George's Place. Mr. John Donnelly, town clerk, Town Hall, Kingstown.

IRELAND.—The committee of the Dromahair Dairying Society invite tenders for erection of creamery. Mr. John O'Rourke, secretary, Dromahair.

KIDLINGTON.—Jan. 4.—For erection of two cottages at Kidlington station, Oxfordshire, Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station, London.

LANCASHIRE.—Jan. 17.—For erection of three cottages at Ireleth. Mr. R. P. Nelson, surveyor, Broughton.

LANCHESTER.—For erection of six houses. Mr. John Buckham, timber merchant, Lanchester.

LEICESTER.—Jan. 13.—For raising the present roof of the boiler-house at the refuse destructor works, Nedham Street, and other work. Mr. E. George Mawbey, surveyor, Town Hall, Leicester.

LEWISHAM.—Jan. 13.—For erection of buildings to accommodate about 800 persons, together with the necessary administrative offices, at Slagrove Farm, Ladywell. Messrs. Newman & Newman, architects, 31 Tooley Street, London Bridge, S.E.

LYNDHURST.—Jan. 10.—For erection of the following additions to Holmfild, Lyndhurst:—(1) A range of stabling, with coachman's cottage and groom's apartments; (2) a billiard-room as specified; (3) a greenhouse; (4) sundry alterations throughout the present house, comprising a complete renewal of sanitary arrangements and water supply. The Hon. G. Lascelles, Queen's House, Lyndhurst.

MANCHESTER.—Jan. 10.—For erection of thirteen shops, Oldham Road. The City Surveyor, Town Hall, Manchester.

MANCHESTER.—Jan. 10.—For erection of twenty-six three-storey tenement buildings and two corner shops, fronting Pott Street and Caroline Street, Ancoats. The City Surveyor, Town Hall, Manchester.

MITCHAM.—Jan. 26.—For erection of visitors' room and engineer's house at the schools, Mitcham. Mr. C. E. Vaughan, architect, 25 Lowther Arcade, Strand, W.C.

OTLEY.—Jan. 4.—For erection of offices at Atlas Works. Messrs. Fairbank & Wall, architects, 3 Manor Square, Otley.

POOLE.—Jan. 5.—For alterations and additions to the gas service at the workhouse, Longfleet, and for providing and fixing new cast-iron guttering. Mr. H. F. J. Barnes, architect, Towngate Street, Poole.

PLEASLEY.—For erection of additions to Board schools, Shirebrook. Mr. Frederick Ball, architect, 23 King Street, Nottingham.

RADCLIFFE.—Jan. 11.—For erection of public baths, and supplying and fixing of all engineering work, hot and cold water systems, and all connections and fittings complete. The Engineer, Council Offices, Radcliffe.

RYTHER.—Jan. 12.—For restoration of church. Mr. C. Hodgson Fowler, architect, The College, Durham.

SALISBURY.—Jan. 4.—For erection of engine-shed and retaining wall and construction of three engine-pits, for the Great Western Railway Company. Mr. G. K. Mills, secretary, Paddington Station.

SCOTLAND.—Jan. 3.—For erection of villa on West Terrace, Kingussie. Mr. Alexander Mackenzie, architect, Kingussie.

SCOTLAND.—Jan. 15.—For alterations on two houses in the village of Archiestown. Mr. D. Maclean, blacksmith, Archiestown.

SCOTLAND.—For erection of the town and county bank, buildings at Craigellachie. Messrs. Dunn & Finlay, architects, 35 Frederick Street, Edinburgh.

SCOTLAND.—Jan. 8.—For erection of extensive warehouse and brewer's house at Tomatin Distillery. Mr. Alexander Mackenzie, architect, Kingussie.

SHOEBURYNNESS.—Jan. 8.—For erection of Victoria Hall. Mr. W. Cox, churchwarden, High Street, Shoeburyness.

SHREWSBURY.—For additions to the hotel at Church Stretton. Mr. John R. Withers, architect, Shrewsbury.

SOUTHAMPTON.—Feb. 1.—For erection of an isolation hospital on land in Mousehole Lane, Millbrook. Messrs. Greenaway & Smith, architects, 21 Queen Anne's Gate, Westminster.

SOUTHBORNE.—Jan. 6.—For additions and alterations to the Board school at Southbourne, about $\frac{1}{2}$ miles from Emsworth. Mr. N. C. H. Nisbett, architect, 62 High Street, Winchester.

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SWANSEA.—For erection of a block of offices at the docks. Messrs. Margrave & Peacock, architects, Metal Exchange, Swansea.

WALES.—Jan. 7.—For building an hotel, with stables, at Llanilleth, Mon. Mr. C. Telford Evans, architect, 8 Queen Street, Cardiff.

WALES.—Jan. 5.—For conversion of Plasnewydd House, Maesteg, into a school for the higher standards. Mr. E. W. Burnett, architect, Tondur.

WALES.—Jan. 25.—For erection of a school for girls, and alterations to existing boys' school. Mr. H. Teather, Andrew's Buildings, Queen Street, Cardiff.

WALMER.—Jan. 5.—For erection of a public convenience near the Strand Promenade and for fencing and levelling the site of the new recreation ground, Campbell Road. Mr. J. E. Turner, 2 Cornwall Road, Walmer.

THE LAND TRANSFER ACT, 1897.

The clerk to the Board of Works for the Lee district has presented a report to the board, dated December 22, with regard to the Land Transfer Act, 1897. He points out, with regard to the letter from the London County Council of the 25th ult., that Parliament has left to the County Council to decide whether the Act shall be first tried in London. Before deciding the matter the Council had invited the opinion of the board, and the clerk points out, with regard to the registration required of any transaction affecting land or houses, that for the following reasons the first experiment of compulsory registration under the Act should not be made in London:—Registration would be expensive, cause delay, would not prevent fraud; that it had been tried and found wanting; that the new Ordnance maps should be awaited; and, finally, that London is not the best place for the experiment. The board, after considering the report, passed the following resolution:—"That the clerk's report of this date be approved, and that the London County Council be informed that, in the opinion of this board, compulsory registration is not at present desirable in London, and that the Council be urged to object thereto, and that the clerk is instructed to write to the Council accordingly, and enclose a copy of his said report."

TENDERS.

ABBOTSHOLME.

For excavating, sewerage and road-making works of alterations and extensions at the new school. Mr. LARNER SUGDEN, architect. Quantities by architect.

W. MOSS & SON, Loughborough (accepted).

AMBLE.

For construction of a sewer, Woodbine Street. Mr. W. GIBSON, surveyor.

E. Coulson £72 0 0
R. & G. BROWN (accepted) 68 0 0

ASHINGTON.

For erection of a dust-proof glazed screen for inside of drapery shop window.

E. & T. George £49 0 0
Cocks Bros. 37 10 0
C. LEE, New Hirst (accepted) 33 10 0

BRIDLINGTON QUAY.

For four houses and premises, East Side, Flamborough Road. Mr. J. EARNSHAW, architect, Wellington Road, Bridlington Quay.

W. Barnes £3,609 0 0
W. Moody 2,992 0 0
E. BAILEY, Bridlington Quay (accepted) 2,910 0 0

For erection of dwelling-house, conservatory and premises. Mr. J. EARNSHAW, architect, Bridlington Quay.

W. Hoggard £702 10 0
W. Moody 696 0 0
W. Barnes 656 0 0
E. CORNER (accepted) 650 0 0

DOUGLAS.

For erection of a pupil-teachers' centre and physical laboratory for Douglas School Board. Mr. T. W. CUBBON, architect, Birkenhead.

R. T. DOUGLAS (accepted) £1,492 0 0

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CHORLEY.

For erection of a free library. Messrs. JOLLY & BUCKLEY, architects, High Street, Chorley.

J. Wilson	£4,050	0	0
W. Townson	3,997	15	6
J. Roberts	3,900	0	0
J. Leigh	3,820	6	0
W. Crook	3,712	13	10
J. Booth	3,649	0	0
G. Heald	3,639	0	0
J. Brindle & Sons	3,541	0	0
S. Warburton	3,500	0	0
W. HAMPSON, Pall Mall (accepted)	3,449	17	0
R. Baxendale & Sons	3,368	0	0

EAST SHEEN.

For forming, making roads, erecting fencing, supplying and laying kerb on Palewell Park Estate. Mr. WM. HUNT, surveyor, Donnington House, Norfolk Street, Strand.

C. W. Killingback & Co.	£2,257	0	0
J. Bentham	2,024	0	0
J. Jackson	1,850	0	0
W. Nicholls	1,793	0	0
H. WOODHAM, Blackheath Hill (accepted)	1,724	0	0

GREENOCK.

For constructing a main sewer in Finnart Lane.

J. Walker	£125	19	10
A. Whitelaw & Co.	101	9	0
A. F. McPherson & Co.	97	0	6
J. Walker	94	10	0
R. AITKENHEAD & SONS, Greenock (accepted)	77	13	0

GUILDFORD.

For additions to Guildford Isolation Hospital.

Tribe & Robinson	£2,172	0	0
A. Johnson	2,100	0	0
T. Swayne & Son	2,090	0	0
Higlett & Hammond	1,987	0	0
R. Smith	1,947	0	0
C. Jobbins	1,875	0	0
Low & Howard	1,777	0	0
Brown Bros.	1,694	0	0

KEIGHLEY.

For erection of a warehouse at Providence Mills, Oakworth. Messrs. JOHN JUDSON & MOORE, architects, York Chambers, Keighley.

Accepted tenders.

Sugden, Mitchell & Sunderland, mason.
J. Hartley, joiner.
T. Nelson, Bradford, slater.
W. & J. Harrison, plumber.
B. J. Whitaker, plasterer.

KENSINGTON.

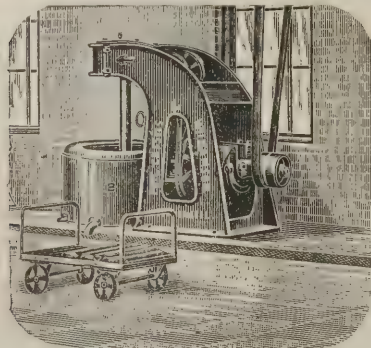
For painting and decorating 24 Elm Park Gardens. Messrs. KNIGHT & Co., surveyors, Sussex Place, Kensington.

W. Rhind & Son	£217	0	0
W. H. Joten	193	0	0
Simmonds Bros.	190	0	0
SELMAN & Co. (accepted)	177	0	0

LONDON.

For works required in pulling-down and rebuilding the Elephant and Castle Tavern, Newington Butts, S.E., together with nine shops and offices and flats adjoining, for Mr. A. Meekin. Mr. JOHN FARRER, architect and surveyor, Albion Chambers, 20 Finsbury Pavement, E.C. Quantities by architect.

Higgs & Hill	£41,840	0	0
W. Cubitt & Co.	40,783	0	0
B. E. Nightingale	39,975	0	0
J. Parnell & Son	39,133	0	0
S. G. Bird	39,100	0	0
Perry & Co.	38,990	0	0
W. Shurmur	38,950	0	0
Mattock Bros.	38,940	0	0
Patman & Fotheringham	38,910	0	0
Lascalles & Co.	38,859	0	0
W. Downs	38,267	0	0
J. Smith & Son	36,696	0	0
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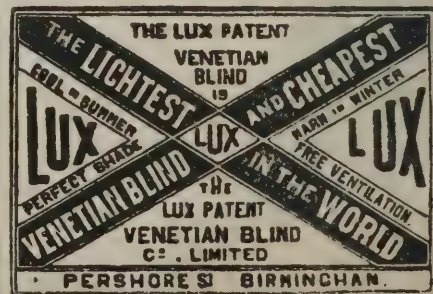
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Patman & Fotheringham 6,928 0 0

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(accepted) 165 0 0

MORECAMBE.

For erection of dwelling-house and three lock-up shops in Margaret Street, Bare. Mr. JAS. MARSHALL, architect, Back Crescent, Morecambe.

Accepted tenders.

Waugh & Ripley, Ilkley, mason £713 0 0

Acton & Sons, Lancaster, joiner 343 0 0

W. J. Cross, Morecambe, plasterer and slater 145 13 10

R. B. Abbot, Morecambe, plumber and glazier 145 0 0

PEMBROKESHIRE.

For erection of Baptist chapel at Neyland. Mr. S. WILSON EDWARDS, architect, Beach Mount Villa, Mumbles, and Neyland.

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L. Davies 1,380 0 0

J. Morris 1,256 10 0

J. H. Thomas 1,251 0 0

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I. Gill 761 17 6

W. Lightburn and Sons 655 0 0

T. TELFER (accepted) 772 0 0

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S. Kavanagh £354 14 6

F. Talbot 288 0 0

R. Pilgrim 261 8 4

W. REEVES, Reading (accepted) 260 15 0

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For painting and colouring required at the John Street school, Pendleton.

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(accepted) £79 19 0

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For construction and completion of additional settling-tanks, carriers, &c., at the sewage farm, Rodbourne. Mr. H. J. HAMP, surveyor.

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E. Love 2,419 0 0

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For erection of superstructure of the Railway Tavern, Cliff Town Road. Messrs. THOMPSON & GREENHALGH, architects, Bank Chambers, Southend.

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E. West . . . 5,393 0 0

A. E. Symes . . . 5,350 0 0

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T. E. DENLEY, Tewkesbury (*accepted*) . . . 123 10 0

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Stokes	215	0	0
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TRADE NOTES.

THE offices for Messrs. R. F. Hall's, Limited, new cycle works, Aston, Birmingham, are being warmed and ventilated by means of Shorland's patent Manchester grates.

MESSRS. THOS. H. TOY & CO. announce that on January 1, 1898, they will commence business at 17 South Street, Finsbury, E.C., as importers and dealers in all descriptions of glass and metal supplies connected with the electric, gas and oil trades.

THE chancel of Knighton Church, Radnorshire, has recently been restored and refitted. A handsome set of choir stalls has been added to the design of the late J. L. Pearson, R.A. These, in addition to the other chancel fittings, were executed by Jones & Willis, of Birmingham and London.

MESSRS. G. & F. COUZENS, of Tudor Road, Cardiff, send us a neat little pocket catalogue of their patent ball and flap valve gully traps, ball valve and syphon interceptors or inspection chambers, patent ball valve water-closets, &c. It is a very little book, but will no doubt be found handy by users of such commodities.

WE have received a specimen of the new "wire-rolled glass," which is worthy of a word or two in commendation. The novelty consists in the glass containing in the centre of its thickness a wire netting, the advantages of which are manifold and manifest. Among these may be mentioned the following:—It is not unsightly, although obviously unsuitable for some positions, as living rooms or shop windows; stones cannot be thrown through it; it is burglar-proof to the extent that a piece cannot be cut out or broken through without great trouble; and it resists fire as long as the same thickness of iron would—the glass is cracked into small pieces by the heat, but will not fall and thus cause draught.

BUILDING AND BUILDERS.

THE Corporation of Cambeltown have resolved to carry out an extension of the pier at a cost of 4,000l.

GROUND has been acquired at the Slates, Kilmalcolm, for the erection of a home to accommodate 100 sailors' orphans.

AN inquest was held by Coroner Dodds at West Hartlepool on Christmas Eve touching the death of a labourer named Michael McOwen, who was killed by falling from a ladder whilst taking down the scaffolding used in altering the front of the Market Hotel, Lynn Street. The evidence showed that no one was in any way to blame for the occurrence, and a verdict of "Accidental death" was returned. Messrs. Henderson & Sons, the owners of the property, generously headed a subscription list for the deceased man's family of six with a donation of 25l.

A CONTRACT has been signed for the enlargement of Medland Hall, by which accommodation will be provided for 150 additional homeless men, thus increasing the total number that can be received to 450 nightly. This additional room will be obtained by enlarging the present top floor and building another storey above it. The inside staircase from top to bottom will be of 2-inch oak in every part, this wood being adopted because it chars rather than flames in the case of fire, and an iron staircase will be fixed outside the building, ready access to it being obtainable from all the floors. The entire cost will be 2,200l.

PLANS have been prepared for a complete renovation of Queen Anne United Presbyterian church, Dunfermline, the original congregation of which was formed by Ralph Erskine when he was deposed from the Abbey. The church, which occupies a commanding site on elevated ground at the junction of Bath Street and Queen Anne Street, is to be practically gutted from floor to ceiling, both inclusive. The present pews, which are much out of date and uncomfortable, are to give place to modern seats with a greater width, and the gallery is to be so reconstructed as to form a semicircle. The present pulpit is to be removed, and behind its site a pipe organ is to be built. Improved methods of heating and ventilation are to be introduced, and by the alteration of the gallery more light will be afforded in the area at the back of the church. It is expected that the carrying out of the scheme will cost at least 3,000l.

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The Lancet, January 12, 1867.

Also, Testimonials from Dr. Hassall, September 23, 1868; the late Dr. Letheby, February 15, 1865, and December 1873.

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OPERATIONS have commenced in the construction of the Banbury branch of the Great Central Railway. The new line leaves the main line of the Great Central at Culworth, about nine miles from Banbury, at a point on Lord Valentia's Eydon estate. It passes through a rich grazing district and one well known to the followers of the Bicester Hounds. With the exception of a long deep cutting between Thorpe Mandeville and Chacombe, the works are comparatively light. The steepest gradient is 1 in 132. The line will be a double one, and will join the Great Western Railway about a mile to the north of Banbury station. The Act obtained for the construction of the line allowed for a capital of 200,000*l*. The engineers are Sir Douglas Fox and Mr. Francis Fox, and Messrs. Walter Scott & Co., of Newcastle-on-Tyne, are the contractors.

ELECTRIC NOTES.

THE Vestry of Hammersmith has resolved to extend its electric-lighting plant, including public and private lighting mains, with new engines and dynamos.

ELECTRICALLY driven locomotives of great power are coming into service in America, the *Pittsburg Post* recently reporting the haulage by one of them of a train of eleven Pennsylvania cars, each carrying 125 people, and also a baggage car round a curve and up a 4 per cent. gradient.

A WEEK ago the last horse tram was taken off the streets of Buda-Pesth. The whole of the tramway lines have been converted into electric lines for a length of seventy English miles, while the Buda-Pesth underground railway also has electric traction for a further distance of fifty-three miles. This is not bad for a town of only 600,000 inhabitants, but the Hungarians are not yet satisfied, and plans for an extensive system of electric elevated and underground railways have just been made public and received with general approval, like everything else tending to embellish or improve the thriving city. At the present time Buda-Pesth is the only large town in Europe in which the horse has been banished from the streets so far as the trams are concerned.

THE electric-lighting experiments which the London and North-Western Railway Company have been carrying on in connection with their Watford traffic have proved so successful that other companies are already adopting the system. Several of the larger lines, of course, have had some system of electric-

lighting in use for some years. Lighting by electricity has the great advantage, from a railway manager's point of view, that when once the installation has been made the cost of lighting trains makes little show in the annual balance sheet. The power is obtained from the engine of the train, and the comparatively slight increase of fuel necessitated makes no perceptible difference in the accounts. Stone's system, which has met with such approval by the London and North-Western Company, will shortly be in use on sixty different railway systems. The new royal train on the Great Western is so lighted, as is also the corridor train on the South-Eastern. The Metropolitan Railway Company have given orders for some trains to be fitted with the installation as an experiment.

ON the 22nd inst. Colonel W. Langston Coke, C.E., an inspector under the Local Government Board, held an inquiry at the Salford Town Hall with reference to an application of the Corporation for power to borrow 13,000*l*. for electric-lighting purposes. The Town Clerk explained that 44,770*l*. had already been expended by the Corporation on the electric-lighting undertaking, and it was now proposed to construct a battery sub-station under the Regent Road Public Baths. A number of accumulators would be placed in the cellars of the baths and the electrical energy stored there, so as to provide for four hours' consumption of electric lighting at the present rate. The mains would be extended along the Regent Road district, and certain other improvements would be made in connection with the undertaking, so as to meet the public demand, now largely increasing. The inspector, after examining the plans, &c., said he should report to the Local Government Board in due course.

VARIETIES.

THE sanitary committee of the Croydon Town Council have recommended the extension of the borough isolation hospital at a cost of 12,000*l*.

A HANDSOME brass altar cross, the work of Messrs. Jones & Willis of Birmingham, has been presented to Balsall Street church, Knowle, by Mr. and Mrs. W. G. Blatch, of Arden Villa, Balsall Street.

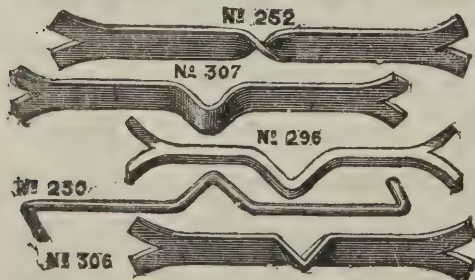
MR. J. R. VEALL, architect, 84 Darlington Street, Wolverhampton, has been re-elected by the Bishop of Lichfield and Archdeaconry of Stafford to the appointment of diocesan surveyor for the district.

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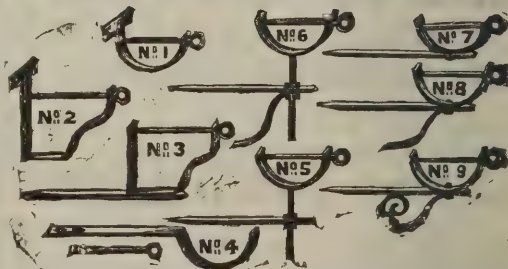
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KING'S LYNN was on Monday morning the scene of a fire which devastated a large portion of the business quarter of the town, and destroyed property which is variously valued at from 100,000*l.* to 150,000*l.*

THE Perth Architectural Association met on Wednesday evening, the 22nd inst., when Mr. John Anderson read a paper on "Dean of Guild Court Procedure" to a large assemblage of members, Mr. G. P. K. Young, A.R.I.B.A., the president, in the chair.

THE lighting committee of Dumfries Town Council have resolved to recommend that an apparatus to utilise the waste heat of public lamps to boil water should be fitted experimentally to two lamps, a halfpenny in the slot enabling a person to draw off a gallon of hot water.

THE Lancaster Town Council have unanimously approved the purchase, for 30,000*l.*, of the King's Arms Hotel and estate, the latter being intended for a covered produce market. Another 5,000*l.* was sanctioned for continuation of improvements in congested thoroughfares.

A GREEN satin portière worked in gold by Armenian widows who have been rendered destitute by the recent massacres is to be presented to the Queen by the members of the Women's Auxiliary of the Scottish Armenian Association. The design, representing the Tree of Life, a favourite subject in the East, was copied from the hangings in an old mosque.

THERE is no place in Wakefield Cathedral suitable for the erection of the proposed recumbent figure of the late Bishop Walsham How, and it is therefore suggested that the memorial to him should also include the additions to the building, which have long been necessary, and the cost of which will in all amount to some 20,000*l.* The son of the late Mr. J. L. Pearson, R.A., who designed the memorial, has been entrusted with its execution.

AT Newtown Stewart, county Tyrone, a fire broke out on Monday last in a shop in the main thoroughfare, and before it could be subdued a block of four-storey buildings, including the Maturin Arms Hotel, were almost gutted. There was a complete absence of fire-extinguishing apparatus in the town, and a strong south-easterly gale was blowing. The damage is estimated at over 6,000*l.*

THE new Lyric Theatre at Liverpool has been designed with taste, and with an attention to comfort of eye and body that cannot fail to please. The auditorium is arranged into pit with orchestral stalls (having a separate entrance), dress circle,

with a box at each side of the stage, and gallery. The entrances are large and the ventilation adequate. The proscenium is large enough to admit not only of the free movement of a large company of artistes, but also of the effective staging of any description of play from tragedy to pantomime. The general internal decoration is effective, white and gold being the dominant colours, and the electric light imparts an agreeable brightness.

CHICAGO Coliseum, said to be the largest building in the world under one roof, was destroyed by fire on Christmas Day. A manufacturers' exhibition was being held in it at the time, and the fire is believed to have been due to the crossing of the electric-light wires. All the visitors had left at the time of the outbreak, but 300 exhibitors and employes remained in the building, and of these three perished and forty were injured. The loss is estimated at 700,000 dols. (140,000*l.*).

THE extensive sawmill and general joinery establishment owned by the Cliff House Sawmills Company, Limited, West Hartlepool, was totally destroyed by a fire which broke out about eleven o'clock on December 23, and continued burning until six the next morning. The whole of the building, plant, machinery, tools and a large quantity of timber were destroyed. The damage is estimated at over 10,000*l.* About one hundred workmen are thrown out of employment.

A FIRE occurred at Weston-super-Mare on Monday evening, at the sea end of the pier connecting the mainland with Birnbeck Island, on which the pavilion, refreshment-rooms and concert-hall are erected. The fire appears to have originated in the children's bedroom of the pavilion through the overturning of a paraffin lamp. The flames rapidly spread, illuminating a large district and attracting thousands of spectators. With a strong wind from the west, all efforts to save the building proved ineffective, and the saving of the surroundings, including the switchback railway, was effected with difficulty. The damage is estimated at 4,000*l.* The property is well insured.

AT a meeting of the parishioners of St. Cuthbert's, Southport, the rector (Canon Denton Thompson) announced that, on the advice of experts and the Ecclesiastical Commissioners, it had been resolved to pull down St. Simon and St. Jude's mission church, opened four years ago at a cost of 6,000*l.* The reason for this step was the settlement in the foundations through the sandy soil, which could not be remedied except at great cost, and even then the appearance would be unsatisfactory, and the risk not entirely eliminated.

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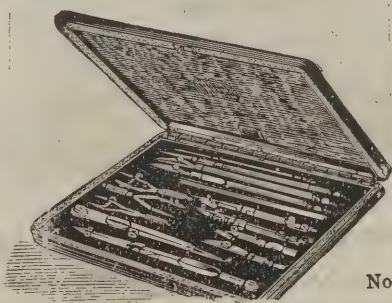
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THE Wellington Hotel, the largest hostelry in Middlesbrough, was burned to the ground early in the morning of the 24th inst. The barmaid and servants were rescued by the firemen, and the landlord, Mr. D. Fitzgerald, was seen at the window. Despite all attempts at rescue he was suffocated, and his charred remains were afterwards recovered. Damage to the extent of a quarter of a million has been done. The Wellington was one of the best-known hostelries in the North of England.

A NEW Conservative club has just been opened at Dunscar. The premises are situate on Darwen Road, and are admirably adapted for their purpose. They comprise reading and card-rooms on the basement, and a capacious room already supplied with billiards and semi-billiards on the first floor. The land was generously given by Captain Slater, and the cost of the building is put down at 400/. A company has been formed, and already 750 shares at 10s. each have been taken up by members and friends. The members at present number 130, and since the informal opening about a fortnight ago the club has been exceedingly well patronised, being well appointed and suitably equipped. The premises were designed by Messrs. John Morris & Sons, architects, of Bolton.

THE new premises of the Carlisle and Cumberland Bank at Cockermouth form a striking and handsome elevation in Main Street. The design is a type of Renaissance adapted to present-day requirements, and the elevation is in warm tinted local stone. The roof is covered with green Westmoreland slates. The ground floor front is devoted to banking purposes, comprising the manager's office, telling-room, waiting and strong-rooms, &c. Above and behind an excellent house is planned for a manager's residence. The bank fittings are being executed in mahogany, while the flooring is in mosaics and wood-blocks. The architect is Mr. G. D. Oliver, of Carlisle.

THE hospital committee of the Liverpool Corporation have been considering the acquiring of land at Fazakerley for hospital purposes. The deputy surveyor (Mr. Turton) having reported on the subject, the hospital committee resolved that the Council be recommended, subject to the sanction of the Local Government Board being obtained to borrowing the money, to purchase for hospital purposes the fee simple, free from restrictions and incumbrances, except a ground rent of not exceeding 1/. per annum, of the estates known as the Harbreck House and Harbreck Farm, Fazakerley, comprising 113 acres or thereabouts, at the price of 300/. per acre, with an additional sum of 3,250/. for all the buildings and timber on the two

estates, making the total price approximately 37,150/, subject to a contract to be prepared by the town clerk, and that an application be made to the Local Government Board for their sanction to borrowing the sum of not exceeding 38,000/. for the purchase of the land for hospital purposes.

THE Scotia Music Hall, in Stockwell Street, Glasgow, has undergone the process of transformation into an up-to-date theatre, to be known henceforth as the Métropole. It is now practically a new house. Only the walls and roof of the old music hall are left. The interior has been entirely rearranged, and as all the alterations have been in the direction of improvement, the theatre in its present state may be considered one of the handsomest and best-appointed in the city. The building provides accommodation for about 2,300. The exit arrangements are ample. The electric-light installation is complete, and all parts of the house, including the dressing-rooms, are warmed by hot-water pipes. Excellent taste has been shown in the decoration, and the lighting, ventilating and sanitary arrangements are in approved style. The stage has been brought out about 20 feet, and now measures 42 feet by 80 feet, with a gradient of one in sixteen.

AT a recent meeting of the Town Council plans were submitted from Sir William Arrol of a proposed new bridge over the Tyne at Haddington. The bridge, which is a handsome structure, is estimated to cost 7,500/., exclusive of approaches. The western approach would be on the site of the present Flesh Market at the foot of Market Street, and the other on the new road through the land belonging to Messrs. Montgomerie & Co., Limited, of the Bernaline Mills. In addition to land offered by the company, they offer to subscribe a sum of 500/. towards the cost. The proposal was favourably received, and it was agreed to approach Lord Wemyss, who is a largely interested proprietor, on the subject.

THE new Refuse Despatch Works erected by the Glasgow Corporation at Haghill, Parkhead, were opened on the 21st inst. The ground, selected as being the most suitable in the locality, extends to 15,192 square yards. Of that 11,012 yards are occupied by the works, leaving 4,180 yards which can be utilised for other purposes. The cost of ground, buildings, machinery and railways, and including the formation of a new street, amounts to about 2,000/. Entering from the street by the north gateway, carts pass over an elevated roadway to the tipping floor, where are tanks, shoots and pails for the separation of the refuse. The process of separating and mixing is carried out on this level. Domestic refuse and dry sweepings

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are screened in riddles, the finer matter passing into mixing machines with revolving blades, and falling direct into railway waggons underneath. The rougher material which cannot pass through the screen is forced by the motion of the riddle on to an endless carrier, which conveys it in the direction of the furnaces. While passing over the carrier all articles of value, such as iron, tin and bones, are picked off and utilised to the best advantage. In the slop tanks is the residuum of soft sweepings from paved streets, which, when firm, is conveyed to railway waggons, and goes to enhance the quality of the prepared manure. This manure is largely used by agriculturists over a wide area of Scotland. There are five furnaces for the cremating process, each with a fire-grate area of 56 square feet. Steam is generated by the heat from the furnaces not only for driving the machinery for treating the refuse, but also for the lighting of the whole station by electricity. It is eighteen years since the Corporation decided to have refuse works, and there are now four such works in the city. Their total cost has been 126,000*l*.

ROYAL CAMBRIDGE THEATRE OF VARIETIES.

THE new music-hall in Commercial Street, which, Phoenix-like, has arisen from the ashes of its predecessor which a few months since was destroyed by fire, is an instance of the immense strides which are being made in the direction of increased comfort and elegance provided for the patrons—the number of whom is constantly increasing—of such establishments. The advance which has been made during the last decade in the aspect of the “halls” and in the tone of the entertainment which prevails, is astonishing and very gratifying. The building in question, which will accommodate some two thousand spectators, is designed in the Moorish style, is lofty, well ventilated, and tastefully decorated and furnished. The stage, which is of adequate dimensions, is provided with an iron curtain and a water curtain, and the lighting throughout is by electricity.

COLLINS'S, ISLINGTON.

THIS is another music-hall or “theatre of varieties,” as it is now the mode to call such places of entertainment, which, yielding to the necessity for expansion and luxury which is a sign of the times, has been demolished and reconstructed from designs by Mr. E. A. Woodrow. The theatre is in all respects

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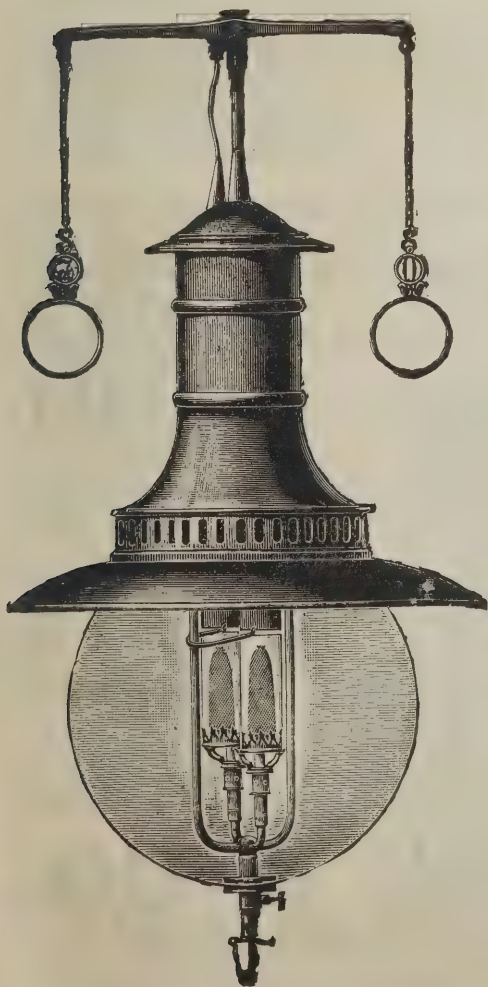
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admirably fitted up and comfortably and even luxuriously furnished. The Louis Quatorze style of decoration has been adopted for the auditorium, the prominent tints being old gold, blue and terra-cotta; the general colouring is carried out in delicate tints, and the blue draperies and plush-covered seats (in old gold) present a warm and rich appearance. The ground-floor is divided into fauteuils, stalls and pit-stalls, with the convenient tilt-up seats, and a handsome pile carpet covers the floor, which is formed of wood-blocks, the result being comfort and solidity and the requisite absence of noise. The stage has been nearly doubled in size and is fitted with tableaux and fireproof curtains and all modern requirements; and from all parts of the house a good view of the performance is given. Hot-water radiators have been provided for making the auditorium and entrance passages comfortable. There is seating accommodation for nearly 1,800, the gallery providing about one-third of this.

PROPOSED ELECTRIC RAILWAY.

A BILL to incorporate the New Cross and Waterloo Railway Company has been deposited in the Private Bill Office. The proposed company seek power to construct an underground electric railway commencing at a point in Old Kent Road, near the bridge carrying the London, Brighton and South Coast Railway over that road, and terminating under Waterloo Road near the point where the South-Eastern Railway crosses that thoroughfare. The capital proposed to be created by the company is given in the Bill at 975,000*l*., which is proposed to be divided into 97,500 shares of 10*l*. each, but with power to subsequently divide these shares into preferred half-shares and deferred half-shares. Upon this capital borrowing powers are



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proposed to be exercised by the creation of debenture stock to an amount not exceeding 325,000*l.* The first directors of the company, who are also given as the promoters, are Mr. James Heath, M.P., Mr. Robert Arthur Read and Mr. Thomas S. Soden. The Bill contains provisions prohibiting the construction of ventilators or other openings in any road or footway, and also the exhibition of advertisements upon any part of the works. During the period of construction power is sought to pay interest out of capital to an amount not exceeding 80,000*l.*, and power is sought to enter into working agreements with the London and South-Western Railway, the Waterloo and City Railway and the Baker Street and Waterloo Railway Companies.

BOROUGH ROAD POLYTECHNIC.

THE sixth annual conversazione was held on Wednesday night, the whole building being thrown open to students and friends. Besides a varied musical programme there were numerous exhibitions, including some clever games of billiards. There are over 3,000 members of the Institute, nearly all of whom attend the classes. The technical section is of course the most popular, and students must be actually engaged during the day upon the work in which they wish to perfect themselves in the theoretical and practical classes. During the past six years the instruction has become so popular that the building is now found to be too small. Five new workshops were added, and it has been found necessary to erect still another five rooms, which will be opened next March. About 150 classes are held daily. There are no less than 650 working students in these departments, no amateurs being admitted.

ALEXANDRA THEATRE.

THE residents of the north of London should be grateful to Mr. F. W. Purcell, the proprietor, and Mr. Frank Matcham, the architect, for putting up in their midst a theatre which for comfort and elegance will vie with any of the West End houses. The Alexandra is admirably situated in the Stoke Newington Road, to which it has a frontage of 120 feet. The elevation, which is attractively designed on Italian lines, is carried out in dark red brick with stone enrichments. The two ends are carried up with pediments, filled in with rich carving,

under which is a deep cornice with entablature with gold letters, bearing the words "Alexandra Theatre and Opera House."

The centre portion is kept lower and divided up with columns between the windows, a large stone oriel window projecting from the crush-room, the whole being crowned at the top with bold balusters divided with pedestals containing flambeaux. A feature in the exterior are the two large handsome ventilating roofs at each end, over the gallery and stage; indeed, the ventilation has been one of the matters that have received the architect's principal consideration.

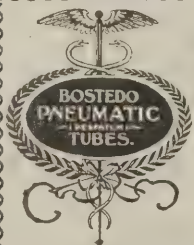
Over the pavement, in the centre of the façade, a large handsome glass and iron verandah is being erected to shield the dress-circle and stall patrons from inclement weather. The pit and gallery entrance is similarly favoured.

The theatre is particularly well provided with handsome vestibules, crush-rooms and foyers, &c., the walls and staircases being of marble. The ceilings are artistically modelled, and the floors are covered with thick velvet pile carpets, while mirrors and brilliant illuminations by the electric light produce a striking *ensemble*. The entrance doors are of polished wood fitted with copper handles and plates, and coloured glasses are introduced into the windows and doors in a very effective manner.

Of the interior, which is approached through a handsome vestibule, an innovation of Mr. Matcham's is a noteworthy feature. It consists in raising the boxes, which are usually situated at the back of the dress-circle, and forming thereof a separate tier, which is exceedingly effective in appearance, and gives space for a handsome corridor at the back of the dress-circle, to which it gives ample and convenient access. The decorations are very rich and the lines elegant. The style is a free adaptation of Elizabethan, the colouring cream and gold, relieved with artistic paintings on a light blue ground, with background, upholsteries and draperies in rich copper-bronze velvet.

Each part of the house has a separate entrance and an additional exit. The staircases and corridors are all fireproof, and are excellently arranged for every entrance and egress, all doors being fitted with alarm exit bolts of the best description. Large and well-ventilated saloons and retiring-rooms, heated with hot water, are provided for each part of the house, and the comfort and safety of the audience have had every consideration.

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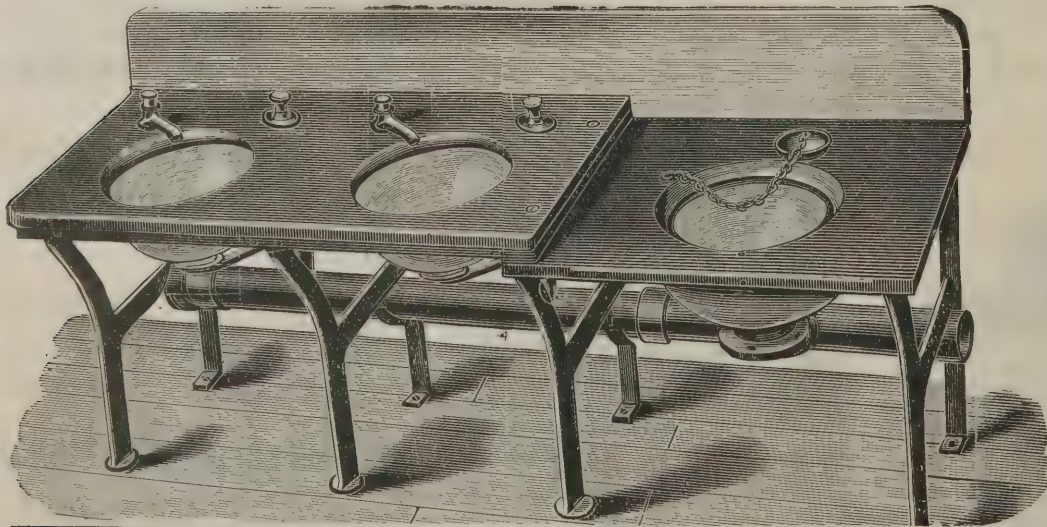
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there is an asbestos and water curtain, by Merryweather, provided to the proscenium, forming a fireproof division between the stage and the auditorium, and embellished with a picturesque view of Sandringham.

The galleries are constructed on the cantilever principle, and are of steel and concrete. The house accommodates about 3,000, the gallery holding 900 and the pit 1,000. On each side of the stage are two boxes, handsome and spacious, surmounted by immense domes. The stage itself is well adapted for scenery of any ordinary size. It is 50 feet deep, 60 feet wide, and the height to the "grid" is 60 feet.

NEW CHURCHES IN GLASGOW.

THE memorial-stone of the new Chalmers Free Church, which is being erected at the junction of Cavendish Street and Pollokshaws Road, has been laid. The new church will cost 6,500*l.* and the site 3,000*l.*, making a total of 9,500*l.* The new church fronts Pollokshaws Road, with classrooms and hall in a separate building at the corner of Cavendish Street. There are side galleries over the aisles, also an end gallery, the seated accommodation being for 840. In the front the central entrance is protected by a circular portico, the pillars of which are 22 feet in height. The interior is arranged with the area pews all following a radius from the pulpit. The platform of pulpit provides space for an organ. The nave is roofed with a level ceiling divided into panels. The contracts for the church and hall amount to 6,000*l.* The architects are Messrs. H. & D. Barclay.

The foundation-stone of St. Kenneth Church, a new church which is being erected at the corner of Katherine Drive and Hutton Drive, Holmfauldhead, Govan, has also been laid. This is the third church to be erected as part of the new scheme of church extension inaugurated by the Rev. Dr. John Macleod and the kirk-session of Govan parish. It will accommodate 800 people, and there will be a hall constructed to seat 300, as well as smaller halls, committee-rooms, vestry, &c. The plan, which is according to the model designed by the architect, Mr. Macgregor Chalmers, for this series of churches, comprises a large nave with one side aisle, in which is the only gallery; a large chancel for the choir and communion table, a side chapel and an organ chamber. The

interior will be finished in stone, the roofs will be of open dressed timber and the halls will be finished in red-pressed bricks.

The new Ferguson Memorial E.U. church, situated in Palmero Street, Springburn, was opened recently. This church is in the Gothic style of architecture, accommodation being provided for 350 sitters. The architect was Mr. J. M'Kellar.

PROPOSED MUNICIPALITIES FOR LONDON.

THE conference of representatives of the London parishes desirous of improving the present system of local government by vestries have prepared a tabular statement showing, side by side, the population and rateable value of twenty-five of the parishes in Schedule A to the Metropolis Local Management Act, 1855, as amended, of the thirty-three places designated by the Registrar-General as "great towns" and of the other large towns classified as county boroughs by the Act of 1888. The development of the area to which the Metropolis Management Acts apply during the past thirty years has proceeded by such strides that its population is now equal to that of Portugal, greater than that of either Sweden, Norway or Switzerland, and is twice that of Denmark or Greece, while "Greater London" nearly approaches in its number of inhabitants the whole of Australasia, the Dominion of Canada or the kingdom of Belgium, "one of the most densely-peopled countries of the world;" and some of the larger "parishes" are far in excess of many of the "great towns" in the provinces. The comparison, it is submitted, lends valuable confirmation and support to the memorial to be presented to the Government praying for an improvement of the present system. From the comparison it appears that the only three "great towns" in England not surpassed either in population or rateable value by one or other of the vestry-governed parishes in the Metropolis are Liverpool, Manchester and Birmingham. Some of the parishes contain more inhabitants than some of the English counties. Thus Battersea, with a vestry as its governing body, is more populous than the whole county of Buckingham, in which a county council and three municipal corporations exercise jurisdiction; and Camberwell has under the local government of its vestry more inhabitants than all Oxfordshire, in which a county council, five municipal corporations and numerous district and parish councils administer the local affairs.

THE GREAT FIRE.

If the roofs of some of the houses burnt down in the City had been covered with copper instead of zinc (which blazes), or lead (which melts), the fire would have been arrested at these buildings, as the flames could not have escaped through the roof.

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THE CITY AND THE FIRE.

THE *City Press* says:—The members of the finance and improvement committee will be called together after the Christmas holidays to resume the consideration of the important question of improving the area which was laid waste by the great fire. The Commission of Sewers will cease to exist on the 10th of next month, and the work of the committee will then be transferred to the improvements committee of the new Public Health Department, so that the continuity of the work will be in no way impaired. Three schemes for great street improvements were laid a few days ago before the improvements committee of the London County Council, the members of which very cordially received the City deputation. No decision was arrived at, and some time must elapse before definite plans are drawn up, as some of the questions involved are very intricate and require grave consideration. The members of the improvements committee of the County Council are, however, in perfect accord with the citizens as to the desirability of effecting a great metropolitan improvement in Cripplegate, although, as is only natural, considerable difference of opinion exists on the question as to how this improvement can be carried out. A new street running through the fire area will not improve the locality if steps are not also taken to prevent owners of property from building on old lines. This is recognised as the crux of the whole question. To the cost of making a new street must be added the enormous expense of compensating owners beyond the area of the proposed street.

THE PROPOSED GOVERNMENT OFFICES.

THE following evidence was given by Mr. Waterhouse, R.A., before the Select Committee on Government Offices (Appropriation of Sites):—

Chairman: You are a Royal Academician, and you are past president of the Institute of British Architects?—Yes.

You are in sympathy with the plan which has been produced on behalf of the Institute by Mr. Anderson, and generally you support the view which he maintains?—Yes, I may say entirely.

You are particularly anxious that these buildings should be kept down to four storeys in height?—I am so in the case of buildings on the Carrington House site, because it comes so immediately opposite the Horse Guards and the old Admiralty

buildings, and in the case of the Great George Street site for the reason assigned by Mr. Anderson, that buildings on it would so better balance the Treasury buildings. In that connection perhaps I may say that one reason why it seems to me better that we should keep the Great George Street buildings absolutely rectangular, and not indulge in canted angles or a sloping front, is that we should lose a great deal of the dignity of the building as seen from Parliament Street if it slopes away from the general alignment of the Treasury Buildings and the Home Office by following a canted diagonal line, or if the corner is cut off either by rounding it or by setting it in, as I understood was proposed.

In fact, you entirely sympathise with the views expressed by Mr. Anderson, that it should be parallel and rectangular?—Yes, both as regards the increased space thus gained and as regards its architectural effect and dignity.

Beyond that, you also would like to see the proposal carried out that the Government offices should be concentrated on the Great George Street site, and that that rectangular line should be carried right up to the park along Great George Street?—Yes.

Then with regard to widening at the neck of Whitehall, you also think that it is essential that the street should be widened, and in your opinion the west side should be thrown back, as shown in the plan which has been deposited on behalf of the Institute?—I think so. From an architectural point of view I think it is most important that the neck of Whitehall should be made wider than it is at present, and that the west side is decidedly the best side on which to effect the widening. In fact, the axial line, about which so much has been said, and the advantages of which have been so much insisted upon, can only be maintained by effecting a widening on the west side of the street.

You attach considerable importance in looking up Whitehall to see the portico and the dome of the National Gallery?—Yes, I do; yet I think it is important that both the dome and the portico of the National Gallery should not coincide with the column.

In that respect you differ?—No, I do not differ. If you look at the column and the portico of the National Gallery, and get them exactly in line, the effect is almost ludicrous, because the dome combines with the column to make quite a ridiculous figure. The one great advantage of Mr. Anderson's plan is, in my opinion, that though he maintains the symmetry of the approaches to Trafalgar Square, he interposes double

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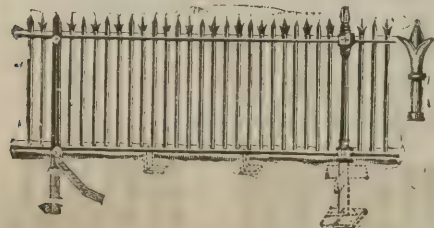
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lines of trees on the axial line between the two roadways, so those who approach Trafalgar Square from Whitehall will have to do so either to the east or west of that line, and therefore see the portico of the National Gallery clear of the column. Yet there is all the dignity and stateliness of a symmetrical arrangement about this scheme.

You would have no designs upon the Horse Guards; that is too valuable?—I think it is. I believe Mr. Anderson has indicated against the flank of the Horse Guards the site for a group of sculpture, perhaps on a lofty architectural base, as a fitting termination to the western roadway. It strikes me, also, that approaching Trafalgar Square along the eastern roadway there would need to be a very careful treatment of the projecting corner beyond the site for the War Office shown upon our plan, since this corner would form a conspicuous feature in the view. With these two exceptions it seems to me that there are no objections to the plan at all, and that these might be met by a careful study of the requirements of the case.

Mr. Whitmore: If you could ignore money altogether, would you widen at the same time the eastern side of Charing Cross?—No; I would like to see some of those buildings rebuilt, but I do not think I should be disposed to alter the alignment.

Mr. Herbert Gladstone: Might it not be desirable to take down the Paymaster-General's office, so as to open up, perhaps under some new treatment and detail, the Horse Guards?—That is part of the scheme; we do propose it.

I understood there was to be some special treatment of the Paymaster-General's office?—No, it comes away, and Mr. Anderson has suggested its being placed in front of the War Office quadrangle, as being there conveniently situated both for the War Office and the Admiralty. Then he also proposes, and I think it is a strong point, a large opening into the park, so as to see more of the park from Whitehall Place.

Chairman: On to the parade, you mean?—On to the north-east angle of the parade.

Mr. Disraeli: Have not you got a road really too large for all requirements just opposite the proposed new War Office?—Of course, it is the widest part of Whitehall Place.

Suppose the committee were to recommend this, do not you think they would be considered to be wasting room?—It is 200 feet wide there, but it is only just at one place.

Mr. Herbert Gladstone: It is not a street, it is more a place—an open place?—Yes. It occurs just at the southern end of the wide avenue, the prolongation of Trafalgar Square south-

wards, and would be needed for easily turning into the western roadway of that avenue.

Chairman: I believe, apart from this, you attach great importance to the street to the south of the War Office opening into Whitehall with its centre immediately opposite the Horse Guards?—Yes. The view of the Horse Guards from thence is particularly interesting, and the view through the arches into the park is exceptionally charming.

And then you attach importance also to this, that in this Horse Guards Avenue there should be some treatment of the northern end of the banqueting-house?—It appears that the northern end of the banqueting-house is in part, if not wholly modern. It is treated in a manner quite unworthy of the west and east fronts of the banqueting-house, and as it would now be more conspicuous than ever, it seems desirable that it should be finished in a manner worthy of the rest of the building.

In all other respects the evidence you would tender would be to confirm that which has been put forward by Mr. Anderson on behalf of the Institute?—Yes.

There are no points in his evidence on which you yourself hold a different opinion which you would desire to record on the present occasion?—No.

Mr. Whitmore: Do you object strongly to those architectural plans?—Yes. I think the sites as first proposed would have been insufficient in area, and ungainly in contour. The Carrington House site is not in itself large enough for a dignified War Office.

If money considerations make the carrying out of your design impossible, you would prefer that nothing should be done rather than that design should be carried out?—I suppose it is better to accept a small good than none at all.

You would esteem this to be a small one?—I should esteem it so from an architect's point of view.

Mr. Disraeli: May I ask you as to the question of the rectangle at the bottom of Parliament Street; it is your strong opinion that it should be a right angle there?—Yes, for the reasons I have assigned. The building, I think, will lose in dignity if it is not kept rectangular.

And nothing would be gained, in your opinion, by making it anything but a right angle?—I think it will be a loss. Perhaps I may be allowed to say that though I sympathise with those who care for the view of Westminster Abbey from the end of Parliament Street, I do not think the view would be better further north than it is at present, when seen from the end of the street.

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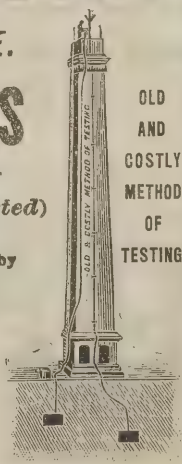
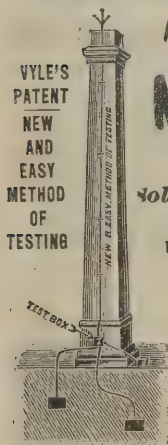
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Have you looked at the view of the Abbey lately since the leaves have been out?—Yes.

You do not see very much of the Abbey, do you?—You do not see much of it, but what you do see is well worth seeing.

You see so little that it is not worth while, in your opinion, going out of your way to alter the alignment of the buildings in order to get a view?—No. I endeavoured to say just now that I consider that as we get a view of the Abbey, and a very charming view it is, from the end of Parliament Street, it is not worth while spoiling a great public building to secure the view a little sooner.

What is your objection to the building on the Downing Street site shown in the plan on the wall?—It does not give us a very large amount of extension, and it shuts out more of the view of the Foreign Office than is altogether desirable.

Do you think that some sentiment about the First Lord's house should be considered?—Yes, I think it would be desirable to keep the house, and that a more pleasing result would be obtained by keeping a little garden space at the western end of the house than by building all over the site, but I have no very strong feeling about that.

You would do away with the other houses. As Mr. Anderson said, you would say that they are of no architectural value?—They are entirely unworthy of the site.

Chairman: I think there was some evidence which you wished to put in on behalf of your Institute; the views of the Institute?—The Royal Institute of British Architects consider it desirable that a definite plan should be considered for the appropriation of such of the land now available for Government offices as may be necessary for their proper development in accordance with the appropriate architectural scheme. By this means the best will be done that now can be done to redeem the omissions of the past and to secure an opportunity for the architectural treatment of these important buildings commensurate with their importance. That I understood to be what the Institute wished us to press if we were allowed to appear before you.

Professor George Aitchison gave the following evidence:—

Chairman: You are an Associate of the Royal Academy and professor of architecture to the Royal Academy?—I am.

You are also the president of the Royal Institute of British Architects?—Yes.

I understand that the proposal which has been carefully explained to the committee by Mr. Anderson is the proposal

which the Institute wished to be brought to the attention of the Government?—It is.

In those matters you support the evidence which was given by Mr. Anderson?—I do.

With regard to the proposal put forward by the Office of Works on the wall there, do you share with both Mr. Anderson and Mr. Waterhouse their opinions with regard to the shape of the building in Great George Street and Parliament Street?—Undoubtedly.

You prefer the parallel to any other formation at the corner?—Very much. It would make a very much finer group if the two wings were the same height and nearly the same length, so that the tall Foreign Office should make the centre of two very fine wings; and that Treasury façade that was built by Sir Charles Barry was looked upon at the time that it was built as very admirable.

You also hold the view that it is undesirable to erect further buildings at the end of Downing Street and on the Horse Guards Parade, and you would prefer with your colleagues that any additional space that would be required for Government offices should, if possible, be acquired on the Great George Street site, so that the whole of the offices might be grouped upon that site?—Yes, certainly; and I think that if on account of its great historical interest the First Lord's house is to be retained, it should be in a position where it can be seen by people who come, not only to London, but also to England, to see such things.

Do you share with your colleagues the opinion with regard to the prolongation of the Mall into Charing Cross, that the opening of the Mall into Charing Cross should be made more to the north than is shown in the Government plan?—I think so, because there are two points about it; one is that you see down the Strand better, and the other is that it is a most charming relief after passing through the dusty streets of London to look on to trees and grass.

I take it that you also have approached this matter with your colleagues entirely from an architectural and æsthetic point of view, and that you have not considered at all the question of cost?—Not in the slightest; and if I may be allowed to say something without being asked, it appears to me that where you have an imperial matter like this to deal with the question of cost should not enter into it. For my own part, I would rather see 1s. a cwt. put upon sugar than that we should have one of the finest parts of London spoiled, and that England should not show as well as other countries in Europe

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its desire to dignify itself in its Metropolis by having the finest buildings it can get, and having them arranged in the best possible way. Of course, there are a few fine sites in Europe that are such by nature that we have not got them; but Sir Robert Peel said of the National Gallery that it was on the finest site in Europe. I do not think it is equal to the Acropolis at Athens, but still it is a fine site. The Piazza at Venice is fine, and there are other fine sites, no doubt; and I think we ought not to have this spoilt.

The view of the Institute, therefore, is that the opportunity should be taken, while the Government are seriously thinking of sites for Government offices, of doing something to improve the unfortunate alignment of Whitehall, and to make the approach to it, at all events, worthy of the Houses of Parliament at the one end and Trafalgar Square at the other?—Yes.

Mr. Molloy: I suppose you hold the same view with regard to the setting back of the Great George Street site?—Yes; you see if you stand in these gardens or even on the further side of the street by Richmond Terrace you there see the whole three.

You see two now?—You see two now, but the third one would add importance to them and form a group as well.

Looking at it from the New Palace Yard or from Westminster Abbey, that is, in an opposite direction, do you think they would have a bad effect architecturally or artistically?—You would see from the New Palace Yard very little indeed; you could hardly see the grouping at all.

Take it from Westminster Abbey, the garden ground round it, looking at it from that point of view, if the Great George Street site were set back to the line I have pointed out to the first witness there would be nothing inartistic then?—Whatever you do to it will, of course, more or less spoil it if these two buildings, that form as it were the wings of the Home Office, are not in a line. If you look from any point where you can only see the Great George Street site it would not matter, but directly you get near the Home Office the best effect of the grouping is gone if the two wings are not in a line.

For the grouping purposes you have to go into Parliament Street?—Yes.

If you are not in Parliament Street the alignment effect is of no value?—No, you cannot see it.

From the several other points of view the setting back would have really no inartistic effect?—No, I do not know that it would. The whole point of the thing is to get the Home Office as a centre, with the lower buildings on either side, and

if these are put at an angle, or one is set back very far from the line of the other, of course you will spoil the effect.

From the Parliament Street view?—Yes.

But not from anywhere else; that was the point?—I do not know that you would.

Is there any necessity for making the new building a wing of the Home Office?—Only an æsthetic necessity; that is all.

Speaking from an architectural point of view?—Yes.

There is no necessity for making it a wing of the Home Office?—No, but you would lose the possibility of that effect if you did not.

If you do not do it you will not have the wing?—No.

There is no necessity for doing that?—Only the necessity of making a very admirable group, which you would not otherwise have. There are many points of view from houses and elsewhere; but I merely took it from the street, because that is where most people see it from.

From the Parliament Street point of view you desire the alignment, but you do not see any evil from any other point of view?—Well, you see, if you want to get a good effect you take it from the place where the thing is most effective, and if you prevent that being taken you more or less spoil the whole thing.

From an artistic or æsthetic point of view, assuming the buildings were worthy buildings, would not a broken line be more effective looking from Westminster Abbey than what you may call a straight line and right angles?—There you have an opportunity of doing a good thing; but I admit that a man of genius is able to produce fine effects in untoward circumstances; you know what a charming effect the National Gallery has, coming up from Pall Mall. It is one of the most delightful pieces of architectural composition, perhaps, in the world.

Your opposition to the setting-back of the new buildings is based solely on your desire to group the Treasury, the Home Office and the new buildings together?—Yes.

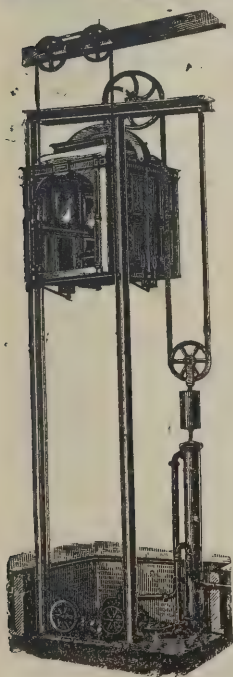
That is the groundwork of your opposition?—That is so.

Mr. Disraeli: May I take it that it would be fatal to the dignity of the scheme of grouping if a corner at the bottom of Parliament Street was in any way tampered with?—Unless you get it pretty nearly the same, not very strongly discernible by the ordinary person's eye that one is much bigger than the other, you lose the effect.

It would diminish the size of the building to the eye?—Yes.

Therefore, in your opinion, it would lose its dignity and importance if it were anything else but a right angle?—Yes.

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May I take you to Charing Cross end; do you attach the same importance to the line drawn from the dome of the National Gallery to the monument, and straight down to the corner of the place?—Supposing you stand under the portico of the National Gallery now, to a great extent the effect of that fine street is missed.

But coming up the street, do you consider the National Gallery buildings are of great artistic merit?—No doubt.

And therefore, if possible, they should get the view?—Yes, certainly.

You do not think that the appearance of the street would be improved by enlarging it on the eastern side, supposing questions of finance would not allow the committee to recommend the other?—It looks very pretty coming up, if you come up on the east side, but you only see the end of the National Gallery. Formerly there was a street at the back, and one of the difficulties Wilkins had to contend with, which he did in the most admirable way, was to make two entrances from the National Gallery into that street, and the labour he bestowed on doing this to make them admirable is worthy of all praise, and they are certainly delightful things. But still, when you have got a large building like that, to have your principal street coming right on one side so that you only see the end of it, seems to me rather a blunder.

Still, Trafalgar Square is a very broad place?—Yes.

Which modifies the fact of the street coming not exactly in the centre?—You get none of the effect in looking down from the National Gallery, whether you go under the portico or in front of it, if you keep it out of the line.

Mr. Whitmore: Supposing it were found impracticable to widen Charing Cross on the western side, or on the eastern side, would you still attach importance to the difference in your plan for the extension of the Mall to Charing Cross and the way it goes there?—What I said before was that it is always a very agreeable thing to look down a long street, and it is still more agreeable to look up a long street and see trees.

Then looking at that point of view from the other side, supposing you are coming from Buckingham Palace towards Charing Cross, do not you think it would still be an improvement to get the point of view that you would get under your line and the extension of the Mall rather than the view that would be obtained by that extension?—We thought undoubtedly it would.

And that would be the case even if your suggested widening of the neck of Charing Cross were not carried out?—

Yes, certainly; but still the most important thing, of course, we think, is the widening of Whitehall.

What I rather wanted to gather from you was this. Supposing your scheme in its integrity could not be carried out, what portions of it would you abandon with the least reluctance?—I think I would abandon that with the least.

Which?—The line of bringing the Mall into Charing Cross.

That alteration of the line?—Yes; but I think that getting the alignment of the street is important.

Still, if you could not get the widening of the street, you would prefer your plan of the extension of the Mall to that?—Yes. For a country like this, when grouping all these great buildings, in which all the government not only of the United Kingdom but of our dependencies takes place, certainly the least possible consideration that can be given by the Government to cost should be given.

The committee agreed to the following report:—

In continuation of our report dated July 23, 1896, we beg leave to state that we have taken further evidence upon the plans laid before the committee last year.

Having regard to certain criticisms made from an architectural point of view upon those plans, we have thought it well to examine representatives of the Council of the Royal Institute of British Architects and other qualified members of the profession.

Various alternative plans have been submitted to us by these gentlemen, but whilst we have availed ourselves of some of their suggestions, we have felt unable, owing partly to the enormous cost involved, and partly to other considerations, to recommend their schemes generally for acceptance.

Upon a review of the whole evidence, we have arrived at the following conclusions:—

We are of opinion that the new public offices on the Parliament Street or Great George Street site should be erected mainly on the lines of plan No. 1 in the appendix to the report of last year, with a frontage in a line with the frontage of the Home Office and parallel to the east side of Parliament Street; but we recommend that the south-eastern corner should be square and not rounded. The land between this new frontage and the present west side of Parliament Street would, if this plan were adopted, become part of the public street, and in our opinion there is no need to make special provision for separating the traffic at this point.

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It appears to us reasonable, in view of the great metropolitan improvement here to be carried out at the cost of the Government, that the London County Council should be requested to consider whether they should not put into operation the powers possessed by them under the Public Offices (Westminster) Site Act of 1896, and contribute a share of the total value of the land, which under this scheme would become part of the public street.

We recommend the appropriation of this site for the Board of Trade, the Education Department, and the extension of the Local Government Board.

As regards the Whitehall site, having considered the alternative schemes for the War Office which have been placed before us this year, we adhere to the recommendation made in our interim report, being satisfied that a building satisfactory in appearance and accommodation can be erected on that site within its present boundary lines, and we are of opinion that the details as to the arrangements of buildings, courts, &c., should be entrusted to the discretion of the Office of Works, in conjunction with the architect selected. We think that a subway should ultimately be formed under the street between the War Office and the Admiralty.

Schemes have been submitted to the committee by the Royal Institute of British Architects and by Colonel Edis for a widening of Charing Cross and of the northern part of Whitehall; but we cannot recommend that the taxpayers should be asked to bear the cost of this metropolitan improvement, which, if undertaken, comes more properly within the duty of the local authorities.

We, however, strongly advise that the Mall should be opened into Charing Cross on the north side of Messrs. Drummond's bank.

We do not contemplate the passage of any other than light traffic through the Mall, and are satisfied that the skill and experience of the police would supply satisfactory means of overcoming any difficulties of traffic which might to some extent follow such opening.

We think that no decision should be arrived at as to building on the triangular site in Spring Gardens until the houses standing there have been removed, and the ultimate requirements of the Admiralty considered.

We recommend that Nos. 11 and 12 Downing Street, occupied respectively as a residence for the Chancellor of the Exchequer and as an office for the Patronage Secretary to the Treasury, should be removed as unworthy of the site they

occupy, but we are of opinion that the principal block of No. 10, the historic residence of the First Lord of the Treasury, for reasons of practical necessity and on account of its associations, should be retained, the Downing Street front being masked by erecting a new building with a good architectural façade and the Park front being cased in stone, so as to harmonise with the north and west fronts of the old Treasury buildings, and the garden ground being enclosed with a screen or railing of handsome design.

We do not recommend any further building on this site. We are of opinion that whatever other office accommodation is required, which cannot be conveniently found in existing Government buildings, should be provided for by an extension of the Great George Street site in the direction of Delahay Street and St. James's Park, in which case readjustment of the arrangement at present shown in the plan of the Office of Works might have to be made.

PREVENTION OF THE SPREAD OF FIRE.

IN the *Times* of Tuesday Mr. N. S. Joseph, architect, discusses the question, Can any methods of construction be enforced to prevent the disastrous spread of fire to neighbouring buildings? The prevention of an occasional conflagration is, he says, impossible. Even the destruction of a large building, filled with valuable goods, is an evil that must be occasionally faced. Insurance companies are established to meet such evils. It would be a far greater evil if such building restrictions were uniformly imposed, in the way of so-called fireproof construction, as would be not only a restraint of fire, but also a restraint of trade and commerce, too onerous and too vexatious to be borne by business men. Yet prudence and public interest should impose reasonable restrictions.

The proper subject for inquiry, then, is not how can we prevent a large warehouse from being burnt down, but how can we prevent such an evil becoming a great calamity by its rapid spread, as in the case of the Cripplegate fire, when buildings covering 17 acres—chiefly modern edifices—were reduced to ruins within about eight hours? And be it remembered that, great as that calamity was, it was only due to fortuitous circumstances, such as the absence of wind, or the presence here and there of specially high party walls, or the existence here and there of an open space, that the calamity

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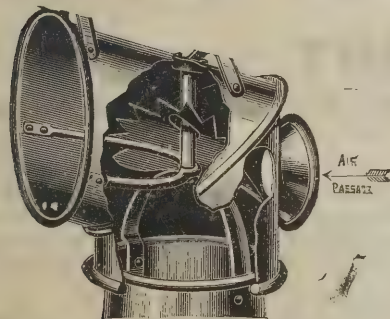
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was not tenfold as great as it was, and that the range of devastation did not spread from Barbican on the north to Gresham Street on the south, from Moorgate Street on the east to Aldersgate Street on the west; for the entire area bounded by those comparatively broad thoroughfares consists mainly of a maze of narrow streets and courts, closely packed with warehouses, factories, offices and shops, save where a church or churchyard intervenes to afford a small open space, or where the Guildhall and a few of the great homes of the ancient City companies hold their own, a contrast in point of space between the past and the present.

What, then, were the causes of the rapid spread of the Cripplegate fire? And what measures should be taken to prevent such or a far greater calamity in the future?

The causes are clear enough to those who witnessed the fire and who have since wandered among the ruins. The flames leaped across the narrow streets, igniting the windows and doors of the opposite buildings, which were thus set ablaze. The flames emerged from the back windows, crossed the narrow lighting areas or well holes common to several warehouses, and so involved all those buildings in the holocaust. The flames, in some cases, mounted over the low parapets of high party walls and appeared to be sucked downwards on to the adjoining roofs, setting on fire the neighbouring warehouses, which thus burnt from the top downwards. Contiguous lead flats, covering outbuildings erected on spaces which had been formerly backyards, and divided only by a parapet only 15 inches high, the minimum required by the Building Act, became involved in one general blaze, the low parapet being unavailing to check the spread of fire, so that every warehouse sharing in these lead flats shared also in the general ruin. The danger was greater and the effect more rapid in those instances where the flat was pierced with wooden skylights. Countless burning embers were hurled upwards through the air from the flaming piles, then driven horizontally or diagonally on to contiguous roofs and lead flats, where they soon burnt their way through the metal or slating, setting alight the roof timbers and upper floors, which again burnt downwards. The match-lined walls of the warehouses not only added fuel to the flame, but the hollow space behind the match-lining—a space usually more or less continuous from top to bottom of a building—lent draught and suction to the fire, so that in a few minutes a tall warehouse became a bonfire, and ultimately a pile of bricks and ashes, but meantime making a bonfire of its neighbour similarly constructed.

An inspection of the ruins is most instructive to the practised professional eye. It shows that all the party-wall provisions of the Building Act are insufficient, by themselves, to check the spread of fire. Huge party walls, some of them absolutely complete from bottom to top, and even surmounted by their chimney-pots, were left standing with great gaps between them, grim monuments of their own futility. Only in cases where a party wall, or the parapet of such wall, had been carried up much higher than a burnt building has the work of ruin been checked.

What measures can be adopted to prevent in the future so widespread a calamity as the Cripplegate fire, or perhaps a calamity much worse? Legislation can do but little. The London Building Act of 1894—in many respects a great improvement on the Act of 1855—is already sufficiently cumbersome, and if its scope of anti-fire regulations were extended it would only apply to new buildings, and could never be made so far retrospective as to be applicable to existing buildings such as crowd the dangerous area above referred to. It is to the great insurance companies that we must look for the remedy. Their own interest will necessitate a revision of their tariffs. Many of the best offices have already minimised their risks in certain crowded City areas, and the time is not far distant when some of those areas will be so far boycotted by the companies that it will be found difficult, if not impossible, to get premises or goods therein insured against fire. The companies, who have already largely raised their tariffs for business premises in latter years, have it in their power, either by refusing to insure or by imposing prohibitive rates in buildings which they deem a source of danger, to compel, throughout the City area, even in old buildings, such mode of construction or alterations as may minimise the spread of a conflagration.

What, then, should they reasonably demand? (1) All parapets of party walls should be raised to a *minimum* of 3 feet above the roofs or flats, instead of the present inadequate 15 inches. (2) All windows and doors opening in front on to streets, or at rear on to common areas less than 30 feet wide, should be fitted with revolving iron or steel shutters, able to be lowered in case of fire. (3) All roofs and flats not built fire-proof should be made fire-resisting by plaster "pugging" between the roof timbers at least 3 inches thick under the slates or lead. (4) All wooden skylights should be replaced by iron. (5) The undersides of all timber floors should be covered with plaster. (6) The wooden entablatures and pilasters to shop fronts, and the wooden dormer-fronts, permitted by the London

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Building Act, should be prohibited by the insurance companies in streets less than 30 feet wide. (7) The tariff rate for warehouses having match-lined walls should be made prohibitive.

And, lastly, the insurance rates should be readjusted so as to encourage (a) building with fireproof flats and roofs; (b) building with solid pugged floors; (c) casing with plaster all exposed structural iron-work; (d) heating with hot-water pipes instead of open fireplaces.

No owner or occupier of City property need feel alarmed at the cost of carrying into effect the suggestions here made. It would bear but an insignificant proportion of the entire value of any business premises, and that value would be *pro tanto* augmented by greater stability of construction and lessened annual outlay for fire insurance. But, whatever be the cost, it should be regarded as of small importance compared with that of the risk to which the citizens of London are at present exposed—the risk that their great city and its rich contents may be devoured by fire in a single day or night.

EGYPTIAN IRRIGATION.

IN Sir W. E. Garstin's report on the Irrigation Department for 1896, says the Cairo correspondent of the *Times*, one of the most interesting chapters relates to the Barrage—a name given to the two dams, each of sixty-one arches, which span the Rosetta and Damietta branches of the Nile at the point of their bifurcation, and which, by holding up water during "low Nile," supply summer irrigation to the delta.

It had always been known that the foundations of portions of the structure were more or less defective, and, under the pressure caused by closing the doors in the summer of 1896, certain arches showed signs of hair-cracks, rendering it necessary to ascertain the actual condition of the foundations under the piers. For this purpose vertical holes, about 5 inches in diameter, lined with steel tubing, and passing right through the masonry from the surface of the roadway above down to the subsoil supporting the piers, were bored in certain piers selected for experiment. These borings in fourteen instances revealed the existence of cavities beneath the piers of considerable area, varying in depth from 10 to 92 inches; free water communication was found to exist between certain holes under the dam flooring, in one case between holes 92 feet apart,

and wonder was expressed that, under these conditions, the structure had stood at all.

Specially-prepared clay was forcibly rammed down the borings, but, though useful to some extent, this material could not be forced to travel under water from one cavity to another so as to satisfy the engineers that there was not merely a clay heap deposited at the bottom of each pier-boring, leaving apertures between them. Then liquid cement was poured down the bore-holes instead of clay, and gave evidence of having travelled freely in every direction, but the doubtful point remains if all of it has set. The operation will be continued this autumn and coming winter, and it is intended to make borings in every one of the 124 piers, pouring down liquid cement, which, it is hoped, will render the Barrage far more stable than it is at present.

Sir William Garstin says that, "in spite of the startling disclosures revealed as to the state of the piers, there is no reason for serious alarm regarding the Barrage so long as the up and down stream aprons constructed by Colonel Western remain sound. These have saved the structure hitherto and enabled it to do the work which it has done for the last six years. If the up-stream floor were to give way, it is difficult to see how the construction could stand under the pressure of regulation (meaning when the archways are closed to prevent the river passing). It is, then, indispensable that measures should be taken to strengthen and consolidate the structure itself, and if the work of filling the cavities with cement prove, as it is hoped, successful, this will be done. In any case the work must do good and can do no harm.

"Undoubtedly the best and most efficient way of rendering the Barrage safe would be to permanently reduce the head of water thrown upon it during regulation period. This could best be done by building a supplementary dam further down-stream, which would hold up water, say, to 2 to 2½ metres, and thus reduce the possible difference upon the Barrage itself to something under 2 metres.

"It is probable that a work of the kind in the Rosetta branch would not cost more than 200,000*l.* Levels and sections of the river are now being made and a design will be worked out so that, if funds should ever be available, it could seriously be considered."

The benefits due to the water held up by the Barrage during summer are numerous. The cotton crop has been almost doubled; other cultivation has been greatly increased; large areas of waste lands have been reclaimed; the delivery of

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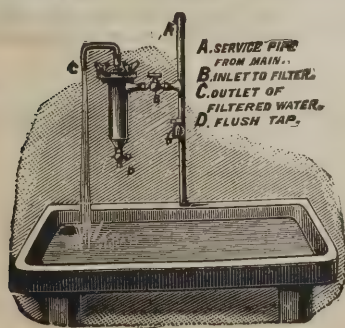
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water into canals at a high level has greatly reduced the cost of lifting it on to the fields, and, by enormously decreasing the amount of silt deposited, has enabled Government to maintain them by contract work in place of the cruel and wasteful forced labour of former times. The growth of sugar in Upper and Middle Egypt has more than doubled since 1883, and would increase more rapidly were it not for the limitation as regards water supply imposed by necessity. A new French factory at Naga Hamadi is the largest of its kind in the world, and a new English factory at Baliana will commence producing sugar this year (1897).

The crying need of drainage has been met by a grant of 256,000*l.* from the funds in the hands of the Public Debt Commission, to be all expended during 1897 upon works in Lower Egypt; and if they can be induced to grant a like sum for 1898 there is no doubt that the drainage problem in Lower Egypt will be in a fair way to being solved, with enormous benefit to the country and revenue. Nearly sixty miles of agricultural roads were made during the year, and the total length existing throughout the country is 955 miles. The demand for them is steadily increasing, and the fact that 450 miles additional have been voted by the provincial councils of Lower Egypt, to cost nearly 83,000*l.*, which sum will be provided by the landowners themselves, is good evidence of the appreciation of the road system by the people.

Concessions were given for laying and working light railways over two of the delta provinces to Messrs. John Birch & Co., and over three others to the local firm of Messrs. Suares & Co. A light railway between Mansura and Matarieh on Lake Manzaleh has been completed this year (1897).

A new indication of scientific progress in Africa, as already mentioned in the *Times*, is that, since January 1, 1896, the water levels of the Victoria Nyanza have been daily recorded by means of gauges erected at three places, viz. Port Alice, Port Victoria and Lubwas Usoga. The readings, as also a monthly statement, showing the rise and fall of the lake, are received at Cairo; but the records of a series of years are necessary before any attempt can be made certainly to prognosticate the extent of influence that a rise or fall of the lake waters may produce on the Nile. The report states that gauges upon the Albert Nyanza are very urgently required in order to show what are the relations between the levels of that lake and the summer water supply in Egypt. This lake being nearer to the point of delivery, its levels are, if possible, more important to Egypt than are those of Lake Victoria, and the hope is ex-

pressed that the English officials at Uganda may erect gauges and furnish Egypt with records of the daily readings.

Major R. H. Brown, inspector-general of irrigation for Lower Egypt, in his report for 1896 expresses the opinion that as the catchment area of Lake Victoria is comparatively small, the lake may not have such an important influence on the Nile as we are accustomed to attribute, and that gauges at Fashoda, Khartoum and Berber are what is wanted. A Fashoda gauge would give the effect of the rainfall in the "region of the Sudds," where the catchment basin is wide, and of floods in the Sobat River; a Khartoum gauge would show the effect of the White and Blue Niles combined, and a Berber gauge would show the variations of the Nile below its last affluent, the Atbara.

Since the report was written, Berber has been reoccupied by the Egyptians, and a gauge was constructed last June at Merawi, which is useful until one can be set up at Berber.

One of the very few recorded eccentricities of the Nile occurred between November 22 and 28, when the level steadily rose nearly 29 inches at Assuan in place of the average fall of 20 inches during that period. No precautions having been taken against an event so unexpected, the water began to flow into the Upper Egypt basins, which had just been sown, and a quantity of seed was lost.

PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

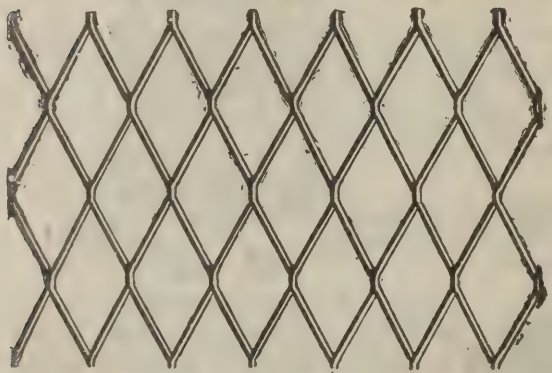
APPLICATIONS FOR PATENTS.

29594. Hezekiah McLaughlin, for "Improvements in scaffolds."

29639. Francis Wood, for "Improvements in bricks for building and like purposes."

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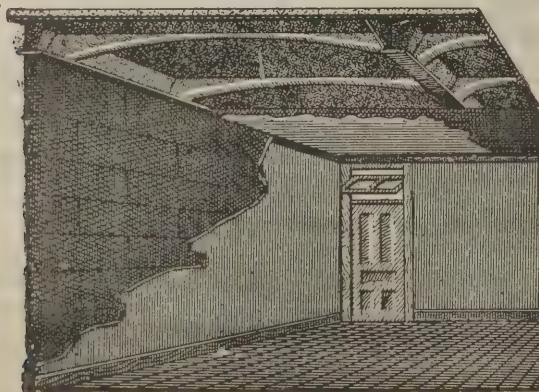
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